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Economic impacts of Contagious Bovine Plueropneumonia (CBPP) in Africa

Organization of African Unity (OAU)
Inter African Bureau for Animal Resources (IBAR)
Pan African programme for the Control of Epizootic (PACE)

Economic impacts of Contagious Bovine Pleuropneumonia (CBPP) in Africa

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Economics Unit

Economic impacts of Contagious Bovine Pleuropneumonia (CBPP) in Africa

Summary

CBPP 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.

1. Introduction

Contagious Bovine Pleuropneumonia (CBPP) is a disease of cattle that affects production through mortality and reduction in productivity. It also retards genetic improvement and limits working ability of cattle. CBPP has been identified by the Pan African program for the Control of Epizootics (PACE) as the second most important trans-boundary disease in Africa after rinderpest. CBPP is now a major focus of activity for the program. However, before the program embarks on a control strategy, it is essential that the economic importance of the disease be established and the returns to investments in control be evaluated.

Unlike some parasitic diseases whose impacts are confined to a single farm, the impact of CBPP is often felt at and beyond a single farm. The occurrence of CBPP in one herd is a threat to neighboring herds in a production system where there is little or no control of cattle movements. The control of CBPP therefore goes beyond the ability of the single farmer, and needs to be looked at from a national or regional viewpoint. The economic impacts of CBPP need not be confined to the farm level only, but also to the national and regional level.

A framework for analyzing the economic impacts of CBPP needs to recognize the fact that the disease reduces cattle products and the productivity of cattle, making farm incomes to decline. The latter puts a downward pressure on demand for both farm inputs and consumption goods. However, effective control of CBPP increases cattle productivity and cattle products, which enhance human welfare through higher incomes, improved nutrition and health. Governed by the institutional, political, biophysical, economic and socio-cultural environments, increased output and incomes also affect the production system, resource use, the eco-system structure and function. Since changes in resource use in turn affect human welfare through consumption, assessing these impacts requires that CBPP be viewed from a wider context of the economy.

It is with the preceding in mind that we examine the economic impacts of CBPP in a number of countries. We have used a spreadsheet model developed in Excel (Microsoft Excel, 2000) to estimate the economic cost of CBPP and the possible returns to investments in its control. The analysis uses epidemiological and economic data from a number of studies to evaluate the economic impacts of the disease under endemic and epidemic conditions.

2. The disease

CBPP is an infectious disease of the lungs in cattle caused by a bacterium, *Mycoplasma mycoides* var.*mycoides* (Radostitis *et al.*, 2000). CBPP is spread almost exclusively by direct contact between animals although indirect spread is also possible (Windsor and Masiga, 1977). CBPP is classified as a list

"A" disease by the OIE (OIE, 2003). When the disease spreads for the first time within a sensitive cattle population, it generally causes high mortality.

2.1 Population at risk

Cattle (both *Bos Taurus* and *Bos indicus*) and to a lesser extent the Australian water buffalo (*Bubalus arnae*) are the only animal species affected by CBPP. The African water buffalo (*Syncerus caffer*) is refractory to CBPP, implying that in Africa, there is no reservoir of infection among other animals including wildlife.

2.2 Outbreaks and distribution

The first outbreak of CBPP in Africa occurred in the 1850s through cattle imports from the Netherlands to South Africa. The disease quickly spread to neighboring countries. In 1904 it was eradicated from Zimbabwe followed by South Africa in 1924 and Botswana in 1939. Angola and Namibia never managed to eradicate the disease. Today, CBPP is present in Central, East, West and parts of Southern Africa but only sporadically present in North Africa. O.I.E. reports indicate that there are about 27 sub-Saharan African countries with cases of CBPP. In the 1970s and 1980s, fewer countries experienced CBPP outbreaks, due in part, to the combined vaccination against rinderpest and CBPP under the Pan African Rinderpest Campaign (PARC). More countries began to experience CBPP outbreaks beginning in 1995 soon after some countries stopped vaccination.

Of the 27 countries reporting cases of CBPP between 1987 and 2000, 12 were in West Africa and two in Central Africa. Half of the 3,000 CBPP outbreaks officially reported during this period occurred in West Africa. Guinea-Conakry reported 30% of the total regional outbreaks followed by Nigeria with 26%. Mali reported a total of 158 outbreaks and 324 deaths from 1987 to 1997.

Tanzania is the single most important country affected in East Africa with 40% of the regional outbreaks and 87% of the deaths. Almost all of these outbreaks and deaths occurred after 1995 when the disease was reintroduced from Kenya (Windsor, 1998). In Southern Africa, Angola and Namibia are the hardest hit both in outbreaks and cattle deaths. Warfare in South West Africa and Angola has made it difficult to eradicate the disease from these countries.

2.3 Epidemiological trends

CBPP outbreaks exhibit two distinct epidemiological trends in Africa. The first is reflected in cases of epidemic outbreaks in areas hitherto considered to be CBPP-free. Botswana is a good example. After eradicating CBPP in 1939, the disease re-appeared in 1994. In 1995 the Government of Botswana eradicated CBPP through the slaughter of infected and in-contact stock and compensation of the owners. Other examples of epidemic outbreaks include Burundi and

Zambia in 1997; Guinea in 1995; Rwanda in 1994 and Tanzania in 1990, 1992 and 1994. Masiga *et al.* (1998) attributed these outbreaks to uncontrolled entry of cattle from known infected populations; a reflection of inadequate movement control, poor disease surveillance and vigilance.

The second trend of CBPP outbreaks is reflected in the increased number of areas that have become endemic to CBPP. Apart from Botswana, CBPP has not been properly controlled and so it has became endemic in many parts of Africa. When CBPP is introduced into a clean area, numerous foci occur. Many animals become infected and develop the acute clinical form of the disease. Mortality rates can be as high as 50%. After some time however, the disease will have a less explosive character, the severity of the symptoms will decline and many animals will recover or become chronic carriers.

A country like Namibia where CBPP has been endemic for a long time posses a risk to Zambia, Zimbabwe, Lesotho, Swaziland, Botswana and South Africa. In eastern Africa, Rwanda, Burundi, most parts of Tanzania, Southern Sudan, Ethiopia and Somalia have remained endemically infected. Neighboring countries such as Malawi, Mozambique and Zambia are currently at risk. CBPP has also been endemic in eastern Guinea (since its introduction into the north in 1974), Mali, Niger and Mauritania and is a threat to disease-free Senegal and Sierra Leone (Windsor, 1998).

2.3.1 Morbidity

CBPP morbidity (the proportion of animals affected in a given population) indicates the risk that an individual animal has in becoming infected. It includes prevalence (number of cases or outbreaks present in a population at a given time) and incidence (number of new cases or outbreaks that occur in a particular population in the course of a given time period), both of which measure the risk that a susceptible animal in a population has of contracting a disease (Toma, *et al.*, 1999; Putt *et al.*, 1987).

CBPP morbidity rates vary significantly between and within herds. Surveys conducted using the complement fixation test (CFT) show infection rates ranging from 1% in parts of West Africa to 70% in northern Rwanda (Masiga *et al.*, 1996). Other surveys reveal rates above 25% in Chad, Ethiopia, Guinea and Tanzania (Kane, 2002; Laval, 2001; Maho, 2001; Msami, 2001). Rates below 5% have been reported in Burkina Faso and Uganda (Byekwaso and Nyamatale, 2001; Kane, 2002).

2.3.1.1 Prevalence/incidence

The prevalence and incidence of CBPP vary according to the epidemiology of the disease as well as the cattle production system concerned. Higher rates occur during epidemics whereas in endemic situations, rates are much lower.

Prevalence rates are also higher in extensive cattle production systems compared to more intensive dairy and beef production systems where animals are confined.

In newly infected areas, prevalence can be very high – up to 90% in Ethiopia (Dejene, 1996). In epi-endemic areas of Ethiopia Desta (1997) has reported a prevalence of 48% while Laike and Roger (1997) and Gashaw (1998) have reported rates within the range of 17% to 46%. Still in epizootic areas, a prevalence rate of 12.7% has been reported in Kenya (Gitau, 2001), 12.9% in Cote d'Ivoire (Kane, 2002) and 28% in Tanzania (Msami, 2001).

In areas classified as endemic, relatively low rates of CBPP prevalence have been reported. In West Africa, Aliyu *et al.* (2000) estimated a prevalence rate of 0.29% from post morten examinations of lesions in 81 national abattoirs in Nigeria. Nawathe (1992) also estimated a prevalence rate of 0.51% in Nigeria while Kane (2002) reported rates of 2.9% for Burkina Faso, 5.4% for Mauritania and 10.5% for Mali. In East Africa, Wanyoike (1999) and Fikru (2001) reported prevalence rates of 2.8% and 4.0% in Kenya and Ethiopia respectively. Maho (2001) estimated a CBPP prevalence rate of 1.2% for cattle raised under the agro-pastoral production system in Chad and a rate of 1.6% for cattle on transhumance.

2.3.2 Mortality

CBPP outbreaks have been associated with various levels of mortality. Because of the debilitating nature of the disease, mortality rates have been relatively low, particularly in endemic situations. Higher mortality rates are however not uncommon. Mortality rates above 10% have been reported in Guinea (Kane, 2002) and Ethiopia (Laval, 2001). Rates between 5 and 10% have been reported in Chad and Cote d'Ivoire (Kane, 2002) while rates below 5% have been reported in Tanzania, Uganda, Burkina Faso, Ghana and Mali (Byekwaso and Nyamutale, 2001; Msami, 2001; Turkson, 2001; Kane, 2002).

3. Economic impacts

CBPP is a disease of economic importance because of the financial losses to farmers, the economic losses to the nation and the associated socio-cultural implications of these losses. CBPP-associated losses also have economy-wide impacts through the reduction in export earnings and the decline in economic activity in industries dependent on the cattle sub-sector.

The concept of *economic cost* is often used to measure the economic importance of a disease. For CBPP, the economic cost is measured as the sum of the *direct* and *indirect* production losses from mortality and morbidity plus the *expenditures* incurred to *control* the disease. Economic cost shows the relationship between the value of output losses and the disease

control expenditures. Higher levels of disease control (treatment and prevention) expenditures often lead to reduced disease incidence and hence lower production losses and *vice versa*.

A number of studies have attempted to evaluate the economic importance of CBPP. In Botswana, Townsend *et al.* (1998) estimated that a generalized outbreak of CBPP would result in a closure of its access to the European Union (EU) market and that the economy-wide effects of such closure would be a 60% decline in beef and other export products. Using a Social Accounting Matrix (SAM) framework, they estimated the total cost to the Botswana economy to be 1billion Pulas (US$350 million).

In Tanzania, Anon (2000) assessed the value of direct and indirect losses due to CBPP to be over US$50 million. This estimate was based on deaths of 250,000 head of cattle, reduced milk yields, reduced growth, loss of weight through wasting, abortions, loss of draught power and manure, and overhead costs of disease control. Mlengeya (1995) also reports that the CBPP outbreaks that occurred in Tanzania from 1990 to 1995 resulted in deaths of 14,000 cattle valued at over US$1 million.

Based on losses of cattle from CBPP in northern Nigeria, Egwu *et al.* (1996) estimated the direct economic cost of CBPP to be more than US$1.5 million. In Nigeria still, Osiyemi (1981) reported economic losses due to CBPP of US$3.6 million.

3.1 Disease effects

CBPP is both an epidemic and an endemic disease in most regions of Africa. However, the erosive losses associated with endemic CBPP are more complicated and difficult to measure than those of epizootic CBPP. Other technical difficulties also complicate the measurement of losses such as the uncertain effects of chemotherapy and restrictions on control options imposed by the poor quality of available vaccines and diagnostic tools. The ineffectiveness of alternative control measures (e.g. immunization, antibiotic treatment, stamping-out, quarantine, movement controls and surveillance) makes it equally difficult to measure the effects.

CBPP-infected animals are sometimes subject to the influences of other animal diseases as well as malnutrition, making it difficult to isolate the effects of CBPP on productivity. Also, the death of an animal and the magnitude with which the productivity of an infected animal is affected may well depend on the level of risk to which it is exposed to CBPP and whether or not it has a high level of immunity. Given the complicating nature of these influences, the disease impact depends very much on the accuracy of the parameter assumptions used.

The effects of CBPP can be measured in terms of the *direct* and *indirect* losses due to mortality and morbidity plus the *costs* of control.

Direct losses are attributed to mortality, slow growth or decrease in weight gain, reduced milk yield, vaccination and treatment costs, disease surveillance and research costs. Indirect losses are due to loss of weight and working ability, delayed marketing, reduced fertility, losses due to quarantine and lost market opportunities through trade bans (Mlengeya, 1995; Masiga *et al.*, 1995). Other indirect losses include the risk of major epidemics that occur from time to time thus making farmers to move animals away from the threat or the sale of animals to reduce their exposure to loss.

3.1.1 Effects of endemic and epidemic CBPP

The epidemiology of CBPP indicates that prevalence, incidence and mortality rates are usually higher during epidemics than when the disease has become endemic in a given area. Disease effects can therefore be expected to be greater during epidemics than in endemic conditions.

Any area within a country or region can witness an epidemic depending on a number of risk factors such as proximity to a previously infected area. Areas classified as endemic to CBPP vary from one country to another depending on the frequency of outbreaks and the duration of infection in the area.

The proportion of cattle considered to be at risk of CBPP varies depending on their distribution in the areas where outbreaks occur. In Ethiopia for example, approximately 42% of the cattle are considered to be in endemic areas, 35% of which are thought to be at risk of CBPP (Afework, 2002). In Kenya and Tanzania, 40 and 25% of the cattle are considered to be in endemic areas respectively, and about 40% of these are considered to be at risk (Gitau, 2001; Msami, 2001).

For the purposes of this analysis, cattle in CBPP-infected areas (epidemic and endemic) are divided into three classes namely, calves and yearlings below 3 years, adult males and reproductive females. Various estimates of cattle herd composition and structure are available in the literature, and vary from one country to another. For example, estimates by *GRM International* (1994) show that the Ethiopian cattle herd comprises of 32% calves and yearlings, 27% adult males and 38% reproductive females. Other studies have reported the percentage of reproductive females to be within the range of 37 to 45% (de Leeuw and Wilson, 1987; Mukasa-Mugerwa *et al.*, 1989).

Losses due to CBPP (epidemic and endemic) are measured as the number of deaths that occur per class of animal, the quantity of beef lost for each class of animal, the quantity of milk lost from reproductive females and the loss in draft power from oxen. Losses in manure, though important, are not included in this analysis because of shortcomings in the data.

3.1.1.1 Mortality losses

Mortality losses are estimated under two scenarios. The first involves the use of mortality rates observed under endemic situations while the second involves the use of mortality rates observed under epidemic situations. In each case, cattle deaths are calculated by applying the CBPP mortality rate to each class of cattle at risk or exposed to CBPP. Cattle exposed to CBPP are derived by applying the effective contact rate to the number of cattle available in CBPP-infected areas. The effective contact rate of 0.126 used for this purpose was simulated by Mariner (2003) from field data collected in Sudan and parts of Ethiopia.

3.1.1.2 Milk loss

In each scenario, milk loss due to CBPP was estimated from two components: (i) loss arising from dead cows that are no longer producing milk and (ii) loss arising from diseased milk cows that can no longer produce the same quantity of milk because of being sick.

In the former case, the CBPP specific mortality rate was applied to the percentage of reproductive females that are exposed or are at risk of CBPP to determine the number of deaths. This was then multiplied by the calving rate to establish the number of dead cows that are no longer producing milk. The product was again multiplied by the daily milk yield per cow and the lactation length as reported in the literature. In Ethiopia for example, *GRM International* (1994) followed a total of 422 complete lactations over a three-year period and reported a mean lactation length of 328 days and a mean lactation yield of 447 kg (1.36 kg/day).

In the latter case, the reduction in milk production was estimated from the number of reproductive females that are infectious to CBPP. These are the number of animals showing clinical signs; derived by multiplying the number of reproductive females at risk by the transition rate from exposed to infectious state. A rate of transition from exposed to infectious of 0.0238 was simulated by Mariner (2003) from data collected using participatory epidemiology methods and used for this purpose. This figure was multiplied by the calving rate to determine the number of infectious cows that are losing milk. Diseased milking cows were assumed to lose all of their milk during the entire lactation period.

3.1.1.3 *Beef loss*

The loss in weight gain was used as a measure of the loss in beef production because diseased animals do not gain weight and may even lose weight depending upon the severity of the infection and level of immunity. The loss in beef production was estimated from the number of cattle considered to be infectious to CBPP and not from the number of dead cattle; the latter being accounted for under mortality.

The number of infectious cattle was estimated by multiplying the number of calves and yearlings, adult males

and reproductive females at risk by the transition rate from exposed to infectious state. Infectious calves and yearlings were assumed to lose a daily weight gain of 0.110 kg while infectious adult males and reproductive females were assumed to lose a daily gain of 0.063 kg (Laval, 2001) for a period of 183 days. This is the duration of infection defined to include the combined length of infectious and carrier states. Studies on the length of illness indicate that clinical disease persists for a period ranging from 4 to 12 months with an average of 6 months (Mariner, 2003; Parker, 1960; Huddart, 1960). Because of varying levels of immunity and disease challenge, not all cattle were assumed to lose their weight gain. In endemic situations 80% of the infected animals were assumed to lose their weight gain whereas in epidemic situations, all infected cattle were assumed to lose their weight gain.

3.1.1.4 Losses incurred to control disease

Controlling a disease involves expenditures in terms of finances, human and material resources. It also involves the application of appropriate technology. These constitute an expense to the farmer and to the nation as a whole and should be considered as a loss if there was no disease in the first place. Losses incurred to control CBPP include expenditures on vaccination, treatment, stamping out, quarantine, movement control and surveillance.

3.1.1.4.1 Vaccination

CBPP can be controlled by immunization using the T1/44 and T1/SR vaccines. However, these vaccines are not 100% efficacious and confer immunity only for a relatively short period of time. Mariner (2003) tested the impact of mass immunization on the persistence of infection (herd level prevalence) and found that vaccination reduced the percentage of herds persistently infected by 53 to 81%. Efficacy trials using the T1/44 vaccine strain conducted at 12 to 15 months post vaccination found a protection against macroscopic pathologic lesions of between 66 and 75% (Wesonga and Thiaucourt, 2000; Masiga *et al.*, 1978; Gilbert *et al.*, 1970). Another trial involving the T1/44 strain in cattle challenged two years post vaccination found a protection of 80% (Windsor *et al.*, 1972).

CBPP control by vaccination is therefore important for reducing associated production losses. For this to happen however, vaccination coverage must attain at least 80%. The AU-IBAR policy for CBPP control is that "blanket vaccination" over a period of about 5 years can be used to reduce the prevalence of infection to insignificant levels. Thereafter the infection can be finally eliminated by a "search and destroy" policy. This option is somehow problematic in that even if vaccination and active surveillance are conducted efficiently, re-introduction from adjacent foci is almost impossible to prevent.

Expenditures incurred to vaccinate cattle against CBPP add to the economic cost of the disease. The unit cost of CBPP vaccination used in this analysis was obtained from Tambi *et al.* (1999). This cost was calculated from the vaccinations undertaken during the Pan African Rinderpest Campaign (PARC) using the bivalent rinderpest-CBPP vaccine. Unit vaccination costs were calculated for a sample of ten countries and found to vary from 0.27 Euros for Ethiopia to 1.71 Euros for Cote d'Ivoire with an average cost of 0.42 Euros.

3.1.1.4.2 Treatment

CBPP is a treatable disease of cattle. Traditionally, farmers have used antibiotics to treat CBPP in the field with various levels of success. The actual degree of effectiveness of these treatments has not been well established for a number of reasons. First, several types of antibiotics from various sources (often unknown to the farmers) are available in the field and at various price levels. Some of the products have either expired, are fake or are poorly stored. Secondly, it is difficult for some farmers and veterinary staff to make the appropriate choice of which antibiotic to use, the proper dosage to apply and the interval of application. As a result, antibiotic use has been less efficient, leading to chronic infections, carrier cases and increased spread of the disease.

Effective control of CBPP using a feasible treatment regime can reduce transmission by decreasing the duration of infection and the effective reproductive number. Recent studies by Mariner (2003) reveal that using treatment to reduce the infectious period by 50% resulted in a 64% reduction in mortality and a reduction in the prevalence of infected herds from 75.4% to 33.2%. The disease effects of CBPP can therefore by reduced by at least half when an appropriate treatment regime is used.

This analysis assumes the use of a standard recommended antibiotic treatment regime at an estimated cost of 8 Euros per head of cattle.

3.1.1.4.3 Stamping-out

Successful control and eradication of CBPP was achieved in Europe in the 19th Century using the "stamping-out" policy. In Africa, there is only one authenticated case of CBPP having been eradicated in Botswana in 1995/96 where 320,000 head of cattle were destroyed and buried at a cost exceeding US$350 million. Although theoretically sound, slaughtering animals with clinical signs and compensating their owners is a very expensive option that most African Governments cannot afford. Even if this were financially affordable, without fencing, prevention of re-introduction would be impossible. If governments were to slaughter animals without compensation, the owners would be unwilling to cooperate. Sick animals will be smuggled in order to escape the surveillance and detection of CBPP.

Stamping out, is certainly a feasible control option but because of the

cost involved and the fact that many governments lack the financial resources to compensate farmers, this option is currently not feasible in Africa. With the current pastoral system of production, levels of movement control consistent with sustainable pastoral livelihoods are unlikely to have a major impact on the incidence of CBPP and in the current socio-economic climate, movement control is unlikely to contribute significantly to CBPP eradication. In view of these, we have not considered this option as part of the economic cost of CBPP.

3.1.1.4.4 Quarantine, movement controls and surveillance

Increased trade and cattle movements have fueled the spread of CBPP in Africa. In pastoral production systems, effective control of cattle movements is next to impossible. Cattle movements are favored by climatic, environmental, feed, water and market conditions. In some countries rules and regulations for cattle movements exist but enforcement is difficult owing to limited resources, vast geographical areas and lack of cooperation by cattle owners and traders. Inadequate resources also limit the extent to which surveillance of the disease can be carried out. Proper definition of stock routes; establishment of quarantine areas (along the stock routes, near cattle markets and near abattoirs); and adherence to existing rules and regulations could help control the spread of CBPP.

3.1.2 Valuation of effects

The effects of CBPP are valued in terms of the production losses and the costs of disease control. In terms of the direct and indirect losses, only cattle deaths, reduced milk production, slow growth or decrease in weight gain and reduction in draft power have been considered. Other losses such as reduced fertility and delayed marketing have not been considered because of data limitations.

Disease control costs include expenditures on vaccination, antibiotic treatment, movement control, quarantine, movement control and surveillance. However, due to data limitations, only the costs of vaccination and antibiotic treatment are considered in this analysis.

Losses due to cattle deaths[1] are valued using the market prices for each of the classes of cattle. Losses in milk and beef are also valued using the market prices of these commodities. The total economic cost (C) of CBPP is thus obtained by summing all the values of the direct and indirect production losses (L) from mortality and morbidity plus the control expenditures (E), represented as

$$C = L + E$$

[1] When some of the meat value of an animal is salvaged after its death, or through emergency slaughter, this residual value should be deducted from the cost of mortality. In this analysis, we have not done so because of lack of appropriate data.

4. Benefits and costs of CBPP control

The estimation of costs and benefits in this analysis assumes the existence of a CBPP (combined vaccination and treatment) control program for comparison with a baseline scenario of no control program. Costs and benefits are measured as the *incremental changes* between the control program and the *no-program* option. Incremental costs are the difference in expenditure incurred between the control program and the no control (cost savings) program. Incremental benefits on the other hand are the difference in production value (avoided losses) obtained with the control program and the value obtained without a control program (losses).

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 as follows:

$$BCR = [\sum B_t /(1 + r)^t] / [\sum C_t /(1 + r)^t]$$

where BCR is the benefit-cost ratio, B is the benefits accruing from the control program, C is the cost of disease control, r is the discount rate and t is the number of years in the future. A benefit-cost ratio greater then one indicates that CBPP control is economically beneficial whereas a value below one would suggest otherwise.

4.1 Costs

The cost of CBPP control/eradication varies depending upon the strategy adopted. There are several such strategies that may include one or a combination of the following: (i) treatment using an appropriate antibiotic regime; (ii) effective immunizaton using the T1/44 and or T1/SR vaccine; (iii) stamping out through slaughter and compensation of the owners of CBPP-infected cattle; and (iv) quarantine, cattle movement control and surveillance. The advantages and disadvantages of each of these measures have been alluded to above.

The AU-IBAR PACE CBPP eradication and surveillance strategy consists of mass vaccination (vaccine to be administered twice a year to ensure a vaccine coverage of at least 80%) over a 5-year period. This would reduce the prevalence of the infection to a level where it could be eradicated by stamping out of the residual foci. This would then be followed by effective movement control of cattle.

Due to lack of data, this analysis takes into account only the expenditures on antibiotic treatment and vaccination. No expenditure data are available for slaughter and compensation of owners of CBPP infected cattle, quarantine, control of cattle movements and surveillance.

4.2 Benefits

There are two types of benefits from CBPP control or eradication -- direct and indirect benefits.

4.2.1 Direct benefits

These originate from (i) avoided production losses caused by mortality and morbidity and (ii) savings in control/eradication costs. Appropriate vaccination and treatment eliminates or reduces the danger of CBPP and prevents the animal from death. The value of the surviving animal represents a benefit, the value of which can be measured in terms of its replacement cost. A CBPP infected animal experiences a loss in productivity due to poor condition, lowered milk production, decreased fertility and a reduction in work force. Elimination of the disease permits the animal to realize the benefits of these productivity potentials. However, because of the varying response of individual animals to infection, these benefits may vary as well. Successful eradication of the CBPP eliminates the future control costs of vaccination, treatment, quarantine, movement control and surveillance, thus providing benefits to farmers and the nation.

4.2.2 Indirect benefits

These accrue when the control/eradication of CBPP opens up avenues for renewed or initial trade with countries or regions that was previously not possible because of the disease. For example, the outbreak of CBPP in Botswana in 1994 led to a closure of its access to the European Union market, leading to a 60% decline in beef and other export products. This was a loss of economic benefits to both potential sellers and buyers. The eradication of CBPP by the slaughter and compensation policy in 1995 led to a re-opening of this lucrative market, thus making it possible for both farmers and consumers to reap the benefits of export trade. Moreover, the cost of enforcing movement control and quarantine procedures is also significant, and further curtails the benefits.

This analysis is restricted to the estimation of direct benefits arising from savings in control/eradication costs and avoided mortality and morbidity losses.

5. Results

Estimates of the economic impacts of CBPP are presented in this section. First, the physical losses from endemic and epidemic CBPP are presented in terms of cattle deaths and reductions in beef, milk and animal power. This is followed by the monetary value of these losses. Next is the economic cost of CBPP, estimated as the combined value of lost production and the cost of disease control. Finally, the benefits and costs of CBPP control are presented.

5.1 Losses in cattle and cattle products

Losses in cattle and cattle products caused by CBPP under endemic and epidemic situations are presented in Table 1 for each of the twelve countries. In general, losses incurred under epidemic conditions are greater (one and half to two times greater) than losses incurred under endemic conditions.

Under endemic conditions, each country would lose on average 3,222 cattle (range from 950 – Ghana to 8,372 – Ethiopia), 266 and 2,010 metric tones of beef and milk respectively. In terms of animal power, an average of 396,000 ox days are lost per country. Cote d'Ivoire experiences the smallest loss in beef and milk while Ghana experiences the smallest loss in animal power.

Under epidemic conditions average estimated losses are 6,316 cattle deaths, 355 metric tones of beef, 3,351 metric tones of milk and 503,000 ox days of animal power.

Ethiopia experiences the largest number of cattle deaths and reduction in cattle products under both endemic and epidemic conditions compared to the other countries, due probably to its large cattle population.

5.2 Value of losses in cattle and cattle products

The average value of production losses caused by CBPP under endemic conditions is estimated at 2.3 million Euros per country with a range from 0.61 million Euros in Cote d'Ivoire to 6.2 million Euros in Ethiopia (Table 2). Losses attributed to morbidity (reductions in beef, milk and animal power) account for 65% of the total value of loss while losses due to mortality account for 35%.

Under epidemic conditions, an average value of 3.8 million Euros is lost per country (range from 1.1 million – Cote d'Ivoire and Ghana to 10.1 million Euros for Ethiopia). Estimated losses in Kenya and Mali exceed 6 million Euros. Note that even though morbidity losses (59%) jointly exceed mortality (41%) losses, the latter are greater under epidemic than under endemic conditions.

5.3 Economic cost of CBPP

The economic cost of CBPP in terms of production losses and disease control expenditures is estimated at 3.5 million Euros per country (Table 3) under endemic conditions. The economic cost for Ethiopia is 9.5

million Euros compared to 5.0 million for Chad, Kenya and Mali and about 1 million Euros for Cote d'Ivoire, Ghana and Mauritania. Production losses account for two thirds of the economic cost whereas the cost of disease control accounts for the remaining one third.

Economic cost under epidemic conditions is estimated at 5.4 million Euros on average. Again, Ethiopia experiences the largest economic cost of 14.2 million Euros followed by Kenya, Mali, Chad and Tanzania in that order. Production losses make up 71% of the total economic cost whereas disease control cost accounts for the rest.

5.4 Benefit-cost analysis of CBPP control

Results of benefit-cost analysis obtained by comparing the incremental benefits (avoided production losses) with the incremental costs (disease control cost savings) are presented in Table 4. Effective control of CBPP in endemic areas at an average incremental cost of 1.1 million Euros would generate an incremental benefit of 2.3 million Euros per country. This will give an average net benefit of 1.2 million Euros. Ethiopia, Mali and Kenya would have net benefits in excess of 2 million Euros. Chad, Uganda, Burkina Faso, Niger and Guinea would derive net benefits of about 1 million Euros.

In terms of returns to investments control of CBPP in endemic areas appears to be beneficial with an average benefit-cost ratio of 2.2. Returns to investments are greatest for Mali (2.97) and Burkina Faso (2.82) and lowest for Tanzania.

Control of CBPP during epidemic outbreaks has great potential for benefits as the estimates in Table 4 indicate. Net benefits average 2.3 million Euros per country with a range from 0.65 million Euros for Ghana to 6.0 million Euros for Ethiopia. The benefit-cost ratio for epidemic CBPP control is 2.8 on average with Mali having the highest return to investment (3.99) compared to Tanzania (1.33.

6. Conclusion

CBPP 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 net benefits that exceed 1.2 million Euros 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.

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Table 1. Losses in cattle and cattle products caused by CBPP under endemic conditions.

Country	Losses			
	Cattle deaths (number)	Beef (metric tonnes)	Milk (metric tonnes)	Animal power (1,000 ox days)
Burkina Faso	2,020	199	1,231	337
Chad	3,242	436	2,697	738
Cote d'Ivoire	1,007	63	500	106
Ghana	950	81	579	137
Guinea	2,554	126	1,059	213
Mali	5,066	432	3,563	730
Mauritania	2,047	87	856	148
Niger	2,485	212	1,981	358
Ethiopia	8,372	823	5,086	1,393
Kenya	4,330	249	3,430	180
Tanzania	3,777	277	1,544	238
Uganda	2,812	206	1,592	177
Average	3,222	266	2,010	396

Table 1 con't. Losses in cattle and cattle products caused by CBPP under epidemic conditions.

Country	Losses			
	Cattle deaths (number)	Beef (metric tonnes)	Milk (metric tonnes)	Animal power (1,000 ox days)
Burkina Faso	4,053	249	2,012	422
Chad	6,485	545	4,373	922
Cote d'Ivoire	2,014	79	833	133
Ghana	1,900	101	953	171
Guinea	4,816	157	1,785	266
Mali	9,630	540	5,863	913
Mauritania	3,344	109	1,367	184
Niger	4,971	265	3,260	448
Ethiopia	16,743	1,029	8,310	1,742
Kenya	8,659	320	6,016	300
Tanzania	7,554	356	2,678	306
Uganda	5,624	265	2,761	227
Average	6,316	335	3,351	503

Table 2. Value of losses in cattle and cattle products caused by CBPP under endemic conditions.

Country	Value of losses (1,000 Euros)				
	Cattle deaths	Beef	Milk	Animal power	Total
Burkina Faso	503	399	492	108	1,502
Chad	801	872	1,079	236	2,987
Cote d'Ivoire	250	126	200	34	609
Ghana	235	162	232	44	673
Guinea	634	251	424	68	1,376
Mali	1,254	863	1,425	234	3,776
Mauritania	507	174	343	47	1,071
Niger	615	424	792	115	1,946
Ethiopia	2,077	1,647	2,034	446	6,204
Kenya	1,157	622	1,715	90	3,584
Tanzania	878	553	618	119	2,168
Uganda	760	412	637	88	1,897
Average	806	542	832	136	2,316

Table 2 con't. Value of losses in cattle and cattle products caused by CBPP under epidemic conditions.

Country	Value of losses (1,000 Euros)				
	Cattle deaths	Beef	Milk	Animal power	Total
Burkina Faso	1,005	498	805	135	2,443
Chad	1,601	1,090	1,749	295	4,736
Cote d'Ivoire	499	157	333	43	1,032
Ghana	471	202	381	55	1,109
Guinea	1,191	314	714	85	2,304
Mali	2,378	1,079	2,345	292	6,094
Mauritania	827	218	547	59	1,651
Niger	1,231	529	1,304	143	3,207
Ethiopia	4,153	2,059	3,324	557	10,093
Kenya	2,314	799	3,008	150	6,271
Tanzania	1,757	711	1,071	153	3,692
Uganda	1,520	529	1,104	114	3,267
Average	1,579	682	1,390	173	3,825

Table 3. Economic cost of CBPP under endemic conditions (1,000 Euros)

	Value of production losses	Disease control costs		Total economic cost
		Vaccination	Treatment	
Burkina Faso	1,502	369	165	2,035
Chad	2,987	1,470	315	4,772
Cote d'Ivoire	609	172	52	833
Ghana	673	328	67	1,068
Guinea	1,376	473	104	1,953
Mali	3,776	915	356	5,047
Mauritania	1,071	353	72	1,496
Niger	1,946	857	175	2,978
Ethiopia	6,204	2,787	566	9,557
Kenya	3,584	1,325	180	5,089
Tanzania	2,168	1,560	204	3,932
Uganda	1,897	708	152	2,756
Average	2,316	943	201	3,460

Table 3 con't. Economic cost of CBPP under epidemic conditions (1,000 Euros)

	Value of production losses	Disease control costs		Total economic cost
		Vaccination	Treatment	
Burkina Faso	2,443	553	206	3,202
Chad	4,736	2,058	405	7,199
Cote d'Ivoire	1,032	258	65	1,354
Ghana	1,109	374	84	1,567
Guinea	2,304	558	130	2,992
Mali	6,094	1,081	445	7,621
Mauritania	1,651	403	90	2,144
Niger	3,207	979	218	4,405
Ethiopia	10,093	3,373	708	14,174
Kenya	6,271	1,987	240	8,498
Tanzania	3,692	2,496	272	6,460
Uganda	3,267	1,133	202	4,602
Average	3,825	1,271	255	5,352

Table 4 Benefit-cost analysis of CBPP control under endemic conditions

	Incremental benefits	Incremental costs	Net benefits	Benefit-cost ratio
Burkina Faso	1,502	533	968	2.82
Chad	2,987	1,785	1,203	1.67
Cote d'Ivoire	609	224	385	2.72
Ghana	673	394	278	1.71
Guinea	1,376	576	800	2.39
Mali	3,776	1,271	2,505	2.97
Mauritania	1,071	425	646	2.52
Niger	1,946	1,032	914	1.89
Ethiopia	6,204	3,353	2,851	1.85
Kenya	3,584	1,505	2,079	2.38
Tanzania	2,168	1,764	404	1.23
Uganda	1,897	860	1,037	2.21
Average	2,316	1,143	1,173	2.19

Table 4 con't. Benefit-cost analysis of CBPP control under epidemic conditions

	Incremental benefits	Incremental costs	Net benefits	Benefit-cost ratio
Burkina Faso	2,443	759	1,684	3.22
Chad	4,736	2,463	2,273	1.92
Cote d'Ivoire	1,032	323	709	3.20
Ghana	1,109	458	651	2.42
Guinea	2,304	688	1,616	3.35
Mali	6,094	1,526	4,568	3.99
Mauritania	1,651	493	1,157	3.35
Niger	3,207	1,198	2,010	2.68
Ethiopia	10,093	4,081	6,013	2.47
Kenya	6,271	2,227	4,043	2.82
Tanzania	3,692	2,768	924	1.33
Uganda	3,267	1,335	1,932	2.45
Average	3,825	1,526	2,298	2.77

Sustainability of livestock health surveillance systems.

Sustainability of livestock health surveillance systems

Presentation to the NAO workshop on Sustaining Livestock Services in PACE member countries
Addis Ababa, Ethiopia
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PACE ECONOMICS UNIT

Introduction

The need for economic development of Africa is widely recognized. How this can be achieved is less clear. For poor countries to develop, agriculture needs to lead the way because agricultural development initiates wealth creation and the means whereby consumers develop the capacity to buy products while, concomitantly, freeing agricultural workers to take up other commercial activities. Particularly in the arid regions of Africa there is little agricultural activity other than livestock production and so to a great extent if livestock and their products cannot be produced and traded more effectively development will continue to be retarded.

In some respects African countries have a comparative trade advantage in livestock products because their costs of production are low and, furthermore, they may be able to satisfy the need for produce that has been derived "organically" and thereby gain access to niche markets in developed countries. Thus if animals or their products from Africa could be exported to the developed world and/or regions of the world with expanding economies and rising demand for livestock products – the so-called livestock revolution – the lot of indigent agro-pastoral communities in Africa would be improved. This issue prompted the idea for the formation of an inter-regional livestock trade commission between Africa and the Middle East that is being supported by AU-IBAR, FAO, OIE, IGAD, USAID and others. The annual potential value of this trade is considered to surpass US$ 1 billion. Even larger non-traditional export markets are also potentially available if Africa's competitive advantage were to be adequately exploited.

There are many constraints to trade in animals and their products from Africa but the most intractable of these is a range of livestock diseases that importers in developed countries fear. If exports of livestock and livestock products from Africa could be freed from this constraint it is likely that significant external income could be derived. This would also improve productivity because disease is a greater constraint to livestock production in Africa than elsewhere in the world. The resulting positive impact on the livelihoods of livestock owners and country economies of the region, especially in the arid areas of Africa, are therefore potentially dramatic.

A fundamental requirement for adequately controlling or eradicating livestock diseases and thereby gaining access to export markets is, for each country in the region, to possess an adequate veterinary service. Most governments unfortunately are facing major economic and financial problems and are finding it difficult to adequately fund veterinary

services. Most veterinary services do not have a fund-raising strategy in place to correct this situation and hence either have no formalized plan or have plans that are unrealistic. The challenge for the region collectively is to identify alternative ways of funding animal health systems on a sustainable basis.

As a first step it is vital that countries have adequate surveillance systems in place because that is a basic requirement for identifying and addressing animal health constraints. For example, an effective epidemiological surveillance system is a requirement of the OIE Pathway for the verification of rinderpest eradication. 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. Epidemio-surveillance systems are thus a requirement for countries to reap the full economic benefits of rinderpest eradication regardless of the intervention strategy used to eradicate the disease.

Currently support for the establishment of epidemio-surveillance systems is being provided jointly by the European Union (EU) and the governments of 32 African countries under the Pan-African Control of Epizootics (PACE) programme. The €72 million EU support is, however, scheduled to terminate in October 2004. The PACE financing agreement stipulates that each country is expected to gradually increase its financial contribution to the programme so that after 2004 it will take over full funding of all the epidemio-surveillance activities on a sustainable basis.

Currently most governments are facing economic and financial problems and find it difficult to adequately fund animal health services. They have to choose from among many priority programs and so rational decision-making is crucial. The questions they often ask are: Is it economically viable to invest limited financial resources in a disease surveillance program? What are the returns to such investments? Decisions to invest in disease surveillance must be supported by facts and governments must be presented with sound arguments that will convince them that the benefits are superior to the costs.

Funding levels required to sustain epidemio-surveillance systems

The PACE Economics Unit has evaluated the cost of some national epidemio-surveillance systems and has analyzed the financial contributions of member countries to the PACE program. Based on these, the funding levels needed to sustain epidemio-surveillance systems have been established.

A review of WPCEs shows that presently, countries are at different levels of implementation of PACE. Thirty (30)) countries have submitted at least one WPCE. One country (Cameroon) is about to begin implementation, four (4) countries are in their second year of implementation, twenty one (21) countries are in their third WPCE and five (5) countries are in their fourth year of implementation.

Analysis of the first, second and third year WPCEs shows that 14 of the 30 countries have budgeted for government contribution to PACE both first and second years. The relative share of government contribution to the total annual budget varies widely (see Tables 1, 2, 3 and 4), ranging from about 6% for Senegal to 66% for Ghana (year 1) and 63% for Eritrea (year 2). For year 3, government contributions vary from 8% for Burkina Faso up to 73% for Tanzania. Two countries (Gambia and Nigeria) have shown the government's contribution for year one but not year two. Three countries (Guinea Equatorial, Mali and Togo) have not budgeted for year-one but have budgeted for year 2. Thirteen countries have not shown any contribution from the government (see Table 5).

The annual government financial contributions contained in the First year WPCEs of the eight countries were compared with the annual funding levels required to sustain epidemiological surveillance systems. The data are presented in Table 6. Except in three countries (Ethiopia Ghana and Rwanda), the current levels of government contributions are far below the annual funding levels needed to sustain surveillance activities. Nigeria, Kenya, Uganda and Chad will require a significant increase in their contributions to be able to meet the required funding levels.

As the PACE program draws near to its closure, the challenge now lies with member countries to increase their budgetary support towards sustaining the epidemio-surveillance systems.

Table 1. EU and national government financial contributions to PACE Year 1.

No.	Country	EU contribution	Government contribution	Total	Government as % of total
1	Senegal	492,818	30,492	523,310	5.83%
2	Uganda	505,748	124,600	630,348	19.77%
3	Gabon	272,655	29,130	301,785	9.65%
4	Kenya	1,249,000	148,000	1,397,000	10.59%
5	Chad	544,000	232,635	776,635	29.95%
6	Gambia	239,000	54,885	293,885	18.68%
7	Ethiopia	820,640	391,515	1,212,155	32.30%
8	Niger	268,978	117,516	386,494	30.41%
9	CAR	535,000	273,664	808,664	33.84%
10	Cote d'Ivoire	506,325	198,473	704,798	28.16%
11	Nigeria	750,000	285,516	1,035,516	27.57%
12	Tanzania	819,000	1,013,010	1,832,010	55.30%
13	Eritrea	284,000	402,027	686,027	58.60%
14	Ghana	214,000	409,384	623,384	65.67%

Table 2. EU and national government financial contributions to PACE Year 2.

No.	Country	EU cont.	Govt cont.	Total	Govt as % of total
1	Senegal	522,000	30,490	552,490	5.52%
2	Uganda	1,228,000	210,897	1,438,897	14.66%
3	Chad	1,726,000	134,859	1,860,859	7.25%
4	Cote d'Ivoire	350,633	76,225	426,858	17.86%
5	Gabon	243,885	76,435	320,320	23.86%
6	Niger	383,000	157,280	540,280	29.11%
7	Togo	221,000	122,508	343,508	35.66%
8	CAR	377,000	278,535	655,535	42.49%
9	Ghana	258,000	330,371	588,371	56.15%
10	Mali	241,000	117,760	358,760	32.82%
11	Eritrea	282,000	475,137	757,137	62.75%
12	Rwanda	347,000	163,493	510,493	32.03%
13	Kenya	1,249,000	811,368	2,060,368	39.38%
14	Guinea Equatorial	49,892	9,391	59,283	15.84%

Table 3. EU and National Government Financial Contributions to PACE Year 3 (€)

No.	Country	EU Contrib.	Govt. Contrib	Total	Govt. as % total
1	Senegal	416,000	87,881	503,881	17%
2	Uganda	655,000	195,307	850,307	23%
5	Gabon	145,836	73,509	219,345	34%
6	Niger	174,000	143,655	317,655	45%
7	Togo	133,000	88,498	221,498	40%
8	CAR	383,000	411,809	794,809	52%
9	Ghana	229,000	242,818	471,818	51%
10	Mali	395,413	211,624	607,037	35%
11	Eritrea	239,000	353,749	592,749	60%
12	Benin	214,200	76,192	290,392	26%
13	Mauritania	218,000	227,608	445,608	51%
14	Burkina Faso	269,000	23,251	292,251	8%
15	Guinea-Conakry	250,000	46,279	296,279	16%
17	Guinea-Bissau	123,000	28,587	151,587	19%
18	Kenya	921,352	229,199	1,150,551	20%
19	Tanzania	529,826	1,459,040	1,988,866	73%

Table 4. EU and National Government Financial Contributions to PACE Year 4 (€)

No.	Country	EU Contrib.	Govt. Contrib	Total	Govt. as % total
1	Senegal	287,253	284,727	571,980	50%
2	Guinea-Conakry	151,932	127,556	279,488	46%

Table 5. Countries with WPCEs that have national government financial contributions to PACE.*

No.	Countries with First Year Govt. cont. but no second year	Countries with Second Year Govt. cont. but no first year	Countries with both First and Second Year Govt. cont.	Countries without Govt. cont. for First and Second Year WPCEs.	Countries without First, Second and Third Year Govt. cont
1	Gambia	Mali	CAR	Benin	Cameroon
2	Nigeria	Togo	Chad	Burkina Faso	Congo Brazzaville
3		Guinea Equatorial	Cote d'Ivoire	Cameroon	Congo-DRC
4			Eritrea	Congo Brazzaville	Djibouti
5			Gabon	Congo-DRC	Somalia
6			Ghana	Djibouti	Sudan
7			Niger	Guinea Bissau	
8			Senegal	Guinea Conakry	
9			Uganda	Mauritania	
10			Tanzania	Sudan	
11			Rwanda	Somalia	
12			Kenya		

* The government contribution provided by these countries covers the cost of personnel, utilities, running cost, some office equipment and duty and tax exemptions. For the other countries the government still covers the cost of personnel and running costs but these have not been budgeted in the WPCE.

Cost of passive and active surveillance

Cost are estimated from the following components:

Salaries

The salary charge for personnel involved in each type of surveillance activity was estimated taking into account the number of staff in each category of personnel, the average annual salary for each category and the proportion of time spent in each type of surveillance activity.

Four types of personnel are considered: Veterinarians, laboratory technicians, animal health assistants and technicians (AHA/T), and support staff (e.g. drivers).

For the seven countries examined, the average number of veterinarians and animal health assistants/technicians per country was 257 and 1003 respectively.

About half of the veterinarians and 80% of the AHA/Ts are involved in passive surveillance. The proportion of veterinarians and AHA/Ts involved in active surveillance varies from 3% to 11%.

On average, veterinarians spend 64% of their time in passive surveillance and 40% in active surveillance. AHA/Ts put in more time in passive (80%) and active (60%) surveillance.

According to Table 3 Ethiopia and Tanzania require about 2 million Euros to meet the salary charge for their passive surveillance personnel. However, the salary charge for active surveillance personnel in Ethiopia is quite small compared to Tanzania, simply because Ethiopia has limited its surveillance area to two zones covering 45 Weredas only or 6% of the total surface area and 8% of the cattle population.

Uganda and Cote d'Ivoire also have a large salary charge for both their passive and active surveillance personnel.

Table 3. Personnel expenditures for passive and active surveillance (1,000 Euros)

	Passive surveillance			Active surveillance		
Country	Salaries	Allowances	Total personnel	Salaries	Allowances	Tota person
Benin	276	105	380	63	75	139
CAR	203	73	276	81	23	104
C. d'Ivoire	768	220	988	80	212	292
Ethiopia	1,810	1,485	3,294	34	56	89
G. Bissau	231	54	286	n.a.	n.a.	n.a.
Tanzania	1,929	1,074	3,003	419	94	513
Uganda	948	746	1,694	152	293	445

Allowances

These are estimated on the basis of the national per diem rates paid to each of the staff categories considered, the number of staff going out on surveillance related missions and the number of mission days per staff per year.

The average number of mission days for each veterinarian and AHA/Ts is 53 and 45 respectively. Per diem rates vary significantly between countries, being higher in Benin, Cote d'Ivoire and Tanzania compared to Ethiopia and CAR.

As shown in Table 3, Ethiopia spends about 45% of its total personnel budget on allowances. Tanzania and Uganda spend a large sum on allowances for both passive and active surveillance activities.

Transport

Expenditures on transport for surveillance is estimated from three components: vehicle (and motorcycle) depreciation, maintenance and running expenses. Vehicles and motorcycles are assumed to have a life span of five years and are depreciated accordingly. Tanzania, Ethiopia and Cote d'Ivoire have relatively high transport costs compared to the other countries (Table 4).

Depreciation on equipment

This is estimated for laboratory, field and office equipment taking into account the lifespan of each equipment.

Other costs

These include the expenditures on sample analysis, information processing and dissemination and epidemio-surveillance related training.

These expenditures are summarized in Table 4. Note that apart from Tanzania, these other costs are relatively small for the other countries.

Table 4. Non-personnel expenditures for passive surveillance (1000 Euros)

	Benin	**CAR**	**Côte d'Ivoire**	**Ethiopia**	**Guinea Bissau**	**Tanzania**	**Uganda**
Transport	49.8	57.6	341.2	625.0	18.4	685.4	172.0
Depreciation on equipment	18.0	30.2	192.3	99.2	19.9	n.a.	14.9
Sample analysis	1.0	2.2	2.1	38.9	2.1	43.0	n.a.
Information dissemination	4.0	4.0	3.0	4.2	0.9	203.7	25.8
Training	25.9	25.9	24.8	n.a.	8.4	5.1	18.5
Total	98.7	119.9	563.4	767.3	49.6	937.2	231.2

Financial requirements for sustaining epidemio-surveillance

To estimate the financial needs that countries will have to put aside to sustain their epidemio-surveillance activities after the PACE program comes to an end, it is assumed that the amount that each country is currently spending, if budgeted and the inflation rate taken into account, it would be sufficient to sustain passive and active surveillance activities in each country.

These amounts are summarized in Tables 5 and 6 for passive and active surveillance. They have not been adjusted for inflation as this will be done once data from all countries are analysed.

To successfully implement passive surveillance activities respective governments will require the amounts indicated in Table 5.

Note the large amounts that will be required by Ethiopia, Tanzania and Uganda. This is a reflection of the large surface area of each country, the number of veterinary staff and the livestock population. The large financial requirement for Cote d'Ivoire reflects more of a relatively high salary and per diem level than the human and animal resources.

Excluding salaries, which most governments have to pay regardless of whether surveillance activities are being carried out or not, the non-salary financial needs account for about half of the total. These vary from 104,000 Euros for Guinea Bissau to about 2.3 million Euros for Ethiopia.

As far as active surveillance is concerned, Tanzania will require over 0.8 million Euros compared to just 20,000 Euros for Guinea Bissau (Table 6). Most of these funds will be required for active disease search which is what all the countries are currently doing.

Table 5. Financial needs required for sustaining passive surveillance activities (1,000 Euros)

Country	Financial needs	Non-salary financial needs	Non-salary financial needs as percent of total
Benin	479	203	42.4
Central African Rep.	396	193	48.7
Cote d'Ivoire	1,551	784	50.5
Ethiopia	4,062	2,252	55.4
Guinea Bissau	335	104	31.1
Tanzania	3,940	2,011	51.0
Uganda	1,925	977	50.8

Table 6. Financial needs required for sustaining active surveillance activities (1,000 Euros)

Country	Active disease search	Serological surveillance	Wildlife surveillance	Laboratory analysis	Total	% of passiv
Benin	116	53	71	22	262	54.6
CAR	135	n.a.	32	60	227	57.3
C. d'Ivoire	282	66	101	72	521	33.6
Ethiopia	241	n.a.	n.a.	n.a.	241	5.9
G. Bissau	14	n.a.	3	2	19	5.8
Tanzania	251	287	158	142	838	21.3
Uganda	171	328	33	146	677	35.2

Table 7. Non-salary financial needs for sustaining active surveillance activities (Euros)

Country	Active disease search	Serological surv.	Wildlife surv.	Lab. analysis	Total	%of total
Benin	93.4	29.8	69.9	5.2	198.3	75.8
CAR	86.8	n.a.	15.3	43.4	145.5	64.1
C. d'Ivoire	252.3	52.1	82.8	54.2	441.5	84.7
Ethiopia	207.4	n.a.	n.a.	n.a.	207.4	86
G. Bissau	14.3	n.a.	3.3	1.9	19.5	100
Tanzania	116.3	140.4	92.8	69.1	418.6	50
Uganda	128.8	240.7	28.6	127.0	525.1	77.5

Unit cost of passive and active surveillance

The average amount required to carry out surveillance per head of animal for the seven countries is 0.32 Euros. This ranges from 0.08 Euros for Ethiopia to 0.71 for Cote d'Ivoire (Table 8). For active surveillance, the unit financial requirement for Ethiopia is negligible compared to the other countries.

Table 8. Unit cost of carrying out passive and active surveillance

Country	VLU (1,000)	Total cost (1,000 Euros)		Unit cost (Euros)	
		Passive surveillance	Active surveillance	Passive surveillance	Active surveillance
Benin	1,885	479	262	0.25	0.14
CAR	3,731	396	227	0.11	0.06
Cote d'Ivoire	2,191	1,551	521	0.71	0.24
Ethiopia	49,545	4,062	241	0.08	0.00
G. Bissau	479	335	19	0.70	0.04
Tanzania	20,210	3,940	838	0.19	0.04
Uganda	9,438	1,925	677	0.20	0.07
Average	**12,497**	**1,813**	**398**	**0.32**	**0.09**

Epidemiology Unit

Gaining Access to international Commodity Markets for African Livestock Commodities

GAINING ACCESS TO INTERNATIONAL COMMODITY MARKETS FOR AFRICAN LIVESTOCK COMMODITIES

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Abstract

There are many factors that constrain access of African livestock producers to international markets for livestock and their products, henceforth referred to as "livestock commodities". Among the more intractable of these factors is an array of so-called transboundary animal diseases (TADs) that are greatly feared by countries in the Developed World. Hence, African livestock commodities have been largely excluded from the most lucrative markets for many decades and, superficially at least, there seems little prospect for significant change unless these diseases are eradicated. Prospects for eradication of most of them is remote with the exception of rinderpest that is now close to extinction after many years of dedicated effort and expenditure running into hundreds of millions of US dollars. Even with the eradication of rinderpest, trade will be constrained by a range of other high-impact TADs.

The World Trade Organization (WTO) through the SPS Agreement and the *Office international des épizooties* (OIE), recognized by the WTO as the standard setter in matters relating to animal disease insofar as they affect trade, have made efforts to minimize the effects of non-tariff barriers but so far this has not greatly benefited the poorest countries where TADs tend to be prevalent. Consequently, animal health authorities in sub-Saharan Africa as well as most international organizations in the animal health and economic spheres have become pre-occupied with plans for eradication of TADs, despite the technical difficulties and enormous cost implied. This situation is increasingly compounded by the growing demand of consumers in the Developed World for safe food, i.e. animal products that are free of artificially administered hormones, biologically active chemicals and their residues as well as infections such as bovine spongiform encephalopathy (BSE) and food-borne pathogenic bacteria. To some, the possibility of adequately addressing these complex problems appears increasingly unlikely.

The basis of safe trade in livestock commodities lies in reducing the risk of transmission of dangerous infections of humans and animals to acceptable levels, i.e. application of measures that achieve "appropriate levels of protection" (OIE, 2003). The traditional way of achieving acceptable levels of risk is, as indicated above, through the difficult and expensive process of eradication of trade-sensitive infections from the exporting country as a whole or from the zone within the country in which production for export occurs. Fortunately, an alternative is beginning to emerge.

This is based on the differential risks that various livestock commodities inherently present when imported to countries where these zoonotic infections or those able to initiate TADs do not occur. This may be irrespective of whether the country or zone is free from these infections. In reality, what is required is for the level of risk of transmission of TADs to be reduced to appropriate levels of protection (i.e. safe levels) defined by international bodies such as the OIE. There are a variety of ways in which this can be done and obviously different measures will need to be applied to different commodities and even different commodities destined for different markets. A measure may, for example, be to reduce the prevalence of the potentially dangerous infections in the locality concerned combined with other complimentary actions to reduce risk. However, complete absence of trade-sensitive infections in the locality of production would not necessarily be a requirement. So the

fundamental principle is that risk reduction to internationally prescribed levels should be commodity-dependent and not necessarily dependent on disease eradication.

Control and certification of these risk reduction measures will become a vital issue but there are ways in which this can be approached that should comply with international requirements especially if these requirements can be amended to address the issue of commodity-based trade. It needs to be emphasized that this approach is not intended to provide a cosmetic "quick-fix"; on the contrary, it will be difficult and expensive to implement. However, it provides the prospect for systematically producing high quality livestock commodities that have access to markets where the best prices prevail and to use part of that income (e.g. through taxation or levies) to further improve marketing and market access. As trade increases and markets develop, the incentive and resources for formulating and implementing effective long-term strategies against TADs (e.g. eradication) will increase.

Introduction

The devastating effects that TADs can have on countries with developed agricultural economies is epitomized by the events which followed the introduction of FMD to the United Kingdom in February 2001. Direct and indirect losses were estimated to be somewhat less than $ 8 billion (Thompson *et al.*, 2002). Other recent episodes, such as classical swine fever in The Netherlands and Germany and highly pathogenic avian influenza in Italy and The Netherlands could also be used. These events are a constant reminder to developed countries of the risks inherent in imports, particularly illegal imports, of livestock commodities. Measures to counter these threats in most developed countries are therefore more or less continually under review. This paranoia has been reinforced by the threat of global terrorism.

The Food & Agriculture Organization [FAO] of the United Nations maintains that for TADs to be considered as such they need to have significant economic/ trade/ food security effects for a number of countries, be capable of rapid spread, their management requires the co-operation of a number of countries and significant zoonotic potential is a further factor. On the other hand, the *Office international des épizooties* (OIE – World Organization for Animal Health) has a list of 15 diseases referred to as "List A Diseases" that essentially comprise a group of TADs considered to comprise the greatest threat when it comes to trade in livestock commodities (OIE, 2003). Of these List A diseases, 12 are endemic to sub-Saharan Africa and many occur naturally nowhere else. The threat that this presents to countries wishing to import livestock commodities from Africa is perhaps the single most significant factor in limiting access of livestock commodities produced in Africa to international markets. Bearing in mind that many arid and semi-arid regions of sub-Saharan have little else to trade, this fact has greatly constrained rural development in Africa.

The economics of trade in livestock commodities

The economic and food security of many African people, especially those in pastoral communities – mostly concentrated in arid and semi-arid regions – depend largely on livestock production and trade in livestock commodities. Without a stable market for livestock commodities, many African countries cannot face the challenges of growing poverty and food security.

Annual production of meat and milk, the most important of the commodities produced in Africa, is estimated at about 10 and 25 million metric tones respectively (Table 1). Production is growing at an annual rate of 4.8% for meat and 6.3% for milk. Notwithstanding the growth in production of these commodities, Africa accounts for less than 5% of total world production compared with 63% (meat) and 48% (milk) for developed countries.

African countries earn about US$1 billion from exports of livestock commodities even though they spend about three times this amount to import the same. Thus, every year the continent loses US$2.2 billion on imports of livestock commodities (Table 2) and this deficit is increasing, albeit slowly. African exports of livestock commodities account for less than 2% of the total value of world trade in these commodities while for developed countries this figure is about 88%, the remaining 10% being supplied by other developing regions. If Africa is to benefit from its varied livestock resources, it must increase its share not only of total world production, but also of total world trade. This is vital for reducing poverty and ensuring food security.

In the course of the last decade, African trade in livestock commodities has been greatly influenced by developments in the global economy. Among the most notable are rapid structural changes in the manner in which livestock commodities are produced, traded and consumed; increasing consumer demand; concentration of global processing and marketing; shifts in the size and direction of international trade flows; and increasing incidence of diseases that threaten human health and welfare.

Barriers to trade in livestock commodities are of two types: tariff and non-tariff barriers. A tariff barrier is a customs duty or tax imposed on the value of an imported commodity, making its price higher in the internal market. Non-tariff barriers on the other hand, come in different forms, the most common forms being import quotas, embargoes, variable levies and standards. A country can apply an import quota to restrict quantities of an imported commodity by issuing import licenses to those who wish to export to the country. If the price of an imported commodity, say, beef is lower than the domestic price, a variable levy can be used to stabilize the price. Such a levy would vary to compensate for changes in the world market price. To assure the quality of products in domestic markets, countries sometimes set technical, sanitary and phytosanitary standards in addition to those set by the WTO.

The Uruguay Round Agreement (URA) initiated in 1986 ushered in a wave of reforms intended to facilitate order, fair competition and less distorted international agricultural trade. The agreement that developed countries would cut tariffs and export subsidies by an average of 36%, in equal steps over 6 years while developing countries would make a 24% cut over 10 years with the least developed countries not being required to cut their tariffs at all has been commendable. The decision to grant preferential treatment and concessions to developing countries has equally been commendable.

However, while domestic policies to limit production and URA commitments on the use of export subsidies has reduced exports of livestock commodities by Europe and North America, only Latin American countries (e.g. Argentina and Uruguay) have taken advantage of this to increase exports. African countries are yet to capitalize on this opportunity. Under

the beef agreement of the Lome Convention certain ACP countries have been granted quotas that enable access to the European market on a preferential basis. Africa has not benefited appreciably from this because some importing countries or groups of countries have suspended imports of some commodities for various reasons (e.g. suspension of fish imports from Lake Victoria to the European Union, ban on live animal imports from East Africa to the Middle East) on grounds of animal disease and other human health concerns.

Since the late 1990s the global meat and dairy market has been characterized by a gradual removal of trade barriers, with countries reducing tariffs and replacing non-tariff barriers by Tariff Rate Quotas (TRQs). However, progress in the implementation of these measures has been slowed by increasing occurrence of animal diseases, particularly Rift Valley fever (RVF), BSE and FMD, which have led countries over the period 1997 – 2002 to impose import bans and invoke stricter sanitary requirements as well as other technical barriers such as requirements on labeling and animal trace-ability. Thus the dismantling of tariff barriers is increasingly being substituted by non-tariff barriers, notably measures requiring higher SPS standards to protect domestic markets under the guise of animal disease and food safety concerns. These measures have greatly affected African access to markets for livestock commodities.

Current international requirements for trade in livestock commodities

As indicated above, the WTO has the minimization of non-tariff barriers as an objective. For most trade sectors the WTO itself sets guidelines and benchmarks whereby the objective will be progressively achieved. In contrast, for animal disease issues as they affect trade, the OIE, since 1926 the standard-setter for trade in animals and their products, is recognized by the WTO as its advisor. The OIE guidelines are contained in the "Terrestrial Animal Health Code" (the Code) which is up-dated annually following the General Session of the OIE held in Paris in late May.

Human food safety standards, including aspects relating to food processing, fall under the ambit of the *Codex Alimentarius* (Codex) administered by the FAO/WHO. The division of standard setting between the Code and Codex results in some confusion because there is increasing overlap between animal health issues and human health. This is because an increasing number of animal diseases/infections are zoonotic or at least potentially so.

Although not specifically stated, the underlying point of departure of the Code is based on the concept that countries that are historically free of TADs, or that have instituted measures to become so, present the lowest risk of exporting potentially damaging TADs through export commodities. Each important animal disease is covered by a different chapter of the Code and it is important to appreciate that disease- or infection-freedom for a country relates only to a specific disease/infection.

The OIE has also accepted that it may be possible to eliminate specific TADs from a zone or zones within an otherwise infected country. In that case, quite logically, export from such zones is deemed to be safer than from other areas within the country. For the approximately 160 countries that are members of the OIE, there is the possibility of countries making application to the OIE for official recognition of freedom from 4 specific diseases. These are

foot and mouth disease (FMD), rinderpest, contagious bovine pleuro-pneumonia (CBPP) and bovine spongiform encephalopathy (BSE, otherwise known as mad cow disease). For other TADs, the Code recommends measures to member countries that should be observed to achieve acceptable risk when imports are considered (the Code accepts that complete freedom from risk, i.e. risk-free trade, is unachievable).

From this it is clear that unless a country can convince the international community and its trading partners that it is either free in its entirety from all trade-sensitive TADs/ List A diseases or at least has a zone or zones in that condition, export of livestock commodities are likely to be constrained. For this reason many developing countries have strategies and policies aimed at establishing so-called "disease-free zones" in terms of the requirements set by the Code. It needs to be remembered, however, that by the conventions of the OIE, disease-free zones are specific for a particular disease. This is a problem for many African countries because, as already indicated, they often have to deal with a range of TADs simultaneously. As a consequence some plans for establishing disease-free zones do not take all the necessary technical considerations into account and are therefore unlikely to be successful in the long run.

This problem is a concern of the African Union's Inter-African Bureau for Animal Resources (AU-IBAR) and, over the last few years, attempts have been made to ameliorate the trade difficulties faced by African countries in a variety of ways. One of these has been to attempt to provide alternatives to eradication of trade-sensitive diseases/infections in reducing the risk of spreading TADs/ List A diseases through exports. This has resulted in the evolution of concepts that AU-IBAR believes have the potential to radically alter the position of African countries with respect to international trade in livestock commodities.

Alternatives

The alternatives discussed below are concepts that have so far been developed to reduce risk of exporting livestock commodities without the need to eradicate trade-sensitive TADs. This is an evolving field and therefore it is accepted that the proposals made in this document will probably undergo further refinement.

It is emphasized that international bodies such as the OIE and WTO do not, so far, recognize the measures outlined below. However, if the measures were to prove potentially beneficial and implementable, African organizations have the possibility of proposing their adoption into new policy for the OIE, the FAO/WHO and WTO as expressed in the Code and the Codex.

Export zones

As indicated above, it is often impractical to attempt to establish disease/infection-free zones for individual diseases in sub-Saharan Africa because most countries have a number of endemic diseases that importers fear and all have to be considered simultaneously. The concept of export zones therefore arose, where disease/infection risk mitigation would apply to a range of TADs and not just freedom from a single disease/infection as is currently the case. Absolute freedom from infection, by implication, would also not necessarily be a pre-condition. This is illustrated in Fig. 1. Export zones are therefore geographically defined areas with a perimeter that should only be crossed by defined animals species or feed-stuffs,

fomites etc. through controlled access points. Although the concept is simple, such a zone could inhibit traditional access to the locality concerned and therefore be difficul to implement and enforce.

Furthermore, creation of generic export zones is more technically difficult than may be superficially supposed for the reason that different TADs may have very different epidemiologies, i.e. factors that influence their distribution and rate of transmission. For example, an export zone to cover both FMD and RVF would be potentially difficult to define because the two diseases have completely different methods of transmission. FMD viruses are directly or, more rarely, indirectly transmitted between infected and susceptible individuals while RVF is a mosquito-borne infection and infection of animals is entirely dependent upon the presence of infected mosquitoes.

Export zones have a further disadvantage in that in many countries the zones, if they were to be established, would probably not contain important existing supply chains, markets and processing plants and therefore result in significant market disturbance through exclusion of existing suppliers.

A working definition of export zones has been proposed: An export zone is one where measures are in place to satisfy all the requirements of a particular importer or set of importers for a particular commodity or range of commodities that are not fulfilled within the exporting country as a whole. The objective is to ensure supply of commodities of pre-determined quality while concomitantly reducing the risk of importation of human and animal pathogens to an agreed level.

Export systems

To overcome the problem of accessing existing markets and supply chains the concept of export systems based on "compartmentalization" has been developed (Hargreaves & Belachew, 2004). "Compartmentalization" has come to mean different things to different people, but the meaning accepted in this discussion encompasses the idea of having a geographically dispersed production system where risk reduction measures are applied to control defined TADs. In other words the production system would be isolated from surrounding production systems where the TADs of concern are uncontrolled.

In contrast to disease-free zones that are geographically defined, export systems need not have specific geographic location as illustrated in Fig. 2. As long as the processes associated with the production of a particular commodity are isolated from contamination/infection by adjacent production systems, they can be accepted as being "compartmentalized".

This system is being considered by the OIE to deal with Newcastle disease (NCD) and highly infectious avian influenza (HPAI) where the infection may be transmitted by wild birds that obviously cannot be confined geographically. In the case of NCD and HPAI, although the infections may be prevalent in the general poultry population of a particular locality, it may nevertheless be possible to isolate production and processing of the broiler industry, for example, of that locality from infection.

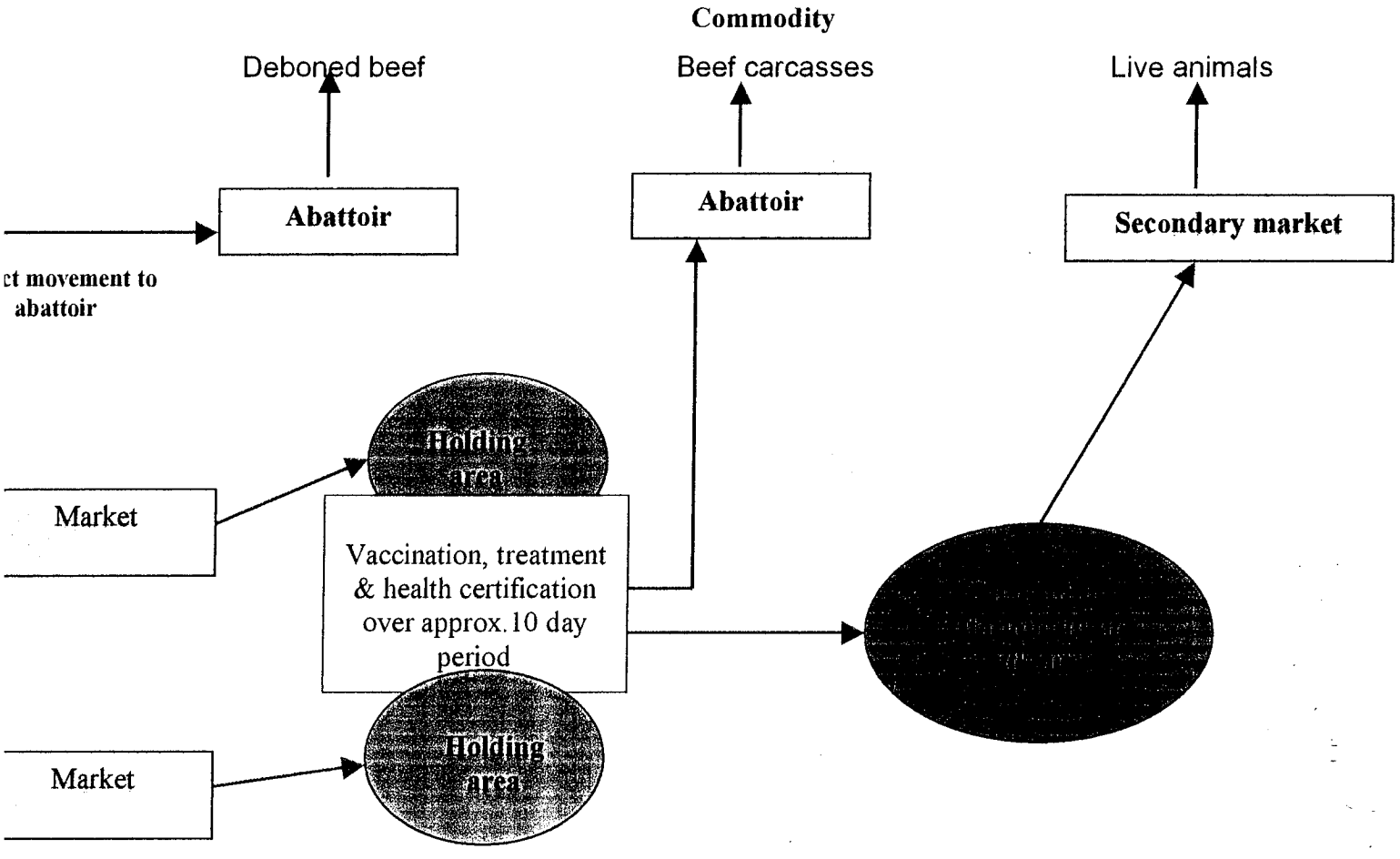

Fig. 2

Diagrammatic representation of different processes required to effectively reduce the risk of spreading transboundary animal diseases by three different commodities derived from cattle

The great advantage of this system is that it could, in principle at least, be designed to fit in with existing supply chains, markets and processing units. The idea behind export systems also incorporates appreciation of the fact that different commodities pose different types and levels of risk and therefore risk management measures depend on the commodity in question (Fig. 2).

Commodity-based trade

It has long been recognized that different commodities pose different levels of risk for importers and therefore to some extent standards recommended to importers by the OIE Code usually differ between commodities. However, the Code's fundamental basis for setting standards is based on the disease- or infection status of the country or zone from which the commodity is derived. It is increasingly being realized that the risk differential that exists between commodities could be more effectively exploited to ensure that levels of risk posed by commodity imports that are commensurate with "acceptable risk" (otherwise referred to in the Code as the "appropriate level of protection" [ALOP]; Chapter 1.3.7). The events in Europe following the introduction of FMD to the UK in 2001 are often used to demonstrate that disease-freedom is no guarantee that imported products from countries recognized as disease or infection-free will be safe. The UK unintentionally exported FMD to Ireland, the Netherlands and France before it recognized the incursion of FMD virus into its territory.

The following issues are important when it comes to trade in commodities:

- The overall risk of trade in a particular commodity[1] is a function of the composite risks it may contain. For example, more than one infectious agent as well as pesticide residues may potentially contaminate the commodity in question. Estimation of the overall risk posed by a commodity will determine not only the acceptability of the commodity for the importing country but also the price the importer is prepared to pay. The current disease-by-disease approach of the Code presents a significant logistical problem to efficient trade because generic standards recommended for commodities are not provided. A reader of the Code may therefore be required to infer the safety of a commodity by referring to several chapters of the Code and then intuitively conclude the level of overall risk. Alternatively, a formal risk assessment considering all the risk factors involved may be undertaken. This latter approach poses two problems: it is expensive and time-consuming and secondly, for many developing countries, it is beyond their capacity to conduct effectively in a reasonable period of time.

- As already mentioned, it is well known that different commodities pose different risks with respect to particular infectious agents. For example, matured beef from which the bones and lymph nodes have been removed presents a significantly lower risk for the transmission of FMD (as well as a number of other diseases such as rinderpest and RVF) than does fresh beef that contains those tissues. Therefore, some commodities pose low risk irrespective of the disease/infection status of the locality from which they are derived. The Code, on the other hand, sets standards for beef imports in respect of FMD risk

[1] The Code defines commodity as "animals, products of animal origin intended for human consumption, for animal feeding, for pharmaceutical or surgical use or for agricultural or industrial use, semen, embyos/ova, biological products and pathological material".

(chapter 1.1.2) that, apart from the nature of the commodity, take the infection status of the locality (country or zone) and whether or not vaccination is practiced into consideration. This encourages greater reliance on the health status of the exporting country than focusing on specific commodity safety recommendations. It is arguable that this "belt and braces" approach is an over-kill and presents a disincentive to the beef trade. The question is, therefore, whether generic standards for a range of commodities can be set which would ensure an ALOP for any reasonable importer?

For countries in sub-Saharan Africa as well as many other developing regions around the world, commodity-based approach offers the prospect of being able ensure levels of acceptable risk for particular commodities without being required to prove that trade sensitive infections do not exist in the area of production.

Commodity processing

Processing of commodities frequently provides effective risk mitigation, in some cases, irrespective of the disease status of the exporting country or zone. This offers additional opportunities for access to export markets by countries where trade-sensitive diseases/infections occur. Once again, although this is recognized by the Code there is arguably too much emphasis on disease-freedom and insufficient on commodity processing for risk mitigation.

A simple example, and one that has been used for decades, is canning. Of course, processing of agricultural products to improve their keeping qualities and appeal to the human taste is as old as the beginning of human civilization and, for that reason, is a highly developed art and science. Many of these processes, because they were originally primarily intended to inhibit putrefaction caused by bacteria, are effective in reducing microbial content and may therefore entirely, or at least contribute to reduce the risk of a given product containing transmissible quantities of infectivity.

A difficulty is that standards for processing edible livestock commodities are defined, as indicated above, by the Codex while risk mitigation measures for transmission of TADs is a function of the Code. Thus, for situations where a commodity may pose risks for both transmission of TADs and agents pathogenic for humans, there is a dichotomy. This is recognized as being an area where the OIE and FAO/WHO need to co-operate more closely to provide more integrated standards to address these types of problems.

Processing has the added potential benefit of value-adding/beneficiation and thus overcoming a long-standing problem of African countries where raw products are frequently exported at low prices only to be "processed" elsewhere were relatively great value is added to the product. These opportunities are not new but it is argued that they probably have been little exploited in the context of livestock commodities because of the assumption on the part of importers that any import of livestock commodities from "infected" locations is inherently risky.

It is argued therefore that a commodity-based approach as outlined above, combined where necessary with processing/beneficiation will in most cases provide adequate risk reduction

(ALOP) for livestock commodities. This is far easier and less expensive to achieve that current attempts at disease eradication. That, of course, does not mean that where possible and cost-beneficial, eradication or establishment of disease- or infection-free zones should not be attempted. However, that should not necessarily be the first or only recourse.

Certification

It is recognized that all the above possibilities imply that credible certification of livestock commodities for export have met with the required international standards and that mechanisms for ensuring this process is carried out effectively and efficiently are crucial. This is a major problem for most African and many developing countries because existing veterinary services are often weak and essentially unequal to the task. It is consequently frequently argued that strengthening or revitalization of public veterinary services is a prerequisite for exports of livestock commodities. Whether this is the only or most practical solution is a moot point. However, this is to some extent a separate issue and therefore will not be discussed further here other than to re-emphasize its importance.

Discussion

Africa is a continent of developing nations, many of which are beset by low agricultural productivity, weak marketing systems, food insecurity and poverty. Analysis of production figures and comparison of relative volumes of international trade shows that Africa is a minor actor in terms of global trade in livestock and their commodities. The reasons for this situation are both broad in scope and complex. This paper has indicated that despite major obstacles to increasing African livestock production and trade there are practical solutions being formulated that may significantly improve the environment for increasing productivity and income generation to aid vital rural development.

The barriers to trade can be broadly divided into tariff and non-tariff barriers. The issue of tariff barriers is both serious and difficult but progress in finding solutions is being made. The most lucrative markets for Africa's livestock exports are either in developed countries where agricultural production is highly subsidized or in the developing markets of Asia and Central / South America (IFPRI, 1999) where exporters are forced to compete with the subsidized export prices of developed countries. The scale of this problem is neatly encapsulated by the fact that developed countries spend approximately US$ 1 billion in agricultural subsidies each day and that one day is equal to the annual revenue Africa derives from the export of livestock commodities. Although commitments have been made by developed nations to reduce the scale of this subsidy on production, change is likely to be both slow and complicated due to the political pressures that exist. Clusters of nations such as the "Cairns group" have initiatives that highlight the negative impacts of subsidies and bring real pressure to bear on the culprits. Africa as a block of nations needs to support such initiatives with coordinated and focused policies on agriculture and tariff barriers.

Of the non-tariff barriers (import quotas, embargoes, variable levies and standards), by far the most serious for the livestock sector is the international requirement that traded livestock commodities be free of artificially administered hormones, biologically active chemicals and their residues as well as specified infections. This is particularly serious for Africa as much of the continent harbours 12 of the OIE's fifteen "List A" diseases. This disease situation

coupled with the present system of international regulations that primarily rewards countries that are free of major TADs, means that Africa is at a particular disadvantage. Currently few African veterinary services and the policies and legislation that guide them are able to meet the standards of quality that are described in the OIE Code (Chapters 1.3.3 and 1.3.4). The technical complexity of the problems facing developing countries and serious lack of all the resources necessary to address them adequately results in preoccupation with day-to-day actions aimed at surveillance, control and eradication programmes. So little time and few resources remain for devising ways to compete effectively in international markets and institute the necessary adaptations. Concomitantly, non-tariff standards continue to increase due to pressure from both consumer groups and the sophisticated veterinary standards of developed countries. For example, animal welfare standards are likely to present new and different challenges when it comes to access to international markets because that is what consumers in some developed regions of the world demand.

This paper has attempted to show that a commodity-based approach to livestock trade offers the opportunity of being able to ensure levels of acceptable risk for particular commodities without necessarily being required to prove that trade-sensitive infections do not exist in the area of production. The paper also proposes methods by which this can be achieved in practice through export zones and, perhaps more practically, export systems. While establishment of these zones and systems is challenging in terms of finance and logistics it does at least offer the possibility of immediate access for African commodities to markets where good prices prevail. It will also hopefully promote a more rational and effective approach to animal disease control.

If this is accepted, two immediate challenges arise. The first is the need to amend current international agreements, guidelines and modes of operation to enable a commodity-based approach. The second is determining and agreeing the internationally acceptable risk for particular commodities (i.e. ALOP). Key stakeholders for the first task will be the OIE and its member states. In this endeavor Africa is well placed because, in theory at least, Africa has the largest block of votes within the OIE. The increasing importance of human pathogens transmitted by food means that the FAO/WHO, through the Codex, and OIE will need to co-operate more closely in order to develop integrated approaches. Food processing as a way of reducing risk of transmission of TADs has been under utilized. One reason for this is probably that at present establishing standards relating to food processing is the responsibility of the Codex. Clearly therefore, the Code and Codex require to complement one another to a greater degree. It is estimated that changes in the existing systems are unlikely to occur in less that 3-4 years. One way to speed the process of change is for African states to rapidly agree the changes required, lobby in international forums for these changes and, eventually, vote for them in the standard setting bodies. The authors believe that developing countries, particularly within Africa, need to further debate and research issues related to commodity-based trade if they are to reach a common position and materially influence the activities of the global standard setting bodies mentioned above.

It is concluded that, despite unfair tariff barriers to international trade, if a system of global commodity-based trade can be established, Africa will have significantly greater opportunity of accessing international markets. Commodity processing adds value to livestock and

therefore such exports are likely to yield greater returns to the sector. Greater returns will in turn attract greater levels of investment that encourages increasing productivity. Logically, better returns and the need for increased production of livestock commodities will provide the incentive as well as the means to invest in disease control policies and legislation that developed nations have already succeeded in implementing. For Africa's dry-land grazing areas in desperate need of development this process should not be delayed.

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Table 1. Meat and milk production in Africa and Africa's share in world production, 1992 to 2002.

Year	Production (million metric tonnes)		Percentage of production in total world production			
	Meat	Milk	Africa		Developed countries	
			Meat	Milk	Meat	Milk
1992	9.1	20.9	4.9	4.0	67.8	54.7
1994	9.1	22.1	4.6	4.2	65.8	50.8
1996	9.7	23.5	4.7	4.3	62.7	49.1
1998	10.4	25.3	4.6	4.5	61.1	46.2
2000	11.2	27.2	4.8	4.7	59.9	45.0
2002	11.5	28.3	4.7	4.3	59.0	44.0
Average annual	10.2	24.5	4.7	4.3	62.7	48.3
Average annual growth rate (%)	4.80	6.26	-0.76	1.59	-2.74	-4.24

Source: Computed from FAO trade statistics, 1992 to 2002.

Table 2. Value of livestock commodities* trade in Africa and Africa's share in world trade, 1992 to 2002.

	Value of trade (Billion US$)			Percentage of exports in total world exports	
	Exports	Imports	Net exports	Africa	Developed countries
1992	0.97	3.25	-2.28	1.33	90.50
1994	1.07	3.05	-1.98	1.40	88.30
1996	1.21	3.05	-1.84	1.41	87.63
1998	1.07	3.31	-2.24	1.38	88.06
2000	1.01	3.42	-2.41	1.30	87.01
2002	0.98	3.20	-2.22	1.22	86.01
Average annual	1.05	3.21	-2.16	1.34	87.92
Average annual growth rate (%)	0.65	-0.15	0.24	-1.62	-1.01

* Includes live animals, milk equivalent, meat, hides and skins, eggs and animal oils and fats.
Source: Computed from FAO trade statistics, 1992 to 2002.

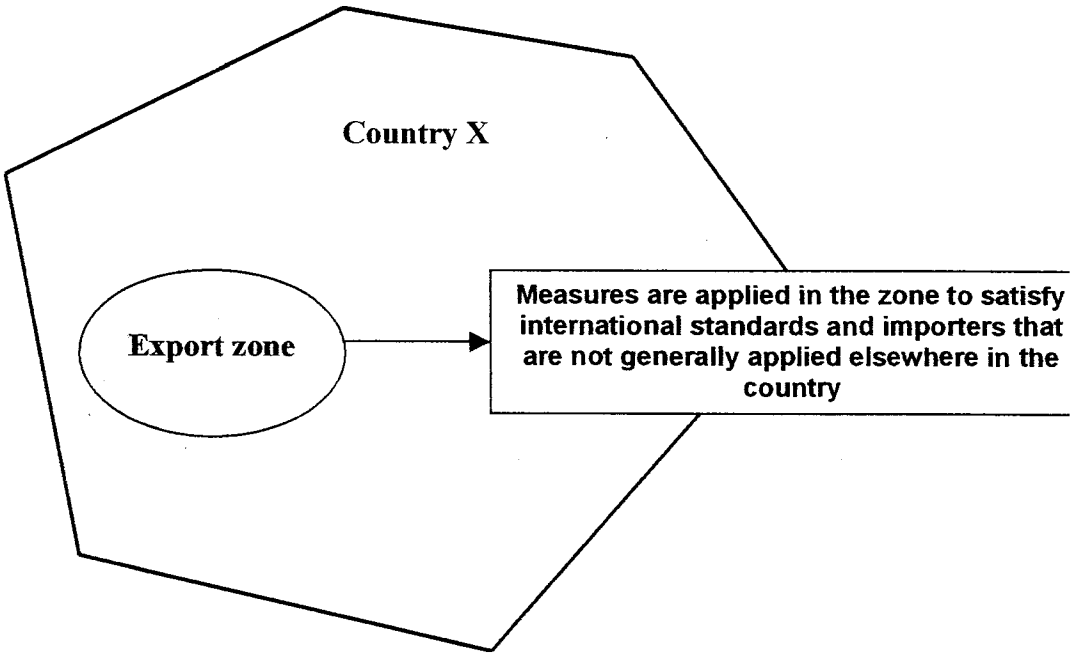

Fig. 1

Diagrammatic representation of an export zone

Rinderpest: Why Eradication is vital and who is responsible for it

RINDERPEST: WHY ERADICATION IS VITAL AND WHO IS RESPONSIBILE FOR IT

The problem

There is good reason to believe that classical rinderpest has been eradicated from the world. This is a triumph of international scientific dedication, field endeavor and mobilization of resources over more than a century and covering three continents, resulting in the disappearance of one of the world's great scourges. Unfortunately, we have not yet seen the complete demise of rinderpest virus; it appears that at least one, possibly two or even more, variants of the virus persist in the Somali Ecosystem. This virus(es) presently causes only mild or inapparent disease in cattle, but sometimes more serious disease in wildlife. However, the variant virus(es), while presently causing losses that are relatively trivial, has the potential to alter its virulence and revert to an infection capable of spreading widely and causing severe damage to domestic livestock and wildlife, as it so infamously did in Africa at the end of the 19th and beginning of the 20th centuries and again in the 1980s. We therefore face a conundrum: on the one hand, there is the expensive and difficult problem – more difficult and expensive than was generally perceived 5 years ago – of eradicating a virus(es) that at face value is having little effect on the population which it infects. On the other hand, if the problem is not dealt with effectively in the near future the consequences are likely to be devastating and will result in the charge that those who should have known better looked the other way. The world will also have missed the opportunity to do away with this plague.

Situation in the Somali Ecosystem

It is difficult where democratic processes do not exist or where unbiased studies have not been undertaken, to be sure of the opinion of the people on the ground. Nevertheless, it seems unlikely that the inhabitants of the Somali Ecosystem (which covers Somalia, part of northeastern Kenya and the Somali region of southeastern Ethiopia) see the rinderpest problem as acute – why should they? It needs to be remembered that this arid region is physically insecure, generally impoverished and politically unstable. In such situations it is obvious that the people directly concerned, most of whom are pastoralists, are confronted with enormous difficulties in their every-day lives and most do not have the time, energy or educational background to give attention to what most probably see as a potential but hardly immediate threat, certainly not one that deserves to take precedence over their other more pressing day-to-day problems. It is acknowledged, however, that the older inhabitants of the region remember vividly the devastation caused by rinderpest in decades gone by but their number is now relatively small and declining. Little but the lingering constraint on livestock trade serves to remind people that rinderpest has the potential to wreak economic damage.

Trade between the Somali Ecosystem and the Middle East

One of the factors that distinguish inhabitants of the Somali Ecosystem (i.e. essentially all Somali-speaking people) from most other ethnic groups in Africa is their almost total dependence on livestock. Historically this has encompassed both dependence on milk, meat, and hides for their domestic needs but also trade in livestock, especially export to countries of the Arabian Peninsula, for generating foreign exchange. Goods purchased with this and imported to Somalia are the principal source of consumables for both rural and urban Somalis. Livestock, it should be remembered, constitutes the only really tradable commodity these pastoralists possess.

In the last 10-15 years the historic trade between the Somali Ecosystem and the Arabian Peninsula has been subject to periodic import bans imposed by countries of the Arabian Peninsula particularly, but also other states in the Middle East, to prevent the import of rinderpest and Rift Valley fever (RVF) – a mosquito transmitted zoonotic disease. Much thought and effort has gone into trying to overcome these admittedly often somewhat porous blockades. Nevertheless, import bans imposed by countries of the Arabian Peninsula, especially Saudi Arabia, have resulted in great hardship and further impoverishment of the inhabitants of the Somali Ecosystem as has been shown by a number of studies (e.g., Ahrens, 1998; Steffen *et al.*, 1998).

Animal diseases and their effect on trade in livestock commodities

In times gone by there was little difficulty in obtaining the support and co-operation of livestock keepers for efforts to control or eradicate rinderpest: the losses caused by the disease needed no explaining or illustration. That situation, as indicated above, has changed. Furthermore, RVF has also been, and remains, the direct cause of some of the import bans. It is arguable that because of its zoonotic potential and the technical impossibility of eradicating it, RVF possibly presents a more intractable and enduring threat to livestock exports than does rinderpest. Unfortunately, when it comes to trade bans resulting from fears of importing potentially devastating livestock diseases, things are likely to get worse before they get better because there are many other epizootic diseases (those that have the capacity to spread widely and infect a large number of animals in a short period of time) endemic to the Somali Ecosystem. In this category are diseases such as foot and mouth disease (FMD – the most feared disease of all when it comes to trade), lumpy skin disease, blue tongue, *peste des petits ruminants* (PPR), sheep and goat pox as well as many non-epizootic diseases that are sometimes important in trade transactions involving livestock commodities. These non-epizootic diseases may or may not be present in the Somali Ecosystem – there is simply little information available. The presence or absence of riderpest in the Somali Ecosystem therefore, contrary to the opinion of some, will not alone, or even principally, determine long-term access of livestock and livestock products from the Ecosystem to markets of the Middle East. In this context it needs to be appreciated that the Middle East also has ambitious development plans and needs therefore to secure its trading status with other more developed regions of the world. As an example, FMD has been identified as a

particular problem requiring integrated control efforts by countries of the Middle East. This will necessitate careful consideration of its possible import into the region and arrangements to counter that possibility.

Developing concepts relating to trade in livestock commodities

There is a trend in international livestock commodity trade that is likely to have an impact in the near future. This involves a move away from the concept that the only way to ensure safe trade in livestock commodities is for the exporting country, or at least the zone of the country from which exports are derived, to be demonstrably free of important "trade sensitive" infections. It is increasingly accepted that different commodities inherently pose different degrees of risk but, at least in some circumstances, risk mitigation procedures can be instituted that will ensure that the commodity does not pose a level of risk exceeding an internationally agreed standard. This has been explained in detail in a recent publication (Thomson *et al.*, 2003). It is therefore possible to conceive of a future scenario where the mere presence of one or more "trade-sensitive" infections will not necessarily preclude trade in livestock commodities derived from the localities where trade-sensitive infections occur as long as the risks can be effectively mitigated and attested to by appropriate, credible certification.

It is contended here, therefore, that eradication of rinderpest, while it will assist in reducing the risk to Middle Eastern countries associated with trade in livestock and livestock products and could yield some immediate benefits by removing one readily-perceived constraint, it will not be a fundamental determinant of the long-term future for trade between the Somali Ecosystem and the Middle East so far as livestock commodities are concerned.

The danger of using access to export trade as an incentive for rinderpest eradication

It has recently been decided that Middle Eastern countries need to make a concerted effort to use the OIE Pathway to prove their freedom from rinderpest (FAO/OIE, 2003). This, of course, is laudable but at the same time presents a difficulty for Eastern African countries because Middle Eastern countries involved in this process of recognition of freedom from rinderpest will no longer be at liberty to import live cattle from countries that are not recognized as free from rinderpest. This, it has been argued, will provide an incentive for countries in Eastern Africa in general and especially those that contain the Somali Ecosystem, to make a concerted effort to rid themselves of rinderpest virus and thereby access Middle Eastern markets when they too have achieved recognition of freedom from rinderpest. The problem with this approach is that in the medium term (in excess of 5 years based on the provisions of the OIE pathway for rinderpest) it will probably have the completely opposite result because in the 5-6 year interim, trade in live cattle would have to cease completely if the countries of the Middle East are to comply with OIE requirements for freedom from rinderpest. The idea that short-term increased

hardship will be rewarded later by free trade in livestock is unlikely to eventuate for reasons that have been pointed out above in the section entitled "Animal diseases and their effect on trade in livestock commodities". Such argument is unlikely to win support from stakeholders and could lead to the temptation to try to cover up the presence of rinderpest – an easy matter while the disease stays mild. Therefore, the idea that increasing the pressure of bans on livestock exports to the Middle East will be beneficial in the long term is flawed.

Is there a better way?

The PACE Epidemiology Unit (PEU) has argued and continues to argue that eradication of rinderpest is vital but that to achieve eradication requires that a conducive environment, including incentives for livestock keepers, be part of any sound plan. In response to that argument the OIE has established a dedicated *Ad hoc* Group to investigate the problem and the Group is in the process of considering proposals made by the PEU to ameliorate the plight of livestock owners in the Somali Ecosystem during the eradication phase. One of the proposals being considered is the possibility of permitting the export of cattle that have been vaccinated against rinderpest as long as they are suitably marked. This would enable rinderpest eradication to proceed without necessarily interfering with the trade in cattle between the Somali Ecosystem and the Arabian Peninsula. Of course, suitable controls would need to be instituted to ensure compliance with agreed procedures. Other proposals made by the PEU in this connection are also under consideration.

Do we really need to eradicate rinderpest?

The arguments advanced above might be construed as an attempt to negate the set objective of worldwide eradication of rinderpest by the year 2010, i.e. the objective of the Global Rinderpest Eradication Programme (GREP), administered by the FAO. That is not the case and, as indicated in the first paragraph, reappearance of classic rinderpest is a likely future scenario whose consequences may be disastrous and which would negate international efforts extending over more than 40 years and costing hundreds of millions of dollars. Therefore, the final eradication of rinderpest remains as vital as ever.

Whose responsibility is it?

Eradication of rinderpest needs to be embarked upon for the right reasons that, as indicated previously, have relatively little to do with trade in livestock commodities. The real and objectively defendable reason is that eradication of rinderpest will remove a devastating threat to cattle and wildlife and, indirectly, the welfare of people in Eastern Africa and possibly further afield as well as concluding an expensive and dedicated international effort stretching over many decades. It has long been argued that this endeavor constitutes an "international public good" and that continues to be the view of the PEU.

If that is so the responsibility clearly lies with the international community in association with relevant representative governments where they exist.

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26/03/04

Guidelines for confirming suspected outbreaks of rinderpest by laboratory examination

GUIDELINES FOR CONFIRMING SUSPECTED OUTBREAKS OF RINDERPEST BY LABORATORY EXAMINATION

with special reference to the Somali pastoral ecosystem and mild rinderpest

Peter Roeder and Gijs van 't Klooster

(The GREP secretariat as the author of the document provided permission to distribute this document as an FAO/IBAR document to the PACE member states)

BASIC PRINCIPLES

Eradication of rinderpest has progressed to a point where any outbreak of disease or suspicion of circulating virus constitutes an international emergency, which demands a full diagnostic investigation. The guidelines given here concern sampling for laboratory diagnostic testing and are meant to complement guidelines for epidemiological investigations, which are the other important component of the investigational procedure.

Unequivocal confirmation of a provisional diagnosis of rinderpest is provided by isolation of rinderpest virus or the detection of rinderpest-specific viral RNA together with their further characterisation. Isolation of virus is preferable for it provides a virus, which can be used for biological transmission and characterisation studies and archived for future use. Antigen detection by immunocapture ELISA provides for specific identification of rinderpest or *peste des petits ruminants* (PPR) while the agar gel immunodiffusion test (AGIDT) is specific only for morbilliviruses.

Although not unique, the rinderpest virus present in the Somali pastoral ecosystem possesses unusual characteristics, which make laboratory diagnostic confirmation particularly challenging. Since its rediscovery in 1995, obtaining live virus for study has proved difficult in wildlife and in cattle. The failure of diagnostic confirmation and virus isolation results from an interaction of many factors, not all of which are well defined, but it is believed that if the guidelines outlined here are followed closely a higher success rate will be achieved in future.

In diagnostic investigations and sampling for laboratory testing, timing is an important factor. A rapid response to the initial suspicion is essential if there is to be a reasonable chance of success, especially so for obtaining live virus. The selection of appropriate donors is critical; it is pointless sampling recovering and convalescent animals for virus isolation. However, it must be appreciated that there are obvious constraints in the case of wildlife.

These guidelines refer to the requirement for samples to be submitted to a Regional Reference Laboratory or the World Reference Laboratory when investigating disease events for which a suspicion of rinderpest exists. A complete examination requires that several sets of samples be submitted from each animal selected as a donor to allow:

- Virus isolation
- Detection and characterisation of viral RNA by reverse transcription – polymerase chain reaction (RT-PCR)
- Virus antigen detection by agar gel immunodiffusion test (AGIDT) or immunocapture ELISA (ICE)

- Detection and characterisation of viral antigen in sections of fixed tissue by imunohistochemistry

Recording observations

One of the most important pieces of equipment needed by investigators is a bound note-book in which to record all observations and findings with a pencil or indelible pen. Each animal identified should be given a unique identifier which incorporates the date. Different investigators will have their own preferences but the following illustrates a system which has been found useful by many. Elements such as sex and age can be recorded separately if wanted.
The basic system is: *Date [Y-M-D] /Sequential number for that day/Place/Species/Age/Sex*

For example, *020827 / 24 / Meru / Bov-zebu / 2.5 y / F* would indicate the 24th animal on 27th August 2002 was a 2.5 years-old, female zebu examined at Meru. Ideally the place should consist of latitude and longitude obtained from a GPS unit. All other information can be recorded against this identifier which is also used to identify samples taken.

It is also essential that the laboratory be given a full and detailed history of the suspect cases investigated together with a written list of the samples submitted with relevant information (see Annex 1 for suitable submission forms). This is necessary to aid decisions as to tests to be performed and significantly assist with interpretation of their results.

Necropsies

Although providing valuable pathological information, generally speaking animals which have died from rinderpest are not good donors of samples for laboratory tests. Cattle dead from the peracute form of the disease are an exception. If you have carried out a necropsy and it is suggestive of rinderpest then search for a good donor of material for laboratory examination.

A full necropsy should be performed paying particular attention to searching for lesions in the buccal cavity, the alimentary tract, lymph nodes throughout the body and the Peyers patches. Samples should be collected from animals slaughtered for necropsy and in the case of animals which have died early in the course of illness (without signs of extensive diarrhoea, dehydration or secondary bacterial infection).

Sampling materials

Ideally investigators should carry to the field with them a well-stocked box containing all the equipment required to collect samples and to preserve them during transit to a laboratory. Expert teams should always have available and maintained ready for use such a box. It should contain:

Post-mortem knife
A screw-top tin containing:
- rat-toothed forceps 6 *
- surgical scissors 6 *
- scalpel handles 3 *

Scalpel blades
Permanent marker pens, fine tip
Bound notebook
indelible pen

Sterile universal bottles (27 ml)*
Sterile bijoux bottles (7 ml) *
Evacuated blood tubes:
- plain for serum (10 ml)
- EDTA treated (5 ml)
- needles and holders

Pasteur pipettes * and bulb
Clinical thermometers
Cool box with cold packs [1]

Universal bottles * with:
- Trizol/RNAlater
- 10% neutral buff. formalin **

Eye swabs (sterile)
PBS pH 7.2 to 7.6, 0.01 M ***
15G 3 cm hypodermic needles
2 ml disposable syringes
10 ml disposable syringes
GPS unit

[1] It is worth investing in a good quality cool box capable of keeping samples cool for three days rather than ordinary domestic picnic-type cool boxes with inferior insulation.

* Instruments, pasteur pipettes and glass containers should be autoclaved to sterilise
** see Annex 2 *** see Annex 3

Marking samples taken

One major problem which laboratories regularly face is that labels on samples are erased or fall off in transit. It is essential that sampling materials taken to the field should include the means of labelling sample containers in a manner which will survive the rigours of transport. Adhesive surgical tape (woven material 1 cm wide) is one of the best materials with the label being written with a fine-point indelible pen. On vials the length of plaster applied should be sufficient to go fully around the tube and to overlap and adhere to itself. Obviously, for virus isolation samples should preferably be collected aseptically into clean (preferably sterile) containers. In the case of tissues collected into formalin, the identifier can be written in pencil on a piece of paper or card which can be inserted into the container.

Transport to the laboratory

It is essential that most materials collected are stored at 4 to 8 °C during transit by the use of ice or cool packs. However, immersing sample containers in a pool of melting ice and water should also be avoided. If commercial cool packs are not available, effective substitutes can be made by freezing water in 500 ml plastic drinking water bottles with screw caps. After labelling, containers should be carefully packed to avoid breakage during transit. Every effort should be made to minimise the time taken to reach the laboratory and to keep the cool box in cool places out of direct sun. Obviously once samples reach the laboratory they must be processed immediately for safe storage and tested without delay.

SAMPLES REQUIRED

Another problem faced by diagnostic laboratories is often the inadequacy of the samples taken. It is pointless placing a tiny fragment of tissue in a universal bottle. Instead, slice lymph nodes and spleen into strips and pack them into the bottle. Similarly, take several swabs rather than one. Also of extreme importance is the benefit to be gained from sampling a number of animals from an affected population; this greatly increases the chances of success in finding the virus. Always sample at least five animals from a herd, carefully selecting the donors and systematically taking the same full set of samples from each.

The recommended samples are:

From fresh carcases:

1. Tissues for virus isolation and RT-PCR

- *Mesenteric lymph nodes*: collected aseptically; fill one universal container
- *Spleen*: collected aseptically; fill one universal container
- *Eye swabs*: collect three from each eye; moisten each with 2 to 3 drops of sterile PBS (see Annex 3); place in single universal bottle
- *Uncoagulated blood in EDTA*: fill one 5 ml evacuated tube

Place samples in cool box with cold packs.

2. Additional tissues specifically for RT-PCR

- *Eye swabs*: place in Trizol/RNAlater
- *Mesenteric lymph node*: place in Trizol/RNAlater

Trizol/RNAlater helps to preserve RNA for subsequent detection but samples so preserved are only suitable for RT-PCR. Trizol is a phenolic compound and as such is highly toxic; great care should be exercised in storing and handling bottles containing Trizol. RNAlater is not toxic.

3. *Tissues for antigen detection by agar gel immunodiffusion test and/or immunocapture ELISA*

These should be collected only if the AGIDT and/or ICE are tests routinely performed by the Regional Laboratory. If it is, then samples should be collected specifically for this purpose so as not to use up valuable samples collected for other tests.

- *Eye swabs*: collect three from each eye; moisten each with 2 to 3 drops of sterile PBS; place in single universal bottle
- *Nasal swabs*: collect three from each nostril; place in single universal bottle
- *Swabs of necrotic debris from the buccal mucosa*: collect three and place in a single universal bottle
- *Lymph node*: collect prescapular and mesenteric lymph nodes and place together in one universal bottle.

Place samples in a cool box with cold packs.

Commercially available plain swabs are preferable to hand-made alternatives made from cotton wool because these are likely to contain RNAases from skin secretions acquired when rolling the swab head. This can compromise tests for the detection of viral RNA.

4. *Tissues for immunohistochemical staining*

- *Third eyelid*
- *Buccal mucosa including cheek papillae*

Place small pieces of tissue (no more than 1cm cube) in 10% neutral buffered formalin (see Annex 2). Such samples not only allow *in-situ* detection of viral antigen but can be subjected to differential staining using monoclonal antibodies for the specific identification of rinderpest virus.

From live animals:

Selection of donors

To maximise the likelihood of success, it is important to select carefully animals from which samples are collected for virus isolation, viral antigen detection and viral RNA detection. Take samples from cattle with a high fever (more than 40°C, preferably over 41°C), watery eye discharge (not purulent), erosive mouth lesions and without diarrhoea or early after the onset of diarrhoea (first or second day only). Samples taken from animals in which diarrhoea is well established are unlikely to give positive results. Selecting animals requires careful examination of the herd for the relatively subtle signs of early disease and requires a thermometer. Despite these recommendations, if no other animals are available then samples should be taken from the most recent cases rather than returning from the field empty-handed. After this, more recent cases should be looked for in neighbouring herds.

1. *Tissues for virus isolation and RT-PCR*

- *Eye swabs*: collect three from each eye; moisten each with one drop of sterile PBS; place in single universal bottle

- *Nasal swabs*: collect three from each nostril; moisten each with one drop of sterile PBS; place in single universal bottle
- *Uncoagulated blood collected into EDTA containing-evacuated tubes*: mix thoroughly by inverting tube several times and store

Place samples in a cool box with cold packs during transit.

2. *Additional tissues specifically for RT-PCR*

- *Eye swabs*: place in Trizol/RNAlater
- *Nasal swabs*: place in Trizol/RNAlater
- *Swabs of necrotic debris from the buccal cavity*: place in Trizol/RNAlater

As mentioned above, Trizol/RNAlater helps to preserve RNA for subsequent detection but samples so preserved are only suitable for RT-PCR. Trizol is a phenolic compound and as such is highly toxic; great care should be exercised in storing and handling bottles containing Trizol. RNAlater is not toxic.

3. *Tissues for antigen detection by agar gel immunodiffusion test and/or immunocapture ELISA*

These should be collected only if the AGIDT and/or ICE are tests routinely performed by the Regional Laboratory. If it is, then samples should be collected specifically for this purpose so as not to use up valuable samples collected for other tests.

- *Eye swabs*: collect three from each eye; moisten each with one drop of sterile PBS; place together in a single universal bottle
- *Nasal swabs*: collect three from each nostril; place in single universal bottle
- *Swabs of necrotic debris from the buccal mucosa*: collect three and place in a single universal bottle
- *Prescapular lymph node biopsy*: collect a biopsy from each prescapular lymph node and pool in one bijou bottle. Locate a prescapular lymph node and grasp it firmly through the skin. Thrust a wide bore hypodermic needle (15 gauge) through the skin into the substance of the node; partly withdraw and reinsert it several times. Withdraw lymph and tissue by attaching a 5 or 10 ml syringe to the needle and pulling on the plunger. Withdraw the needle and syringe and expel the contents into a suitable glass container (a bijou or universal bottle).

Place samples in a cool box with cold packs.

4. *Serum for detection of antibodies*

Examination of sera for antibodies to rinderpest virus is particularly useful in the case of outbreaks of rinderpest; in cattle interpretation of the results is often compromised by an inability to be sure whether or not cattle have been vaccinated. Accurate assessment and recording of ages of animals sampled is essential to assist with interpretation. The best – 'gold standard' - test for rinderpest is the virus neutralisation test and for this good quality, sterile sera are required. The following notes will help in meeting this requirement.

- Take blood from the jugular vein (for most purposes a 10 ml sample, which yields 4 ml of serum, is sufficient) into sterile evacuated containers using a sterile needle (or allow blood to flow via a needle into a sterile container). Always remove the tube with its rubber bung from the needle before withdrawing the needle from the vein. If this is not done any residual vacuum left in the tube will suck air and dirt in through the needle bringing with it contaminating organisms. Immediately label the tubes with an indelible marker so that containers can be identified individually.

In the field, place filled containers in the shade or in an insulated container (not on ice) to prevent exposure to excessive temperatures. Do not leave in a sealed car in the sun.

At daytime ambient temperatures the blood will clot very quickly and clot retraction will start within 2 hours (especially in siliconised containers such as new evacuated tubes). When clot retraction is seen, place the containers vertically in a refrigerator or cool box until the next day. If clot retraction is delayed, before overnight storage free the clots from the container walls with sterile applicator sticks or by holding the tube upside down and banging it gently on a hard surface.

In the morning carefully remove the tubes from the refrigerator, remove the bungs and carefully pipette off clear serum into sterile serum storage containers. If it is not clear, centrifuge at 2000 rpm for 10 minutes before final dispensing into aliquots. Clearly label all serum containers with a laboratory reference number with details being recorded in a laboratory specimen recording book.

If tubes containing clotted blood can be kept cool (not frozen) and transported to a laboratory within three or four days then it is not absolutely essential to separate the serum in the field. Never-the-less, it is important not to delay in separating sera if good quality sera are required. This is best done at the laboratory but good sera can still be produced on long field trips; a hand centrifuge is useful. Be careful not to transfer any cellular material with the serum.

This document has been prepared by the GREP Secretariat
2002
Draft 3 PLR/GvK 9/08/2002

Annex 1 : ***Sample submission forms***

LABORATORY SAMPLE SUBMISSION FORM FOR RINDERPEST

DATE SUBMITTED			
	Day	*month*	*year*

Enter ✓ or write in boxes as necessary

Submission Details

Submitted by:

.....

Address:

.....

.....

.....

.....

Origin of samples

Owner: .....

Village: .....

District: .....

Region: .....

Georeference:

Latitude:

Longitude

Species of animals affected:

☐ cattle ☐ Water buffalo ☐ sheep ☐ goat ☐ Other domestic or wild species

Age group of animals affected:

☐ Less than 12 mths ☐ 13 to 24 mths ☐ 25 to 36 mths ☐ More than 36 months

History and epidemiological information:

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Samples submitted (attach additional list if necessary)

General comment: .....

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Animal identification:

Date [Y-M-D]	Sequential no.	Place	Species	Age	Sex

Clinical observations:

Virus isolation/PCR

- ☐ Mes. Lymph node
- ☐ Spleen
- ☐ Eye swabs
- ☐ EDTA blood

PCR – in Trizol

- ☐ Mes. lymph node
- ☐ Eye swabs

Immunochemistry

- ☐ Third eyelid
- ☐ Buccal mucosa

AGIDT / ICE

- ☐ Eye swabs
- ☐ Lymph node biopsy
- ☐ Nasal swabs
- ☐ Buccal debris

Animal identification:

Date [Y-M-D]	Sequential no.	Place	Species	Age	Sex

Clinical observations:

Virus isolation/PCR

- ☐ Mes. Lymph node
- ☐ Spleen
- ☐ Eye swabs
- ☐ EDTA blood

PCR – in Trizol

- ☐ Mes. lymph node
- ☐ Eye swabs

Immunochemistry

- ☐ Third eyelid
- ☐ Buccal mucosa

AGIDT / ICE

- ☐ Eye swabs
- ☐ Lymph node biopsy
- ☐ Nasal swabs
- ☐ Buccal debris

Samples submitted [continuation sheet]

Animal identification:

Date [Y-M-D]	*Sequential no.*	*Place*	*Species*	*Age*	*Sex*

Clinical observations:

Virus isolation/PCR

- ☐ Mes. Lymph node
- ☐ Spleen
- ☐ Eye swabs
- ☐ EDTA blood

PCR – in Trizol

- ☐ Mes. lymph node
- ☐ Eye swabs

Immunochemistry

- ☐ Third eyelid
- ☐ Buccal mucosa

AGIDT / ICE

- ☐ Eye swabs
- ☐ Lymph node biopsy
- ☐ Nasal swabs
- ☐ Buccal debris

Animal identification:

Date [Y-M-D]	*Sequential no.*	*Place*	*Species*	*Age*	*Sex*

Clinical observations:

Virus isolation/PCR

- ☐ Mes. Lymph node
- ☐ Spleen
- ☐ Eye swabs
- ☐ EDTA blood

PCR – in Trizol

- ☐ Mes. lymph node
- ☐ Eye swabs

Immunochemistry

- ☐ Third eyelid
- ☐ Buccal mucosa

AGIDT / ICE

- ☐ Eye swabs
- ☐ Lymph node biopsy
- ☐ Nasal swabs
- ☐ Buccal debris

Animal identification:

Date [Y-M-D]	*Sequential no.*	*Place*	*Species*	*Age*	*Sex*

Clinical observations:

Virus isolation/PCR

- ☐ Mes. Lymph node
- ☐ Spleen
- ☐ Eye swabs
- ☐ EDTA blood

PCR – in Trizol

- ☐ Mes. lymph node
- ☐ Eye swabs

Immunochemistry

- ☐ Third eyelid
- ☐ Buccal mucosa

AGIDT / ICE

- ☐ Eye swabs
- ☐ Lymph node biopsy
- ☐ Nasal swabs
- ☐ Buccal debris

Submission of sera for rinderpest antibody assay:

DATE SUBMITTED			
	Day	*month*	*year*

Submission Details

Submitted by:

.....

Address:

.....

.....

.....

.....

Origin of samples

Owner: .....

Village: .....

District: .....

Region: .....

Georeference:

Latitude:

Longitude

Species of animals affected:

☐ cattle ☐ Water buffalo ☐ sheep ☐ goat ☐ Other domestic or wild species

Age group of animals affected:

☐ Less than 12 mths ☐ 13 to 24 mths ☐ 25 to 36 mths ☐ More than 36 months

History and epidemiological information:

.....

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Serum number	Date [Y-M-D]	Sequential no.	Place	Species	Age	Sex

Annex 2: ***Neutral buffered 10% formalin***

Dissolve the following salts in 900 ml of warm water:

(a)	disodium hydrogen orthophosphate (Na_2HPO_4)		
		anhydrous salt	6.50 g
	or	dihydrate salt ($2H_2O$)	8.15 g
	or	dodecahydrate salt ($12H_2O$)	16.40 g
(b)	sodium dihydrogen orthophosphate		
		anhydrous salt	3.08 g
	or	dihydrate salt ($2H_2O$)	4.00 g
	or	potassium dihydrogen orthophosphate (KH_2PO_4) anhydrous salt	3.49 g

Add 100 ml of commercial formalin (40% formaldehyde solution). Store in sealed containers.

Annex 3: ***phosphate buffered saline (0.01 M pH 7.2 To 7.6)***

To make 1 litre:

•	sodium chloride	8.5 g
•	sodium di-hydrogen orthophosphate anhydrous	0.336 g
	or dihydrate salt	0.437 g
•	di-sodium hydrogen orthophosphate anhydrous	1.022 g
	or dihydrate salt	1.282 g
	or dodecahydrate saalt	2.579 g
•	Deionised distilled water (or other pure water) to 1 litre	

Dissolve using a magnetic stirrer, measure pH and adjust pH with saturated solutions of sodium dihydrogen orthophosphate or di-sodium hydrogen orthophosphate if necessary (pH 7.2 to 7.6 is satisfactory for most purposes).

If the pH is too high (i.e. more than 7.6) add sodium di-hydrogen orthophosphate, if the pH is too low (i.e. less than 7.2) add di-sodium hydrogen orthophosphate. Add the solutions slowly as drops from a small pipette whilst stirring and measuring pH.

WORKSHOP REPORTS

Economics Unit

1. Draft Proceedings of workshop on budgeting to sustain national livestock development activities in PACE member countries.

Epidemiology Unit

1. Final Report – Regional workshop on Rift Valley Fever

2. Rapport Provisoire – Atelier Régional sur les strategies de contrôle de la PPCB en Afrique (25-27 février 2004, Guinée Conakry)

3. Proceedings of the workshop on the Eradication of Mild Rinderpest from the Somali Ecosystem (18-20 February, 2004)

Economics Unit

Draft Proceedings of workshop on budgeting to sustain national livestock development activities in PACE member countries.

DRAFT PROCEEDINGS OF WORKSHOP

BUDGETING TO SUSTAIN NATIONAL LIVESTOCK DEVELOPMENT ACTIVITIES IN PACE MEMBER COUNTRIES

HELD AT THE AFRICAN UNION CONFERENCE HALL ADDIS ABABA, ETHIOPIA

MARCH 29-30TH 2004

Tuesday March 29, 2004

Opening Session

The workshop was called to order by the moderator, Dr. Emmanuel Tambi of AU-IBAR PACE Economics unit, who then invited the Director of AU-IBAR, Dr. Jotham Musiime to give his speech. Dr. Musiime welcomed the workshop participants and observers and wished them fruitful deliberations. In his speech, he noted that livestock's contribution to the GDP is important but often not included into the official statistics. He also noted that government budgetary allocation to livestock services is less than 1% against its contribtion to GDP which is about 6-15%. It is against this background that this workshop was convened in order to convince governments to increase their budgetary allocations to livestock services in Africa. Both public and private sectors are welcome to invest in livestock provided that they convinced that the sub-sector has positive returns to the investments. The AU-IBAR office has a continental mandate for livestock development but its calls upon the support of national governments and the private sector in this noble cause.

A representative of the EC Delegation in Ethiopia also addressed the meeting and retaliated the support of the European Union towards the financing livestock services especially in PACE member countries. He said that EU was attending the meeting as an observer but was interested in the recommendations of the workshop for sustaining livestock services in Africa.

African Union's Commissioner for Agriculture and Rural Economy, Her Excellency Madam Rosebud Kurwijila then gave the keynote address. She welcomed all the participants to the workshop on behalf of the Chairperson of the African Union, His Excellency, Dr. Alpha Konare who was away on other official committments. In her speech, the Commissioner stressed the importance of livestock in the economic development of African countries. She reminded the participants on the African Union Heads of States meetings at Maputo and Libya where the livestock sub-sector was given prominence. Given the importance and priority of livestock in national development policies, it is now time for our governments to encourage increased public and private sector investments into this sub-sector. Governments must, among other reform measures, commit a significant portion of their national budgets to livestock development. An important part of the gross domestic product contributed by livestock to the economy must be ploughed back in to this sub-sector for it to grow. Market-driven and private sector-led growth need to be promoted through a conducive investment climate. The commisioner alos noted the importance of trade in livestock and its products among and between African countries as well as other

international markets. She hoped that the meeting will develop convincing ways and means to policy makers towards increasing investments (both by public and private sectors) into livestock sub-sector. She then declared the workshop officially open.

After the opening ceremony, the provisional agenda was accepted and election of the bureau for the meeting was done. Kenya was elected as the chair while Benin was elected as vice-chair. Sudan and Togo were elected as rapporteurs. This was followed tea/coffee break after which the following presentations were made;

Dr. Rene Bessin

Presentation: *Workshop Objectives*

Dr. Rene Bessin, PACE program Coordinator then briefly outlined the workshop objectives. Referring to the opening speeches that gave many examples of the importance of livestock to Africa, Dr. Bessin put these examples into the context of the AU / IBAR PACE programme. This programme works to control epizootic diseases and establish epidemio-surveillance zones. Livestock productivity is severely constrained by livestock disease and examples of the impact of trans-boundary diseases (TAD) were provided. For example, IBAR estimated the economic cost of CBPP in 12 countries during PARC and shown that the direct and indirect production losses averaged 2.3 million Euros per country for endemic CBPP and 3.8 million Euros in epidemic CBPP.

After providing this back ground information, Dr. Bessin noted that the workshop was designed to among other things measure the effects of the determinants of Africa's production and exports of meat, milk, and livestock commodities and to evaluate the significant amount of foreign exchange earnings from trade and exports.

The workshop objectives were detailed and include the following:-

1. Present economic justifications for adequate funding of animal health programmes;
2. Examine alternative fund-raising strategies for financing of national surveillance systems and vet services in general;
3. Examine the possibility of export-driven initiatives to promote investments in livestock production

He noted that a participatory methodology will be adopted for the workshop, based on analysing the current situation, setting long-terms objectives and developing alternative fund raising strategies.

Dr. Bessin informed the participants that the anticipated results of the workshop are :-

1. Participants are sensitised on the need to provide adequate funding for national veterinary services and surveillance systems;
2. Development of alternative strategies for fund raising
3. Promote, assess and identified livestock production and commercialisation;
4. Production of a future plan of action.

Dr. Bessin concluded by noting that the African Economic Community was created in June 1991 and had identified Agriculture and livestock as priority number one in the field of cooperation between member states with the ultimate objective to increase production and productivity to tackle food security. That livestock generates important income that can be reinvested in other development activities.

Mr. David Mwangi – Representing the Lead EC Delegation for the PACE programme - Nairobi

The EC welcomed the participation of some member states and their representatives of Ministries of Finance. Mr Mwangi highlighted key areas for the efficient running of the PACE programme and its numerous national components

Decommittment
Each EC delegation and PACE member state should be aware of the balance on their PACE funds. Funds have to be decommitted before any extension of funding can be considered. The rules of decommittment are available in the various EC manuals of procedures.

Workplans
Workplan must be approved

Proceedures
Partner states have their own procedures for utilisation of PACE funds – harmonising proceedures is a challenge but important. Establishment of real working relationships with local EU delegations is vital. Formulation of steering committees is useful in acheiving these linkages, as all major stakeholders are present on such committees. Close coordination between technical ministries and finance ministries is a vital component. Recognition of the roles of the the RAOs and NAOs is also important. In deed it is worth while to attend training on EC proceedures.

Dr. Bidgeh Kebkibeh
Presentation: *Epidemio-surveillance systems: Their importance for effective veterinary service*

Dr. Bidjeh highlighted the reasons for improving animal health. He noted that TADs are the one of the biggest impediments to livestock production and international trade. The World Organisation for Animal Health (OIE) pathways for verification of freedom from diseases such as rinderpest requires are documented and rely on the establishment of effective epidemio-surveillance systems. These systems are being assessed and supported by the PACE programme. PACE works closely with the World Organisation for Animal Health (OIE) to establish these systems. However the member states do need to take over the financing and running of these systems as the PACE programme phases out.

The vital components of an epidemio-surveillance system were described. It was emphasised that epidemio-surveillance systems are not independent from national veterinary services but are an integral part of vet services. The importance of institutional strengthening of vet services to allow efficient epidemio-surveillance was underscored. Finally the types of financial support for efficient functioning of epidemio-surveillance were detailed eg. provision of a cold store and laboratory kits.

IBARs support role
AU/IBAR's "PID" data handling system was given as an example of how IBAR is using computerised systems to support standardisation and dissemination of the results of epidemio-surveillance systems. IBAR is also providing training for filed workers, laboratory technicians and on the interpretation of results of epidemio-surveillance. IBAR is developing performance indicators for the sytems.

Finally an over view of PACE and the progress of member state projects was provided.

Dr. Emmanuel Tambi
Presentation: *Analysis of the costs and benefits of animal disease control*

Dr. Tambi gave an analysis of the economic costs and returns to investment of CBPP and Rinderpest diseases. He discussed the various aspects of the control of CBPP including vaccinations and treatment as well as other options like stamping out. The vaccination and treatment option was given prominence. The conclusion of this was there are huge economic costs associated with the CBPP control and that the national governments should propose concerted efforts in order to fund a regional or continental program on the control of this disease.

Dr. Otieno Mtula

Presentation: *Pro-poor livestock policy research findings and conclusions*

Dr. Mtula observed that experience shows that most technology-oriented projects in the livestock and related sectors have generally been unsuccessful, and furthermore the few that succeeded in reducing poverty had a distinctly enabling institutional and policy environment. He commented that building effective institutions is critical in fighting poverty and effective institutions can make the difference in the success of market reforms and wealth creation. The conclusions of a study on policy and institutional issues and poverty for the livestock sector covering 5 countries in Eastern Africa was presented. As per other presentations, Dr. Mtula noted the general lack of proper recognition of the contribution of the livestock sector to the overall economy and to securing of livelihoods in Africa and suggested studies be undertaken on the contribution of livestock to national economies and human development, that fora be organised to advocate, network and share information on the importance of livestock to national economies and human development. Findings of the study were that the livestock sector was generally included in the PRSP but not adequately captured. The need for relevant detailed poverty and livestock data in all countries was also retaliated. The study also noted that the policy formulation process in all the countries was characterised by a strong top down orientation with heavy government influence plus inadequate participation of the poor in the policy making process. Policy making and policy making processes are complex as they involve a wide cross section of interests, a web of interrelated decisions, evolution over time, evolution during implemented, operate as political technologies, are enmeshed in relations of power between citizens, experts and political operatives. As a result of the above many government functionaries admitted that they needed knowledge on policy making and policy-making processes; policy makers were not always able to respond to frequent changes requiring updating or making of new policies; the biggest group of livestock policies were actually missing or outdated policies; policy monitoring and evaluation mechanisms remain grossly inadequate.

Further more it was concluded that the capacities of partners to utilize a livelihoods approach needs to be built in order to identify key policy and institutional constraints affecting the use of livestock in poverty reduction.

Dr. Mtula confirmed that if the countries are willing to invest in the areas mentioned in this paper, IBAR as an international technical and policy organ of the AU is willing to work and collaborate at a regional level to support pro-poor policy and institutional development for Africa's livestock sub-sector.

Dr. Gijs Van't Klooster
Presentation: *Gaining access to international commodity markets for African Livestock Commodities*

After providing back ground information on livestock prodcution and trade figures for Africa and the globe, Dr. Klooster mentioned that there are two main types of trade barrier - tariff and non-tariff. Despite the previous efforts (Uruguay round and WTO round at Doha) in reducing tariff barriers, industrialised countries spent approximately US$ 1 billion on agricultural subsidies each day during 2003. One day of these subsidies is equal to the total annual revenue Africa derives from the export of livestock commodities.

Dr. Klooster confirmed that WTO is working to minimize non-tariff barriers through the "Agreement on the Application of Sanitary and Phytosanitary Measures" (SPS Agreement). Under SPS, any country, developing or otherwise, wishing to access international markets needs to comply with sanitary standards (safety and quality) that satisfy the appropriate level of protection required by the importing country and, by international convention, norms prescribed by the WTO. SPS requires that standards of safety be unambiguous, scientifically based and realistic. WTO's partners in setting SPS standards are the Office international des épizooties (OIE), the World Organization for Animal Health, which sets the standards designed to minimize the risks from animal diseases, including zoonoses, to human and animal health and the Codex Alimentarius managed by FAO / WHO which sets standards for human food safety.

Dr. Klooster noted that the OIE Code's fundamental basis for setting standards based on risk is the disease/infection status of the country or zone from which the livestock or livestock commodity is derived. Because of this countries with disease are pre-occupied with establishing disease free status of disease free zones rather than trading. But as Africa contains 12 of the OIE's 15 "list A" trade-sensitive diseases, eradication is expensive, slow (and impossible for some countries).

To overcome constraints linked to national disease eradiation programmes IBAR has studied alternative mechanisms. Dr. Klooster described three alternatives:-

1. Export Zones, geographically defined areas with a perimeter that should only be crossed by defined animals species or feed-stuffs, fomites etc and be free of a particular disease / infection. Such zones have problems as Africa has many trade sensitive diseases and such zones are generally outside existing marketing chains

2. Export Systems (Compartmentalisation), are slightly more practical and they consist of geographically dispersed production systems where risk reduction measures are applied to control defined TADs.

3. Commodity-based trade whereby international standards for biological safety be based on the inherent potential risk posed by the commodity in question. It is believed believe this approach would better facilitate international trade in the longer term by providing a simpler and more transparent mechanism for assuring the safety of commodities, rather than reliance on the disease-freedom of countries. It was further noted that processing of foods at national level can further reduce risk eg. Canning and add value to the product. However for a commodity based system to function clarification is required between the roles of OIE and Codex Alimentarius and credible certification is going to be absolutely crucial.

For countries to make an investment in surveillance they need to see a return. Commodity based trade requires more than just epidemio-surveillance, it requires certification, focus and private sector contributions. Dr. Klooster concluded by stating that for sub-Saharan Africa, a commodity-based approach combined where necessary with processing/value adding will in most cases provide adequate risk reduction for livestock commodities. This is far easier and less expensive to achieve than current attempts at disease eradication required under current SPS guidelines.

Dr. Emmanuel Tambi and Onesmus Maina –
Presentation: *Guide-line funding levels needed to sustain national epidemio-surveillance systems.*

Onesmus Maina gave an overview of the current implementation of the PACE program in the different countries. It was noted that so far at least 30 countries have submitted a workplan and cost estimate to AU-IBAR for funding consideration. He said that 4 countries are implementing their second-year WPCE while 21 countries are already in their third-year program implementation. Five countries are implementing their fourth-year WPCE. Government contributions in the various countries were analysed from year one to year four. These were then compared as a proportion of the total funding from both EU and the national governments. It was generally noted that the level of government contributions were not matching the required amounts as stipulated in the PACE program financing agreement where countries were required to increase their contributions as early as possible. Countries were called uponn to increase their contributions to livestock services as donor funding nears a close.

Dr. Tambi then gave the required funding levels needed to sustain the epidemio-surveillance systems in a sample of seven PACE countries that managed to complete a questionnaire previously circulated. The analyses included the costs of both passive and active surveillance systems. The preliminary conclusions from the data analysed for seven countries are that if national governments must sustain the activities of PACE after it come to an end, the estimated amounts presented will have to be put aside for each head of livestock with the country. Since governments are currently paying salaries regardless of whether effective surveillance is on-going, it would be appropriate for them to incorporate in the national budget, the equivalent of the non-salary charge required for operational activities.

Afternoon Session

This session was devoted entirely to group discussions and plenary presentation of the results on the topic

Assessment of funding needs of veterinary services and the ability of governments to fund these services.

Group I Report

CHAIR: Dr. Sonhaye from TOGO
RAPPORTEUR: Mrs R.P. Tumusiime from UGANDA

Other countries represented were :-
Burundi, Nigeria, Ghana, Kenya, Mali, Benin, Burkina Faso, Chad, Tanzania, Sudan, Djibouti and European Union.

The guiding principle of the group's discussions is the need to increase funding to the Livestock industry policies and programmes must promote public/private partnerships.

POLICY FRAMEWORK

A conducive environment is needed to streamline roles and responsibilities of the different players i.e central local governments, private sector. It is also important to have a policy framework which attracts private investment into the sector. Issues considered were:-

- Institutional arrangement
- Private sector participation
- Trade related issues

RESOURCE REQUIREMENTS FOR VETERINARY SERVICES

The group identified critical areas which require funding:-

A) HUMAN RESOURCES

- Personnel (number expertise etc.)
- Training (skills development)
- Technical Assistance, consultants

B) EQUIPMENT AND CAPITAL REQUIREMENTS

- Laboratories, buildings
- Vehicles
- Office requirements (computers, kits etc)

IMPLEMENTATION PLAN
The group identified the following as being crucial for Livestock development:

- Sensitization (policymakers, leaders, MF/Planning)
- Analysis of veterinary services development for PRSP

Possible sources of Funding/Potential sources

- Establishment of a livestock development fund
- Mainstream livestock concerns into PRSP for increased budget support
- Identify attractive aspects for private sector investment opportunities

The overall objective is to ensure that livestock funding increases. The following arguments can be used to convince governments:-

- Maputo recommendation
- Cost benefit analysis outbreak
- Dangers of disease outbreak
- Potential for increasing household in cases & foreign exchange

Group II Report

Group II was composed of the following members: Ghana, Nigeria, Chad, Senegal, Somalia, Burkina Faso, Kenya, Sudan, Burundi and Tanzania.

Memebers of the group selected Kenya as the chair and Sudan as the rapporteur. The group examined the above topiç and decided to split it into parts namely:

1. Assessment of funding needs
2. Ability of government to fund these services

Regarding the assessment of funding needs, the group came out with the following needs:

1. Information network (consisting of personnel, equipment and running costs)
2. Communication
3. Provision of material, financial and humn resources
4. Training and capacity building
5. Research upgrading
6. Legislation
7. Policy reforms (involvement of private sector)
8. Increasing the capacity for intervention (human and financial)
9. Introduction of computerized systems for collection, processing and dissemination of data.
10. Strengthening the civil society
11. Strengthening the veterinary services delivery institutions

On the ability of governement to fund these services, the group concluded that the topic was related to government policy formulation. After deliberations, the group came out with the following results;

1. The governments should develop clear cut policies
2. Livestock sector role in national economy should be recognized.
3. As the government is aonly able to fund part of the needed services, other partners including the private should be called upon tgo fund some of these needed services
4. Governments should develop isssues to cut on taxes on livestock and develop retention schemes to reduce burden on breeders.
5. Governments should develop funds to facilitate marketing of livestock and its products.
6. Governments should allocate part of its national revenue to fund these services.
7. Governments should develop policies together with private sector

8. Mobilize lobbying groups to sensitize the governements to be convinced to fund services and concentrate on profitable services.

Day 2
Tuesday, March 30, 2004

Dr. Francis Inganji
Presentation: *Improved development communication for sustainable investments in livestock development.*

Dr. Inganji outlined the main objective of development communication which is develop and promote tools for sentizing policy makers regarding increased investments into livestock development. The modalities for communication's role in livestock development and the type of data required was also highlighted.

Group discussions were held soon after this presentation where the following topics were deliberated upon.

1. Identification of livestock export-driven opportunities to promote sustainable investment in national epidemio-surveillance systems.
2. Targetting and approaching government and private sector sources of funding for national epidemio-surveillance systems.

Results of the group discussions were as follows;

Group I

Thême : Choisir et solliciter des sources de financement approprées (gouvernement et secteur privé) pour les systèmes nationaux d'épidèmiosurveillance.

Président : Tchad
Rapporteurs : Ghana
Burkina Faso
Pays participants: (1 rapport 1 rapporteur)

D'entre de jeu le président a demandé au modérateur de faire un rappel sur le sujet suivant l'exposé fait lors des présentations de la précédante journée.

Après ce rappel, les participants ont été invité à intervenir plusieurs interventions ont été entendues. On peut retenir que deux secteurs ont

été entendues. On peut retenir que deux secteurs ont été concernés. Il s'afit du gouvernement et du privé. Les responsabilités se résument ainsi qu'il suit concernant le gouvernement.

- Désengagement de certains activités véterinaires telles la transformations et la commercialisation au profit du privé.
- Mise à disposition d'un pourcentage des taxtes et impôts (importation) au profit des services de l'elevage
- Mâitriser les statistiques
- Facilitation de encouragement pour les activités des privés (vente d'animaux et produits animaux)
- Entreprendre une politiques de long terme
- Assaisir l'environement de juridique et réglementation
- Des fonds pour la promotion de l'elevage
- Promotion de la transformation – faire des etudes
- Subventionnement certaines activités de l'elevage préable
- Information et côntrol (des activités)

Le secteur privés

- Reprise et promotion des activités non encore explosées et exploitées
- Entreprendre les élevages communautaires

Un secteur nouveau a ne pas omettre c'est les collectivités locales qui à travers leur activités faire profiter es taxes parcues au profit les services de l'élevage donc des système national d'épidemiosurveillance.

RECOMMANDATIONS

1. Mettre en place un cadre propice au développement de l'élevage
2. Mener une étude sur les oportunités de productions transportation et de commercialiation
3. Promouvoir les productions et éleveurs privés satisfaires les exigences des consommateurs.

Group II

This group met under the chairmanship of Kenya and Sudan was the rapportteur. After the deliberations on the two topics, the group agreed to broaden the concept of export driven opportunities to cover all issues related to livestock sector export without confining it to epidemio-surveillance and moved towards commodity-based approach to promote trade.

The group started by listing livestock products for which countries usually export or have potential for export. These products were as follows:

- Live animals and their by-products
- Meat frozen, chilled and canned.
- Fish and poultry
- Offals
- Skins and hides
- Dairy products
- Horns, hoofs and bones
- Eggs and feathers
- Honey from bees and hives
- Wildlife and their products
- Genetic resources

The group then discusssed the export-driven opportunities and concluded that this depended on the demand for the products being exported. The first step needed then was to conduct a research study to dentify the importing markets demand. Based on the findings of the study, policies could be improved or formulated accordingly.
The group also recognizes that demand for livestock products is increasing at the same time supply is limited. This then has created shortages which could be filled through the following interventions;

- Intensive livestock production
- Development of focussed and appropriate livestock policies
- Market research studies (domestic and international)
- Strengthening regional trade in livestock and its products through the regional economic blocks.
- Encourage member countries to develop enabling environment to allow private sector to invest and promote trade.
- Develop infrastructure
- Encourage bilateral agreements between the exporting and the importing countries.
- Endorse certification and improvement of the veterinary services to enable exporting countries meet the required standards of their produccts.

Regarding the second them which was targetting and approaching governments and private sector sources for funding the epidemio-surveillance systems, the group agreed on the following;

- Divide the areas of responsibilities into three categories namely government, private sector , shared resonsibilities and others.

Government responsibilities then included rreserach, basic infrastructure development, capacity building, marketing, diseases

control, formaulation of appropriate policies and legislation, and information.

Futher the following activities could be used to supplement government efforts in meeting the above responsibilities.

- Develop a mechanism to create an enabling environment for the private sector to invest in livestock development.
- Develop a private sector-inter ministerial collaboration and coordination system.
- Improve funding to the livestock sector through improving the veterinary services to perform better.
- Rationalize veterinary services by improving service delivery and basic infrastructure.
- Institutionalize chenge in the veterinart services as a continous process.
- Harmonize policies among the various government ministries for improved, livestock development.

Private sector responsibilities in the veterinary sedrvices provision include disease curative and preventive neasures.

Shared responsibilities between the government and the private sector, these could be marketing and communication development, human resources development and disease control.

Other category could include the civil society NGO's and donor organozations. These groups responsibilty is to provide funding to the private sector and government for livestock development. One option of funding is to establish the livestock development funds.

After the presentations to the plenary of the results of their discussions, the following draft recommendations on the budgeting to sustain the national livestock services including the epidemio-surveillance systems were made:

DRAFT RECOMMENDATIONS

A- TO GOVERNMENTS

1. Recognizing the important role of livestock in economic development of African countries and the non-inclusion of its real contribution in the official national statistics, it is recommended that governments should officially recognize this contribution and adequately allocate resources when budgeting.
2. Recalling the resolution adopted by the Heads of State and Government in Maputo and the Sixth Conference of Ministers

responsible for animal resources which took place in Addis Ababa, Ethiopia, it is recommended that governments should allocate at least 10% of the national budget to agriculture in general, and a significant part of this to the livestock sub-sector.

3. Recognizing the importance of animal disease control and eradication in promotion of trade in livestock and livestock products, it is recommended that governments allocate adequate resources for this.
4. Given that Africa is currently losing about 2 billion US$ per year on imports of livestock and their products, it is recommended that countries should increase and add value to livestock products so as to enhance their competitiveness in domestic and international markets.
5. Given that there is inadequate availability and exchange of information on trade in livestock and its products, there is an urgent need for the establishment of an Information and Communication network on trade . This will facilitate free flow of information on trade potential in Africa. This can be achieved through regional economic communities and international organizations.
6. Member countries are urged to liaise with other regional commisions to strongly lobby at the OIE general session to endorse the concept of commodity-based approach for the purpose of promotion of livestock trade in Africa.
7. Governments should undertake studies on livestock production , processing, and trade opportunities in each member country.
8. It is further recommended that emphasis should be placed on the development of transport and infrastructure to enable free circulation of livestock, livestock products and commodities, at national regional and continental level.
9. It is recommended that Governments should establish market research centers which can produce accurate and reliable data and information on the value, volume and direction of trade in Africa. They should also conduct studies on Africa's comparative advantage in livestock production and trade.

B.- PRIVATE SECTOR

1. In view of the declining ability of national governments to continue funding livestock activities, it is recommended that the private sector be involved in profitable livestock development activities.
2. Given that certain livestock development activities activities can be carried out jointly by the government and the private sector, it is recommended that countries should establish a strong linkage between the public and private sectors.

C AU/IBAR

1 Given AU/IBAR's continental mandate on livestock development in Africa, it is recommended that IBAR strongly lobby countries to avail adequate resources to livestock development activities.

The above draft recommendations were then discussed at the plenary session where various ammendments and additional suggestions were made.

The draft recommendations will be re-casted and polished by the workshop secretariat and then circulated to all the participants together with the workshop proceedings.

The delegate from Benin read the final communique while the delegate from Burkina Faso moved vote of thanks to Ethiopia for hosting the workshop. A vote of thanks was also moved by the delegate from Nigeria to the AU Commission for organizing and facilitating the workshop.

The workshop was officially closed by the Director of Rural Economy and Agriculture Division in the Department of Rural Economy Dr. Ibrahima Diallo on behalf of the Commissioner H.E. Madam Rosebud Kurwijila. Dr. Diallo thanked the AU/IBAR and the European Union for organizing and facilitating the workshop. He said that the workshop was useful and will go a long way to convincing the governments of member countries concerned to increase their allocations for livestock services. Countries should continue to provide sound and convinicing economic arguments while lobbying for increased funding to livestock. He then wished the participants safe travel back to their countries.

Epidemiology Unit

Final Report – Regional workshop on Rift Valley Fever

African Union
Interafrican Bureau for Animal Resources (IBAR)
Pan African Programme for the Control of Epizootics (PACE)

Final report
Regional workshop on
RIFT VALLEY FEVER

Dakar (Senegal) : 20 - 22 January 2004

A. Introduction

The Rift Valley Fever (RVF) is a disease caused by a virus of the *Bunavirides* family of the *Phlebovirus* type. It affects many animal species as well as man (major zoonosis).The virus is transmitted through various mosquito species (*Aedes, Culex*...) which are biological vectors. Man is directly contaminated through contact with infected animals and the handling of meat or contaminated bodies.

In West Africa, the disease has been declared for many years now, but with irregular virulence and frequency. However, given the resurgence of RVF foci in the sub-region in 2002 and 2003 (Gambia, Mauritania, and Senegal) (1), now was the appropriate time to make an assessment, exchange the latest information on the last foci in the countries involved, but also review the latest result of research on this issue, and to consider collective and concerted control strategies.

Thus, on January 20- 22, 2004 was held in the conference room of the SAVANA hotel in Dakar, under the aegis of PACE, a regional workshop on RVF with the participation of officials of Veterinary Services and Public Health Services of Mali, Mauritania, Senegal, and Chad, as well representatives of various institutions working on the subject (UA-IBAR-PACE, FAO, OIE, CIRAD, IRD, ISRA-LNERV, Pasteur Institute of Dakar, EISMV...).

The opening ceremony of the workshop was chaired by Doctor Ameth Yoro DIALLO, the Honourable Minister of Animal Husbandry of Senegal in the presence of the Representative of the European Commission Delegation in Senegal, the Director of the Pasteur Institute of Dakar and the Director of the National Laboratory of Livestock and Veterinary Research (LNERV).

The objective of the meeting was to exchange experiences and develop strategies for the control of RVF. Participants attended and discussed the following different presentations :

- Assessment of the current situation of the disease and surveillance activities in the countries involved
- The aftermath of the FAO Technical Cooperation Project on the surveillance and control of RVF in West Africa (Mali – Mauritania – Senegal),
- Perspectives in the area of disease surveillance,
- Entomological studies carried out in West Africa,
- The molecular epidemiology of RVF in West Africa,
- The laboratory diagnosis of RVF,
- Animal vaccines in emergency situations and the interest of establishing a vaccine bank,
- Vaccination trials with the attenuated R566 strain of the RVF virus in sheep in Senegal,
- The use of remote sensing for predictive purposes,
- The modifications brought to the chapter on RVF of the Health code for land animals of the OIE and their implications,
- The evaluation and modelling of RVF-risk in the Ferlo-region.

B. Summary of Communications & Discussions

After the opening ceremony, the Regional Coordinator of the PACE programme, Dr Bouna Diop, gave a background overview of the stakes and the interest of the meeting.

1st Session :

The first plenary session which was chaired by the Director of Livestock Services in Senegal, Dr. Abdoulaye B.Niang, was used for the general presentation of the disease situation in countries.

The Gambia : has reported confirmation of numerous foci of RVF on several sites in 2002, and in 2003, where cases of abortion and mortality in small ruminants were reported. Because of the absence of serological diagnostic capacity in the country, various samples were taken to and analysed in Senegal (at the LNERV of Dakar-Hann and at the Pasteur Institute of Dakar). In doing so, the health authorities of the country managed to confirm the diagnosis of 2 human cases with severe forms (haemorrhages and encephalitis) in January 2003. The measures taken included raising public awareness and providing information, active surveillance, emergency planning preparation and the establishment of multi-disciplinary teams.

Mauritania : The representative presented the RVF surveillance system through REMEMA, where a distinction is made between 'passive' and 'active' surveillance. The first is carried out by all the agents and is based on an alert threshold of less than 10% of abortion in animals to trigger epidemiological surveys and samples. Active surveillance is based on 'sentinel herds' located in risk areas (close to temporary ponds and along the River Senegal). Results show that the country has had numerous epidemics in the past (1982, 1987, 1998, and 1999), followed by a break in 2000 and 2001 and a strong resurgence in 2002 and 2003 (several foci in 5 regions). Likewise, 5 cases were confirmed in humans in 2003. An emergency plan (including vaccination and vector control...) is being considered. He concluded by recommending the establishment of a regional control strategy.

Mali : The first alert was given in 1998 with two positive sheep for RVF IgM. At the time, no clinical cases or manifestations were recorded. No RVF case was ever diagnosed in humans either. Currently, 'passive' surveillance is conducted (the TCP being ended, active surveillance through sentinel herds has ended too). Prospects are essentially aimed at reinforcing surveillance activities, sensitisation and vaccine development. Information on the monitoring of RVF at the human level was presented by the representative of the Ministry of Public Health.

Chad : After having presented the animal disease surveillance system REPIMAT, the representative reported about 2 cases diagnosed in humans in the French armed forces based in Chad. Preliminary investigations have shown 53% of positive ovines (IgM) out of 497 animals slaughtered (bovine, sheep and goats) ; on the other hand, no clinical signs have been reported to date. A surveillance programme is being developed.

Senegal : The first appearance of the disease goes back to 1987, followed by a 'quiet period ' which continued until 1992. The virus circulated anew in 1993 and 1998 preceding the appearance of local foci in 1994 and 1999 at Ross-Bethio and Ranerou. Very recently, foci were recorded in 2002 with an extension over several regions along the banks of the River Senegal in 2003. The current surveillance system has made it possible to detect foci but is characterized by (1) lack of operational means for the veterinary posts which represent baseline structures, (ii) difficulty in maintaining sentinel herds (vaccination, miscellaneous veterinary care...) and (iii) lack of vaccine and vaccination strategy to propose to herdsmen and owners.

The discussions for this first session mainly focused on :

- ✓ The difficulty in accurately determining the transmission risk periods and spread of the disease, particularly because of vectors (normal 'quiet' years followed by epidemics...).
- ✓ The inadequacy of the current regional control approach.
- ✓ The inadequacy of RVF surveillance in man and of collaboration between veterinary and public health services ;
- ✓ The interest of using sentinel herds for the monitoring of virus circulation and the disease which remains an indicator but does not allow an assessment of prevalence;
- ✓ The impact of the disease on camelids and the role this species could have, particularly in Mauritania.
- ✓ The necessity to carry out more in-depth epidemiological 'analytical' studies in order to determine risk factors, while simultaneously making appropriate use of descriptive studies already carried out : entomological studies as well as molecular epidemiology studies.

2nd Session :

The second plenary session, chaired by Dr Kebkiba Bidjeh of the PACE epidemiology unit focused on the following communications :

Follow-up on the TCP FAO projects on RVF in West Africa : Dr Vincent Martin from FAO made an assessment of the two projects sponsored by this institution (TCP in Mauritania and Regional TCP (2) indicating that the results were positive and have improved the knowledge we have of the disease in the sub-region (confirmation of virus circulation, establishment of a surveillance system, epidemiology of RVF, consultations and collaboration amongst stakeholders, regional coordination...).

Surveillance of RVF and prospects : Dr Martin stressed the importance of pre-epizootic detection, enabling to set off an early warning. A better knowledge of the disease would be necessary in order to develop efficient control strategies. A certain number of surveillance indicators were presented: (i) direct indicators (field observations, isolation of the virus, serological surveys...) and (ii) indirect indicators (risk zones, sensitivity of population, risk factors...). After having listed the pre-requisites and constraints, the speaker highlighted a few feasible strategies including vaccination in two forms: 'systematic vaccination in risk zones' vs 'systematic mass vaccination'. Advantages and disadvantages of the two options were presented.

Entomological studies in West Africa : Dr Yamar Ba of the Pasteur Institute at Dakar reported on the results of entomological studies conducted in the sub-region. He demonstrated that *Aedes* seems to act at the beginning of the rainy season while *Culex* intervenes towards the end of the rainy season. The action-radius of the latter would seem to be about 500 – 600 m. from water points (ponds, wells,...).

Molecular microbiology of the RVF virus : Dr Ousmane Faye of the Pasteur Institute at Dakar presented the potential of molecular epidemiology in the study of the disease, particularly on the genetic links between viral strains. This approach contributes to an understanding of the outbreaks of RVF-epidemics (geographic origin of the virus, transmission, links...).

The laboratory diagnosis of RVF : Dr Karim Tounkara of PACE reviewed the conditions necessary for a sound laboratory diagnosis. The collection of samples, the screening of animals, the packaging and shipping of samples were all reviewed. The laboratory tests for a diagnosis of RVF were described and a list of reference laboratories was presented.

Discussions at the conclusion of presentations highlighted the following points :

- ✓ The importance of the role of farmers in the surveillance of RVF;
- ✓ The current knowledge, which is still inadequate to carry out efficient vector control. Research is still necessary particularly in order to study the behaviour of the vector in its environment and its behaviour regarding insecticides.

3rd Session :

The 3rd plenary session was chaired by Dr. Lemrabott Ould Mekhalla of Mauritania and focused on the means and tools to fight against RVF.

Animal vaccines in emergency situations and the interest of having a vaccine bank : the communication presented by Dr Fatah Bendali of the PACE epidemiology Unit, concertrated on the vaccination-options against RVF. After having underscored the rationale for this vaccination, the different vaccines available (live vs inactivated) were presented, the advantages and drawbacks of each of them were discussed in terms of immune protection, side-effects, costs and feasibility in field conditions... The intervention also underlined the importance of the choice of vaccination strategy (mass, targeted, establishment of a vaccine bank...).

Current development of vaccines against RVF : Dr Yaya Thiongane of the ISRA-LNERV presented the preliminary results of vaccination trials with the R566 strain in sheep and goats in Senegal. The first results seem encouraging as no pathogenic effects have been noted, immune protection is rapid and does not cause any teratogenic effects in gravid females. This makes this vaccine-strain once again a potential promising candidate pending the conclusion of tests and certification in other conditions.

The use of remote sensing for predictive purposes of the RVF : Dr Martin of FAO showed that in RVF control, because of the vector borne characteristics, the use of new technologies (satellite images, MIS, ...) for the prediction of climate changes (temperatures, rainfall...) appears to be very useful. Promising predictive models were presented. The necessity of a strategic and combined approach (deductive and mathematical) will enable modelling of the risk of outbreak and transmission of RVF, not only in the region, but also outside Africa.

Implications of the new chapter of the OIE code for RVF : Dr Bidjeh of PACE referred to the new chapter of the OIE Code adopted in May 2003 (3). He reviewed the specific nature of RVF in Africa (history, epidemiology, complexity of surveillance...) and underlined the alterations planned in the new code, notably in terms of exports.

Analysis of the risk of outbreak of RVF in the Ferlo (Senegal) : Dr Véronique Chevalier presented the preliminary results of a study conducted by CIRAD in collaboration with the LNERV-ISRA, IP and IRD and focusing on 4 research axes (animal mobility and health risk, land-use, vector ecology and interface host-vector). It turns out that the rains determine the abundance of vectors (water quantity, distribution of rain episodes, length of rainy seasons). The benefit of a multi-disciplinary approach has been mentioned. Several research-areas remain to be explored and validated (distance to the pond, productivity of ponds and rainfall regime), the maintenance of the virus and the dynamics of the infection (in the host and the vector...).

The discussions which followed this series of presentations focused mainly on :

- ✓ The criteria which must determine the choice of vaccines to be used based on the epidemiological situation;
- ✓ The development of recombinant vaccines, advocated as an alternative solution, but this proposal did not reach a consensus agreement;
- ✓ The interest in pursuing vaccination trials with the R566 strain, which requires the availability of a Standard A3 animal reserve;
- ✓ The interest in having information on mass vaccination experiments carried out in Egypt, Yemen or other parts of the world ;
- ✓ The importance of a « cost-benefit » economic study which could facilitate the choice of control strategies against RVF.

4th Session :

This session, which was chaired by Dr Soumana Diallo of Mali, was used for group proceedings and reporting on the results in a plenary session. Participants were divided into 2 groups and had to discuss the following two points:

a. Strategies of control of RVF
b. The management of emergency situations in case of an outbreak of RVF.

Following the reporting on proceedings and discussions in plenary session, the following recommendations were adopted:

C. Recommendations

The discussions in plenary sessions and in group proceedings made it possible to adopt the following recommendations:

1. Strategies of Control of RVF

The workshop made the assessment that the state of knowledge is still incomplete on certain aspects of RVF (analytic epidemiology, definition of risk areas, vector biology, efficiency of insecticides, etc.) and that this requires conducting more studies and/ or medium or long term research.

The workshop believes that in the current state of knowledge, disease control must be considered more through vaccination than through vector control.

1.1. Control of RVF through vaccination

Vaccination against RVF is aimed at the protection of cattle against the consequences of the disease (abortions, mortality in young animals), at the suppression of the amplification-cycle of the virus in animals and hence, at establishing a protective shield for man in areas where the virus circulates.

The workshop therefore recommends vaccination as the tool of choice, both in emergency situations and as a preventive measure.

Two vaccines are currently available :

- an inactivated vaccine which is safer but of lesser efficiency, the cost being high and the availability limited,
- a live modified vaccine which confers greater immunity but which could also contain a residual pathogenic effect in animals and humans.

The workshop recommends that veterinary services, with the support of PACE, FAO, and OIE, do the utmost to gather all available information on the results of vaccination campaigns conducted in the Arabic peninsula (Saudi Arabia, Yemen), in Egypt, Southern Africa and the Far East. Such information should help in the decision making process on the vaccine to be used.

If vaccination campaigns are to be conducted, one presumes that surveillance activities have been carried out for a sound knowledge of the disease situation in the field and for a risk assessment, particularly in countries that do not have any data on the distribution of the disease.
In the short term, it will be useful to carry out cost-benefit studies in order to evaluate the vaccination strategies to be implemented.

In order to improve the availability of vaccines, the workshop recommends:

- That countries, in the short term, proceed to imports from production laboratories whenever the situation requires it and meanwhile develop a local production, which requires having certified strains of vaccines and further securing the current conditions of vaccine production.

- That the LNERV of Dakar, in collaboration with the Pasteur Institute of Paris, pursues research-activities aimed at the development of a vaccine derived from the R 566 strain by initiating as soon as possible, the necessary procedures to conduct the viral tests and the protection tests in an A3 standard animal environment (South African laboratory, for example).

- That the Pasteur Institute of Dakar (IPD) contributes to the task of validating a vaccine derived from the R 566 strain.

1.2. Vector control

The workshop acknowledges that several unknown elements remain to be clarified, before recommending systematic vector control.

Nevertheless, the workshop recommends that countries, in the short term, could turn to practical measures aimed at reducing vector numbers and consequently the risk of transmission of the disease. Such measures will aim at:

- Protecting animals through the use of « pour on » products and insecticide dipping,
- Protecting humans through the use of repellent products, particularly such traditional ones as smoke screens,
- Moving farmer camps away from ponds by advocating settlement at a distance of no less than 2 kilometres.

Active communication campaigns will be necessary in order to raise awareness amongst the communities involved on the measures adopted.

2. Management of an emergency situation caused by the RVF

The workshop considers that there is an emergency of RVF as soon as clinical cases of the disease are observed and confirmed in the laboratory. In such a case, the workshop recommends that countries observe the following line of conduct:

1. Declaration of the disease by veterinary services to : the OIE, FAO, AU-IBAR, neighbouring states and public health services; the latter being responsible for the reporting to WHO.
2. Implementation of sanitary police measures dealing in particular with the restriction or ban on animal movements towards or from the focus area.
3. Vaccination of herds grazing around ponds located in the focus area.
4. Implementation of in-depth epidemiological surveys (including the search for the virus at vector level).
5. Implementation of an information and sensitisation campaign of the population on the risks they run and measures which need to be avoided (stamping out of sick animals, handling of stunted animals).

The management of an emergency situation requires an early warning system. The triggering of the alert could rely on the following steps :

Presence of IgM antibodies in an animal or detection of viral circulation in humans or mosquitoes by virus isolation :

- Strengthening of epidemiological surveillance,
- Multi-disciplinary investigative missions (doctors, entomologists, veterinarians) around the herd involved if not the village and collection of samples to be analysed by the laboratory.

Negative laboratory result, i.e., absence of other IgMs and no clinical cases are reported.

- Maintaining active surveillance in the area concerned.

Positive laboratory result, i.e., increase in the number of IgMs and presence of clinical signs (abortions and/or rate of stillbirths) :

- Launching the alert and implement the measures advocated for emergency situations.

Any efficient fight against RVF requires a close collaboration between veterinary services (VS) and public health services (PHS). To that effect, the workshop recommends that countries which have not done so yet, establish a consulting and coordinating body for RVF related activities.

Countries are strongly advised to update regulations in order to add RVF to the list of mandatory reporting diseases.

Countries are also strongly advised to develop an emergency plan for RVF based on the guidelines developed by the EMPRES programme of FAO.

The workshop developed and adopted the following action plan :

D. Action plan

Activities	Countries	Deadline	Responsible
Improve baseline knowledge on the epidemiological situation of RVF	Chad and other countries (Burkina Faso, Côte d'Ivoire, Guinea, Guinea Bissau, Niger, etc.)	December 2004	VS[1] and PHS[2] of the countries involved, with the support of PACE, FAO, CIRAD[3], IP[4] and IRD
Carry out analytical epidemiological studies on RVF	Mali, Mauritania, Senegal, Gambia	December 2005	VS of countries involved with the support of PACE CIRAD, IP and IRD
Collect information on experiences with the use of live attenuated vaccines	All countries	July 2004	FAO, OIE, AU/IBAR/PACE
Update legislation or regulation regarding RVF	Countries involved	June 2004	VS and PHS
Develop an emergency plan and have it adopted by the competent authority.	All countries	May 2004	VS
Carry out a feasibility study with regard to vector control, in particular sensitivity tests of vectors to insecticides and individual protection measures at the human and animal level.	All countries	December 2005	IP, IRD, ISRA, CIRAD
Finalise vaccine testing using the R566 strain	All countries	November 2005	LNERV-ISRA, IP
Carry out a cost-benefit study of potential vaccination strategies	All countries	December 2004	FAO, AU/IBAR/PACE
Investigate options for the local production of the RVF vaccine	Vaccine producing countries	April 2004	LNERV-ISRA, IPD LCV – Bamako, FAO, PANVAC[5]
Establish a coordination mechanism between veterinary services and public health services	Countries involved	December 2004	VS and PHS
Sponsor an evaluation meeting about the best control measures against RVF	Countries involved	December 2005	FAO, OIE, AU/IBAR/PACE

[1] VS : Veterinary Services
[2] PHS : Public Health Services
[3] CIRAD: International Cooperation Center in Agronomic Research for Development
[4] IP : Pasteur Institute (IPD : Pasteur Institute at Dakar)
[5] PANVAC : Panafrican Veterinary Vaccine Control Center.

E. Conclusion :

This workshop made it possible to bring together countries of the sub-region which are confornted by Rift Valley Fever. The result of surveillance and control activities was presented and the experiences shared for the benefit of all. Important advances have been made in terms of knowledge and surveillance of the diseases. The disease is now indeed better diagnosed and better understood in the countries which are affected. Nevertheless, there are still some weaknesses related in particular to the complexity and epidemiology which are characteristic of this disease. Research areas and recommendations have been approved. A framework of activities has been adopted in order to improve surveillance and control of Rift Valley Fever.

F. Acknowledgements :

The Officials of the Veterinary and Public Health Services of The Gambia, Mali, Mauritania and Chad, as well as the representatives of AU – IBAR – PACE, of FAO, OIE, who travelled to Dakar to participate in the regional workshop on RVF adopted a vote of thanks to the Senegalese authorities and the Officials of the National Directorate of Livestock Services and PACE-Senegal for the very good organization of the workshop.

G. Bibliography :

1. International Office of Epizootic Diseases ; health information; http://www.oie.int
2. Proceedings of the seminar on epidemiological surveillance and control of Rift Valley Fever in West Africa (Mali – Mauritania – Senegal); FAO document; 2001.
3. Health Code for Land Animals, International Office of Epizootic Diseases ; Chapter 2.1.8 ; http://www.oie.int
4. All communications in this workshop (except those of the Pasteur Institute at Dakar) are available on simple request à the Regional PACE Coordination for West and Central Africa in Bamako : fatah.bendali@pacereg.org, or bouna.diop@pacereg.org

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Rapport Provisoire – Atelier Régional sur les strategies de contrôle de la PPCB en Afrique (25-27 février 2004, Guinée Conakry)

Union Africaine
Bureau Interafricain des Ressources Animales (IBAR)
Programme Panafricain de Contrôle des Épizooties (PACE)

Rapport provisoire
Atelier Régional sur les stratégies de contrôle de la PPCB en Afrique

Conakry (Guinée) : 25 - 27 février 2004

Introduction

Le Programme Panafricain de Contrôle des Epizooties (PACE) du Bureau Interafricain des Ressources Animales (IBAR) de l'Union Africaine (UA) a organisé à Conakry (Guinée) du 25 au 27 février 2004 un atelier de validation de stratégies de contrôle de la PPCB en Afrique et particulièrement dans les pays participant au PACE.

Ont pris part à la rencontre les responsables des services vétérinaires et de laboratoire de vingt pays de l'Afrique de l'Ouest, du Centre et de l'Est (Bénin, Burkina Faso, Cameroun, Cote d'Ivoire, Erythrée, Ethiopie, Guinée Bissau, Guinée, Mali, Kenya, Niger, Nigeria, Ouganda, RD Congo, Sénégal, Somalie, Soudan, Tanzanie, Tchad, Togo).

Ont également participé à l'atelier les représentants de la FAO, du CIRAD-Emvt et de l'UA-IBAR-PACE (Nairobi et Bamako).

Mercredi 25 février 2004

La cérémonie d'ouverture a été présidée par le Ministre de l'Agriculture et de l'Elevage de Guinée en présence de représentants de la Délégation de la Commission Européenne, de la FAO, de la Mission de Coopération Française, et de l'OMS en République de Guinée.

Trois discours ont été prononcés respectivement par le Représentant du Directeur de l'UA-IBAR, le Représentant de la délégation de la Commission Européenne en République de Guinée et par le Ministre de l'Agriculture et de l'Elevage de Guinée.

Après la cérémonie d'ouverture, les participants ont procédé à l'élection du bureau et à l'adoption de l'ordre du jour de l'atelier.

- Président : Guinée
- Vice-Président : Tanzanie
- Rapporteur : Services communs PACE (Bamako).

L'ordre du jour de la réunion est joint en annexe.

Présentation des objectifs de l'atelier

Le Coordonnateur du PACE, Dr Bessin, présente l'objectif de l'atelier qui est d'obtenir un consensus sur des stratégies de lutte contre la PPCB à mettre en œuvre dans les pays du PACE suite aux rencontres organisées par le PACE à Addis-Abeba (Ethiopie) en novembre 2001, à Accra (Ghana) en février 2003 et à Nairobi (Kenya) en mai 2003 ainsi que par la FAO à Rome (Italie) en novembre 2003. Il rappelle l'importance accordée à cette maladie et les travaux déjà entrepris dans le cadre des anciens programmes régionaux (PARC...).

Rappel des recommandations des ateliers précédents

Dr K. Bidjeh, de l'unité d'épidémiologie du PACE rappelle les conclusions et recommandations des ateliers qui ont été organisés sur le thème de la PPCB par le PACE à savoir :

- l'atelier d'Addis-Abeba en novembre 2001 (annexe 2),
- l'atelier d'Accra (Ghana) en février 2003 (annexe 3),
- la réunion d'experts de Nairobi en mai 2003 (annexe 4).

Rappel des recommandations de la réunion du 3ème groupe consultatif de la FAO sur la PPCB

Dr W. Amanfu de la FAO présente les recommandations de la rencontre du 3ème groupe consultatif de la FAO sur la PPCB qui s'est tenue à Rome en novembre 2003 (annexe 5)

Utilisation de la technique participative pour l'évaluation de l'impact des maladies émergentes):

(Dr G. Thomson, de l'unité d'épidémiologie du PACE, présente au nom du CAPE les principes de l'utilisation de la technique participative pour l'évaluation de l'impact des maladies émergentes. A l'inverse des approches conventionnelles, les approches participatives semblent fournir des solutions dans les zones où les méthodes classiques ne peuvent pas s'appliquer (zones pastorales, peu de données, cerner l'impact réel de la maladie/autres...).

Les données économiques sur 12 pays ont été étudiées par l'Unité d'Economie du PACE. De l'exemple de Tanzanie (15,6 millions bov), il en ressort des taux de morbidité et de mortalité très faibles (0,01 à 0,02% de mortalité) liés à la PPCB. L'étude de Modélisation a estimé une perte annuelle d'environ 2,1 à 3,7 millions d'euro, alors de les coûts de la vaccination seraient de 3,9 à 6,4 millions d'euro. Ces estimations basées sur des modèles mathématiques ont des limites (manque de données complètes et fiables). L'alternative serait l'évaluation d'impact par les approches participatives, avec l'avantage de facilité de rapidité et de coûts faibles, elles impliquent d'avantage des acteurs de terrains. Elle est bien utilisés en Afrique de l'Est mais moins en Afrique de l'Ouest et du Centre. Elle permet aussi de fournir l'effet de la PPCB par rapport aux autres contraintes liés à la production animale.

La méta-analyse (exploitation de toutes les données disponibles, de sources diverses) est abordée et expliquée, cette méthode peut probablement être une bonne solution.

Discussion générale sur les présentations

Dr Bessin souligne qu'il est nécessaire de clarifier la notion de: 'vaccination de masse'. Il indique que les pays doivent évaluer l'impact économique 'réel' de la PPCB et ses conséquences pour espérer convaincre les décideurs et les bailleurs de fonds à supporter des programmes de lutte contre cette maladie. Il considère que l'analyse globale (méta-analyse) est à encourager pour mieux élucider la question, un système régional pourrait être mis en place pour la collecte des données (tous les acteurs de terrain...) de toutes les sources potentielles.

Le délégué du Togo s'inquiète des conséquences d'une libéralisation totale de la vente des vaccins aux éleveurs.

Le délégué de Côte d'Ivoire fait remarquer que chaque pays a une position par rapport à l'utilisation des antibiotiques en attendant d'être édifié par les résultats des recherches en cours.

Monsieur Grégoire de l'unité de communication du PACE souligne l'importance du concept information-communication dans l'approche participative et l'intérêt de l'appropriation (ou de la responsabilisation) des éleveurs dans la surveillance des maladies et l'application des stratégies de lutte.

Dr Denormandie souligne le manque de documents et de références sur la méthodologie de recherche participative et l'utilité de développer des outils d'application sur le terrain.

Dr Diop souligne qu'il serait bon de faire un état d'exécution même sommaire des recommandations des précédentes réunions et demande plus particulièrement au représentant du CIRAD et les pays (Côte d'Ivoire, Ethiopie, Mali et Nigeria).dont les laboratoires avaient été retenus pour les essais de traitement aux antibiotiques de faire le point sur ce travail. (

Dr Amanfu de la FAO demande si le type d'élevage est pris en compte dans l'analyse coût-bénéfice. Il donne des informations sur l'expérience d « stamping out » conduite au Botswana en précisant que le coût de cette opération (420 millions de USD) peut paraître élevé mais peut être justifié pour les effets bénéfiques à long terme sur le bien être des populations.

Le délegué de la Tanzanie souligne que l'aspect sociologique doit également être pris en compte dans la méta-analyse en plus de l'aspect économique stricte.

Le délégué de la Somalie demande si les études économiques ont été conduites sur une ou plusieurs années. A son avis, de telles études devraient se faire sur de longues années pour mieux apprécier l'impact de la vaccination. Le fait de cibler des zones permettrait de réduire des coûts.

Le président de séance donne la parole aux présentateurs rapports pour répondre aux questions posées.

Jeudi 26 février 2004

Analyse des stratégies de lutte contre la PPCB dans les pays du PACE

Dr Bidjeh fait la synthèse des rapports reçus des pays relatifs à leur stratégie de contrôle de la PPCB, suite à l'atelier d'ACCRA.(Cf communication)

Le point sur les tests diagnostic de laboratoire, de la vaccination et du traitement par les antibiotiques

Dr Thiaucourt (CIRAD-Emvt) rappelle les résultats de la rencontre RCM-FAO en fév. 2003 (cf. annexe) et l'usage des différents tests diagnostic de laboratoire pour la PPCB et décrit les caractéristiques des nouveaux tests disponibles. Le C-ELISA est validé et reconnu comme test official par l'OIE au même titre que le CFT.
L
es essais sur la vaccination consistant à tester l'effet sur la protection immunitaire en augmentant les doses (min 10^7/animal) ont été présentés. Des doses supérieures (10^8, 10^9 et 10^{10}) ont été testées, et l'effet dose a été évalué (sur mortalité, lésion, adhésion...). Les résultats montrent qu'il n'y a pas d'effet dose significatif. Par ailleurs, la protection est estimée à 30% pour la T1SR et 70% pour la T1/44 au bout d'un an. Cependant, les réactions post-vaccinales sont très aléatoires selon les vaccins utilisés et les cheptels concernés, le choix des vaccins sera à raisonner pour chaque situation. Il y aurait une différence sur la durée de protection et non sur le taux de protection.
L'effet des antibiotiques (tétracycline LA) : des essais ont été conduits avec une administration d'une dose unique à des animaux infectés expérimentalement. Les résultats montrent que les AB peuvent entraîner la disparition ou réduction des symptômes cliniques mais n'éliminent pas le portage.
Les perspectives de recherche visent à vérifier l'effet 'rappel' de vaccination. En outre, de nouveaux essais sur les antibiotiques est envisagé. Des études d'immunité cellulaires ont déjà débuté, l'identification des facteurs de virulence et l'élaboration de 'mutants' sont envisagés dans un proche avenir.

Proposition d'un guide de surveillance de la PPCB

Dr F. Bendali présente un exposé basé sur les principes de surveillance de la PPCB. Après un rappel sur les 3 axes de surveillance (clinique, sérologique et abattoirs) il propose de considérer deux cas de figure selon la situation épidémiologique des pays, une zone 'indemne' et une zone 'endémique'. Ainsi, les points clés de surveillance selon les deux cas épidémiologiques sont décrits et expliqués.

Discussion générale sur les présentations

Le délégué du Kenya souligne la difficulté d'atteindre un taux immunitaire de 80%. La confusion est liée au fait que ce taux est celui de la couverture vaccinale et non la couverture immunitaire (les laboratoires n'étant pas outillés).

Dr Bidjeh soulève la question relative à l'isolement du mycoplasme (dans les écoulements et les points d'injection...) en demandant si un tel animal doit être considéré comme infectieux ou pas. Il considère que les rappels vaccinaux sont à encourager mais pour cela il faudra convaincre les éleveurs à faire une vaccination systématique des animaux..

Dr Thiaucourt répond qu'il serait intéressant de replacer dans des conditions d'urgence les animaux 'naïfs'. Il indique également qu'il y a un intérêt à faire un rappel des vaccins annuellement surtout que l'augmentation des doses ne semble pas concluant. La vaccination répétée permettrait de diminuer la prévalence sans arriver à l'éradication si elle n'est pas combinée avec d'autres mesures comme les abattages sanitaires systématiques (exemple de l'Australie).

Le délégué du Nigeria fait observer qu'il y a une incompréhension par rapport à la recommandation faite à Accra et relative aux essais de traitement aux antibiotiques.

Le délégué du Kenya indique que l'utilisation des antibiotiques par les éleveurs est fréquente alors que la maladie ne présente pas des symptômes suffisamment clairs. A son avis, il ne faudrait pas utiliser systématiquement les antibiotiques. La détermination de la prévalence de la PPCB nécessite des analyses de laboratoire, son pays est en train de s'équiper, mais demande à avoir un test 'valable'.

Le délégué du Mali précise qu'il n'est pas opportun de faire des essais de traitement aux antibiotiques car ce traitement est interdit par l'OIE. Il se pose la question de l'intérêt à poursuivre de telles recherches. L'OIE devrait plutôt appuyer les recherches sur l'élaboration de vaccins protecteurs. Des foyers qui existaient déjà en 2002 sont toujours présents et n'ont pas été contrôlés.

Le délégué du Bénin demande des précisions sur la durée de protection des vaccins actuels et le protocole de vaccinations le plus adapté. Il demande si les 2 vaccinations annuelles pourraient être remplacées par une seule ?

Dr Thiaucourt précise qu'aucun test n'est sûr à 100% , il peut toujours avoir des faux positifs. L'institut Pourquier est le seul à fournir et produire le test cELISA.

Le délégué de la Somalie explique le fait qu'en zone de faible endémicité la vaccination a moins d'impact par la difficulté de mesurer et de quantifier l'impact du vaccin sur la réduction d'une faible prévalence, contrairement à des situations où la prévalence est forte. La difficulté de réaliser un échantillonnage aléatoire dans les conditions pastorales est soulevée. Cet aspect est d'autant plus important dans des zones indemnes où l'on veut confirmer l'absence de maladie.

Le délégué de la Côte d'Ivoire demande des précisions sur l'estimation des prévalences, la différence entre une prévalence 'réelle' et une prévalence 'apparente'. Ce souci peut être pris en compte lors de l'élaboration de l'enquête de prévalence et dépend de la précision souhaitée, de l'échantillonnage (taille et sélection) et de l'importance à priori de la maladie. Raison pour laquelle il est vivement recommandé de mentionner les estimations de prévalence avec leur intervalle de confiance, d'autant que pour cette maladie, la prévalence est souvent sous-estimée. Par ailleurs l'unité épidémiologique considérée pour la PPCB est le troupeau.

Politiques et stratégies de contrôle de la PPCB à adopter par les pays du PACE

Dr G. Thomson présente une réflexion sur les politiques et stratégies de lutte contre la PPCB à proposer dans les pays du PACE. Il introduit le sujet en soulignant la difficulté à évaluer l'impact de la maladie sachant qu'il n'est pas exclusivement économique mais aussi politique, sociale... comme l'illustre l'exemple de l'Afrique du Sud. A son avis, une politique basée uniquement sur la vaccination pendant 5 ans ne suffirait jamais à l'éradication car ne tient pas compte des autres outils (abattage, contrôle de mouvement efficace). D'autant plus que la vaccination n'atteint pas les seuils prescrits (35% en moyenne sur 8 pays de l'Afrique de l'Ouest au lieu de 80%). Des circonstances atténuantes sont à noter (incubation longue...) qui expliquent que l'éradication est très difficile à mettre en œuvre actuellement. Le coût d'une vaccination de masse annuelle pendant 5 ans sur 30 pays est évalué à 300 millions d'Euro, même si le recouvrement des coûts finance 50% de ce montant, il resterait à couvrir les coûts de contrôle de mouvements (quarantaines...). A l'heure actuelle, il est plus indiqué de réaliser une évaluation d'impact et de définir une stratégie selon cet impact.

Discussions :

Le délégué du Nigeria propose de réaliser des études pilotes pour évaluer l'impact de la PPCB.

Dr Diop pense qu'une politique de contrôle de la PPCB efficace au niveau régional suppose une adhésion des pays et la prise en compte de leurs priorités. Les difficultés à contrôler les mouvements du bétail transfrontaliers sont réelles mais pourraient être atténuées si les pays concernés se concertaient davantage en vue d'harmoniser leurs les mesures de contrôle.

Dr Rouillet, AT Coopération française en poste en Guinée souligne l'importance de l'implication des 3 partenaires que sont l'Etat, les vétérinaires privés et les éleveurs dans toute stratégie de lutte contre les maladies animales. Il cite l'exemple de la Grande Bretagne où au début de l'épizootie de fièvre aphteuse, l'Etat avait négligé l'appui de ses propres services vétérinaires. Il ajoute que l'existence d'associations d'éleveurs en GDS (ou autre forme d'association) est également important car elles représentent une force de négociation vis à vis des services de l'Etat quand il s'agit de défendre leurs intérêts.

Dr Squarzoni souligne l'intérêt des études pilotes pour évaluer l'impact des stratégies de lutte, la possibilité de faire des économies et de capitaliser les pratiques déjà existantes dans des pays qui ont réussi dans certains domaines et thématiques particulières.

Le délégué du Tchad regrette que toutes les recommandations de l'atelier d'Accra n'aient pas été suivies.

Le délégué du Nigeria rappelle que le NEPAD ne prend pas encore en compte le secteur de l'élevage et c'est quelque chose qu'il faut corriger.

Dr Denormandie souligne l'importance de la démarche participative (au lieu de mesures coercitives), cela permet de tenir compte des autres maladies présentes et préoccupantes pour les éleveurs afin d'accroître leur implication et leur adhésion aux recommandations et stratégies de lutte. Il faut qu'ils soient convaincus de l'importance de la lutte. Mettre en avant la mise en place des documents comme en Guinée, de gestion des mouvements de circulation et de transhumance des animaux inter-état et intra-état.

Le délégué du Togo demande des précisions sur une idée avancée par Dr Thomson selon laquelle les maladies animales n'étaient pas forcément un obstacle aux échanges commerciaux.

Dr Thiaucourt souligne l'intérêt d'associer à la lutte PPCB d'autres maladies afin de tenir compte d'avantage des préoccupations sanitaires des éleveurs et ainsi de mieux les impliquer dans les stratégies de terrain (ex : PB, Charbon,...).

* Togo : ces maladies présentent un frein aux échanges commerciaux et doivent donc être maîtrisées et associées à la lutte contre la PPCB.

Sur une suggestion du Dr Diop, les participants à l'atelier ont convenu de donner la parole aux représentants de la Guinée, du Mali, de la Tanzanie et du Tchad pour faire un bref exposé de leurs expériences dans le contrôle de la PPCB.

Présentation des expériences de lutte contre la PPCB de quelques pays du PACE

1. Guinée

Le pays est divisé en 4 zones : indemne, surveillance, tampon et infectée. Différentes mesures sont prévues dans chaque zone pour la surveillance et les mesures à prendre en cas de suspicion. L'ensemble des actions : abattages, contrôle des mouvements des animaux , cantonnement, vaccinations sont définies précisément en fonction de chaque zone et appliquées grâce à l'implication forte de tous les acteurs sur le terrain. Ex : le marquage des animaux à l'oreille avec un trèfle pour ceux qui sortent de la zone tampon avec interdiction de passage en zone indemne. L'organisation des acteurs (éleveurs, vétérinaires et services de l'état) est structurée à tous les niveaux, ce qui constitue un atout majeur dans la surveillance sanitaire. Des manuels de déclaration des maladies, de surveillance,.. existent.

2. Mali :

Avant, la vaccination entre PB et PPCB était séparée. Actuellement, la vaccination constitue un axe prioritaire dans la stratégie de lutte contre la PPCB. Les privés sont impliqués et effectuent 75% des vaccinations réalisées. La vaccination couvre environ 50% des animaux actuellement avec campagnes de sensibilisation. Problème : élevage transhumant, frontière avec 7 pays (atteints de PPCB) : nécessité d'un contrôle des mouvements à l'échelle régionale.

3. Tanzanie :

Le représentant rappelle quelques épidémies enregistrées dans le passé. L'état finance la vaccination actuellement, atteindre une couverture vaccinale de 80% semble difficile.

4. Tchad :

La vaccination systématique du cheptel est réalisée avec un recouvrement du coût réel. Les vétérinaires privés et agents du service public sont en charge de cette opération.

Discussions :

Le délégué de la Côte d'Ivoire dit que son pays a mis en place un fond de vaccin pour la pérenniser les opérations de vaccination.

Le délégué du Sénégal demande des précisions sur le coût de revient des vaccins PPCB au niveau des éleveurs dans chacune des zones épidémiologiques de la Guinée.

Le délégué du Nigeria demande si la surveillance post-mortem est pratiquée dans tous les abattoirs du pays en Guinée.

Dr Denormandie : souhaite connaître le coût de revient des vaccins dans les différents pays.

Le délégué du Kenya : soulève le problème des abattages par les bouchers qui échappent à la surveillance.

Dr Thiaucourt : soulève la question de la qualité du vaccin et l'importance du contrôle de ces derniers par les pays via une institution indépendante. Les coûts de cette procédure serait à la charge de l'Etat.

Le délégué de la Guinée répond aux différentes questions: le coût du vaccin est de 300 FG et sont supportés à 100% par l'éleveur. La supervision des campagnes de vaccination est faite par les services de l'Etat. Le taux de couverture annuelle avoisine 90% . Un recensement national est fait tous les 5 ans (éleveurs et cheptel) , l'identification du cheptel a été instauré. Les certificats sanitaires et de tatouage sont de couleurs différentes selon les zones. Les animaux contaminés sont abattus sous surveillance vétérinaire et avec l'aide de l'Etat (transport...). La vaccination est assurée à 100% par les privés. Les veaux sont indemnisés pour un montant forfaitaire de 50.000 FG.

Le délégué de Mali indique que les 50% de couverture vaccinale sont rapportés à l'effectif national. L'indemnisation pour les abattages est de 30% du prix réel de la viande sur le marché. Le coût de revient de la dose de vaccin est de 100 FCFA.

Le délégué du Tchad répond que le cheptel bovin est d'environ 6 millions de têtes, le coût de revient de la vaccination est de 100 CFA.

Le délégué de la Tanzanie indique que le coût de revient est de 12 cts USD.

<u>Travaux de groupe</u>

Deux groupes ont ensuite été constitués pour réfléchir et proposer des stratégies relatives aux 4 situations suivantes :

- Stratégie à proposer dans les pays où la maladie est régulièrement déclarée et qui pratiquent une vaccination
- Stratégie à proposer dans les pays où la maladie n'est pas signalée et qui pratiquent une vaccination
- Stratégie à proposer dans les pays où la maladie n'a jamais été déclarée et où la vaccination n'est pas pratiquée
- Stratégie à proposer dans les pays où la maladie est épisodique.

Vendredi 27 février 2004

Séance plénière de restitution des recommandations de chaque groupe puis synthèse des travaux et élaboration des recommandations finales (cf. Annexe)

Adoption du communiqué final, des recommandations et d'une motion de remerciements à l'endroit des autorités guinéennes.

Cérémonie de clôture présidée par son Excellence, Monsieur le Ministre de l'Agriculture et de l'Elevage.

Annexe 1

Résultats des travaux en groupe

Groupe 1

Bénin , Burkina Faso, Cameroun, Guinée 1, Guinée Bissau, Mali, Niger, Sénégal RDC, Tchad, Togo,
Représentants : CIRAD-EMVT, PEU 1, UCP1

Participants : 30
Bureau : Président : Niger
Rapporteurs: Tchad et Togo

Introduction

La PPCB a été reconnue comme la maladie la plus importante après le contrôle de la Peste Bovine et a fait l'objet de plusieurs ateliers de travail. Il s'avère nécessaire après tous ces ateliers de mettre en place une stratégie de lutte contre cette maladie dans le but de la contrôler en vue de son éradication totale du continent.

Cette stratégie doit être soutenue par un programme de communication (information et sensibilisation) et de formation de tous les acteurs du sous-secteur élevage, et adaptée aux différentes situations épidémiologiques qui caractérisent le continent.

1. Stratégies à proposer dans les pays où la maladie est régulièrement déclarée et qui pratiquent une vaccination

La stratégie de lutte s'articule autour des quatre (04) points suivants :
- La vaccination
- Le contrôle des mouvements du bétail
- L'abattage
- La surveillance épidémiologique

La vaccination

La vaccination doit être de masse et obligatoire sur une base annuelle et pendant au moins cinq (05) années consécutives et concerner au moins 80 % du cheptel. elle doit être harmonisée à l'échelle sous-régionale et doit faire l'objet d'un suivi sérologique à partir de la troisième année dans le but d'évaluer la prévalence de la maladie.

Le contrôle des mouvements du bétail

le contrôle des mouvements du bétail doit reposer sur :
- la rédynamisation des réunions aux frontières sur l'harmonisation et l'application des textes réglementaires ;
- la révision et l'application des textes réglementaires ;
- l'identification des troupeaux, la mise à jours des axes de transhumance et le renforcement des capacités des services vétérinaires ;
- le contrôle effectif des documents techniques (certificats international de transhumance, de vaccination et zoo sanitaire) accompagnant les troupeaux ;
- la collaboration entre les différents services vétérinaires sous-régionaux ;
- l'émergence des organisations d'éleveurs et commerçants d'animaux.

L'abattage

En fonction de la législation des pays et en cas de manifestation clinique de la maladie, tous les animaux reconnus cliniquement malades seront abattus et une vaccination en anneau autour du foyer sera exécutée.

La surveillance épidémiologique

Elle se fera par le contrôle des mouvements du bétail en appliquant rigoureusement le contrôle des documents techniques.

RECOMMANDATION : A ce state de la lutte, faire des études pilotes d'évaluation de l'impact du contrôle de la PPCB.

2. Stratégies à proposer dans des pays où la maladie n'est pas signalée et qui pratiquent une vaccination annuelle

La stratégie de lutte dans ce cas de figure repose sur :
- l'instauration d'un cordon sanitaire (vaccination massive le long des frontières) ;
- la surveillance active dans les autres régions ;
- le contrôle strict des mouvements du bétail ;
- la mise en place d'un plan d'intervention définissant les procédures d'admission des animaux au sein de la zone (animaux de boucherie, d'élevage et de transhumance) ;
- l'amélioration des connaissances épidémiologique et économiques.

3. Stratégies à proposer dans les pays où la maladie n'a jamais été déclarée et où la vaccination n'est pas pratiquée

La stratégie de lutte, ici repose sur :
- la mise en place d'un cordon sanitaire et une surveillance le long des frontières,
- le contrôle efficace des mouvements du bétail aux frontières, la surveillance au niveaux des abattoirs et marchés à bétail,
- la mise en place d'une procédure OIE pour avoir le statut de pays indemnes de la PPCB.

4. Stratégies à proposer dans les pays où la maladie apparaît pour la 1ère fois :

Deux cas de figure se présentent :

Une trouvaille d'abattoir

Dans cette situation, il faut diligenter une enquête de traçabilité pour remonter à l'origine de l'animal.

Une apparition de foyer

Dans cette situation, c'est la mise en place d'un plan d'intervention d'urgence.

Groupe 2

Participants: 17
Chairman: KENYA
Rapporteur: UGANDA

The group agreed to use the recommendations derived during the workshop on strategies to control Contagious Bovine Pleuropneumonia in ACCRA (3rd –6th February 2003), and improve on them using the FAO consultative meeting recommendations held in Rome (12-14 November 2003) and presentations by resource persons during this workshop.

Preamble

The continuing spread of CBPP disease has confirmed the decreased capability of the control of the disease throughout Africa. The reasons for this include gaps in the basic understanding of the disease and the effective surveillance and control programmes. In order to develop effective strategies for the control and eventual eradication of the disease AU-IBAR, FAO and other international organisations organised 3 workshops and consultations.

Considering

- Recommendations from the technical meetings on CBPP organised by AU-IBAR in Addis-Ababa, Ethiopia (November 2001), Accra, Ghana (February 2003), and Nairobi, Kenya (May 2003)
- the outcome of the Third FAO/AU-IBAR/OIE/IAEA Joint Consultative Group Meeting on CBPP held in Rome, Italy from 12th –14th November 2003
- Preliminary results of studies on antibiotic use in CBPP control commissioned by AU-IBAR
- That the logistics of multiple vaccination is expensive and the prevailing weather conditions may not permit
- The persistence of CBPP in Western, Central and Eastern Africa with incursions in parts of East Africa and Southern Africa
- That the disease continues to be a major health constraint to cattle production in sub-Saharan Africa where although the law and regulations in most of the countries identify CBPP as a contagious disease and foresee prophylactics measures
- That control measures adopted until now based on vaccinations have regrettably attained low levels of herd immunity
- That other sanitary measures (quarantine of cattle exposed or infected animals, control of cattle movements etc.) are insufficiently applied;
- The effects of CBPP on cattle production, the incomes of cattle owners and the rural economy are considerable, causing direct (mortality and morbidity) and indirect losses (exclusion from external and international markets);
- That the meeting of Ministers responsible for animal resources of the Organization of African Unity held in 1998 in Mbabane (Swaziland) and in 2002 in Addis Ababa (Ethiopia) recognised the CBPP as one of the main constraint to livestock development in Africa and recommended a Pan-African program to control this disease;
- That efforts should again be made in Africa to better quantify the damage caused by CBPP to estimate correctly the socio-economic impacts and to analyse the cost - benefits of the various control options, but the control of this disease finds its justification in the need to improve food security, to reduce poverty and risks associated with trade.

Recognising that

- Vaccines for CBPP control confer short lived immunity (<1yr) and are cold chain dependant
- The urgent need for external and independent quality assurance of CBPP vaccines by PANVAC
- There is a need for epidemio-surveillance in defining CBPP affected areas
- Budgetary allocations have to be made for CBPP control by national governments and other sources
- CBPP has a long incubation period (3-8weeks) necessitating improvement of control/quarantine period
- Inability of the currently available serological tests to determine herd immunity and differentiation of infected and vaccinated cattle
- The impact of CBPP disease is not well understood

...the group recommended the following strategies

1. **Proposed strategies in countries/zones where CBPP is regularly reported and where vaccination applied**

Recommendations

Recommended strategies should aim at CBPP containment with eventual eradication in endemic zones and the protection of zones where the disease is not currently reported. These should be based on a regional approach taking into account the epidemiological situation, socio-economic conditions as well as livestock movements and husbandry systems. Those strategies should be accompanied by provision of information to stakeholders, education and a participatory approach to disease surveillance and control.

The strategy of control should be based on:
At least annual mass vaccination of cattle for five years and concurrent evaluation,
Improvement of the management of cattle movements. (AU-IBAR and PACE are considering a workshop for stakeholders on this matter),
Strengthening of epidemio-surveillance systems/networks,
Improvement of epidemiological knowledge and conduct economic assessment studies on the disease.

2. Proposed strategies in the countries/zones where CBPP is not reported and where vaccination is applied

The strategy of control should aim at prevention of introduction of CBPP into a free country.
Mass vaccination of cattle in the buffer zone (areas neighbouring infected areas);
Active surveillance in the disease-free zone and the surveillance zone;
Strict control of cattle movements;
Implementation of a plan of intervention defining the procedures of admittance of animals within this zone (animals for of butcher's shops, breeding and transhumance etc.).
Improvement of epidemiological and economic knowledge.
Development and implementation of emergency preparedness plan
Ultimately the country should seek to enter the OIE pathway for freedom from CBPP disease

3. Proposed strategies in the countries/zones where CBPP has never been reported and where vaccination is not applied

The strategy should aim at application for recognition of freedom from CBPP disease to OIE and follow procedures required by the OIE pathway, develop emergency preparedness plan

Establish clinical and serological surveillance as well surveillance at abattoirs;
Development of contingency plans
Control cattle movement

4. Proposed strategies in the countries/zones where CBPP has ben recently introduced

The strategy should aim at regaining freedom from CBPP by applying guidelines as stipulated by the OIE.

Annexe 2

Recommandations de l'atelier de Conakry

Introduction

Le Programme Panafricain de Contrôle des Epizooties (PACE) du Bureau Interafricain des Ressources Animales (IBAR) de l'Union Africaine (UA) a organisé à Conakry (Guinée) du 25 au 27 février 2004 un atelier de validation de stratégies de contrôle de la PPCB en Afrique et particulièrement dans les pays participant au PACE.

La cérémonie d'ouverture de la rencontre a été présidée par son Excellence Jean Paul SARR, Ministre de l'Agriculture et de l'Elevage de Guinée en présence de représentants de la Délégation de la Commission Européenne, de la FAO, de la Mission Française de Coopération et de l'OMS en République de Guinée.

Les responsables des services vétérinaires et de laboratoire de vingt pays de l'Afrique de l'Ouest, du Centre et de l'Est ont participé à cette rencontre ainsi que des représentants de la FAO, du CIRAD-Emvt et de l'UA-IBAR-PACE (Nairobi et Bamako).

L'objectif de l'atelier était d'obtenir un consensus sur des stratégies de lutte contre la PPCB à mettre en œuvre dans les pays du PACE suite aux rencontres organisées par le PACE à Addis-Ababa (Ethiopie) en novembre 2001, à Accra (Ghana) en février 2003 et à Nairobi (Kenya) en mai 2003 ainsi que par la FAO à Rome (Italie) en novembre 2003. A cet effet, il a été fait un rappel des recommandations issues de ces différentes rencontres.

Les participants à l'atelier ont ensuite suivi et discuté les présentations relatives à :

1) l'utilisation de la technique participative pour l'évaluation de l'impact de la PPCB,
2) l'évaluation de l'impact économique de la PPCB en Afrique,
3) les résultats préliminaires de la recherche sur l'utilisation des antibiotiques dans la lutte contre la PPCB, sur l'effet dose et rappel,
4) la proposition d'un guide pour la surveillance de la PPCB dans les pays du PACE
5) l'analyse des stratégies de lutte contre la PPCB proposées par les pays du PACE
6) une proposition d'une politique et des stratégies de lutte contre la PPCB au niveau régional.

Les discussions en plénière suivies de travaux en groupe axés sur des études de cas suivants :

- stratégies dans les pays où la maladie est régulièrement déclarée et qui pratiquent une vaccination
- stratégies dans les pays où la maladie n'est pas déclarée et qui pratiquent une vaccination
- stratégies dans les pays où la maladie n'a jamais été signalée et où la vaccination n'est pas pratiquée
- stratégies dans les pays où des foyers de PPCB apparaissent de façon épizootique.

Les recommandations adoptées à la fin des travaux de l'atelier sont indiquées ci-après.

Recommandations

L'atelier considérant que :

- la PPCB est reconnue comme l'une des maladies les plus importantes en Afrique subsaharienne.

- des efforts sont encore à faire pour quantifier les dommages provoqués par la PPCB afin d'évaluer l'impact socioéconomique et analyser le coût-bénéfice des différentes options de lutte.

- les systèmes d'élevage des pays africains en général rendent difficiles une bonne maîtrise des mouvements de bétail transfrontaliers et à l'intérieur des pays.

- les connaissances actuelles sur l'épidémiologie de la maladie, les moyens de diagnostic et l'efficacité des vaccins sont limitées et nécessitent la poursuite des recherches.

- les résultats préliminaires des recherches sur l'efficacité du traitement aux antibiotiques dans la lutte contre la PPCB ne permettent pas encore de conseiller leur utilisation à grande échelle sur le terrain.

- les réunions des Ministres chargés des ressources animales de l'Union Africaine tenues en 1998 à Mbabane (Swaziland) et en 2002 à Addis-Abeba (Ethiopie) ont reconnu la PPCB comme l'une des principales contraintes au développement de l'élevage en Afrique et recommandé la mise en place d'un programme panafricain de lutte contre cette maladie.

- le contrôle de cette maladie trouve sa justification dans le besoin d'améliorer la sécurité alimentaire, de réduire la pauvreté et les risques liés au commerce du bétail.

Reconnaissant que les stratégies à préconiser en vue de contrôler la PPCB à court et moyen termes et envisager son éradication du continent africain à long terme nécessitent que les pays disposent de services vétérinaires fonctionnels, des systèmes de surveillance épidémiologiques opérationnels incluant les enquêtes aux abattoirs, des capacités adéquates de diagnostic de laboratoire, mettent en œuvre des programmes de formation et de sensibilisation des éleveurs mais également une politique visant un contrôle effectif des mouvements du bétail.

Recommande :

1. Dans les pays où la maladie est zone endémique

où l'objectif visé sera de réduire l'incidence et la prévalence de la maladie en vue d'améliorer son contrôle,

- une vaccination annuelle ciblant 80% de l'effectif dans la zone concernée pendant cinq ans. Les vaccins utilisés feront l'objet d'un contrôle de qualité externe et interne (contrôle de titre aux différents niveaux de stockage).
- l'évaluation de l'impact de la maladie (cette évaluation pourra se faire au niveau régional à travers des études pilotes basées sur une approche participative).
- l'abattage des animaux cliniquement malades dans les foyers.
- un contrôle strict des mouvements du bétail (en interne et transfrontalier).

2 . Dans les pays où la maladie n'est pas signalée

où l'objectif visé sera d'empêcher l'introduction ou la réintroduction de la maladie,

i) dans les pays qui vaccinent actuellement contre la PPCB,

- la mise en place d'un cordon sanitaire (avec une zone tampon et une zone de surveillance) destiné à protéger la zone indemne
- une vaccination des bovins dans la zone tampon,
- une surveillance active dans la zone indemne et de surveillance,
- un contrôle strict des mouvements du bétail (en interne et transfrontalier)
- la mise en place d'un plan d'intervention définissant les procédures d'admission des animaux au sein de cette zone (animaux de boucherie, d'élevage et transhumants etc).

ii) dans les pays qui ne vaccinent pas contre la PPCB,

- la vérification de l'absence de la maladie par une sérosurvaillance,
- une surveillance active incluant les abattoirs,
- un contrôle strict des mouvements du bétail (en interne et transfrontalier),
- la mise en place d'un plan d'intervention d'urgence.
- l'engagement dans la procédure OIE pour l'obtention du statut de pays indemne de PPCB.

3. Dans les pays indemnes où la maladie est nouvellement introduite

où l'objectif visé sera de parvenir à éliminer rapidement le foyer et de recouvrer le statut de pays indemne de PPCB

- l'abattage sanitaire de tous les troupeaux contaminés conformément à la procédure OIE
- un contrôle strict des mouvements du bétail (en interne et transfrontalier),

Enfin, les participants à l'atelier ont recommandé que le PACE à travers son unité d'épidémiologie élabore d'ici fin avril 2004 :

- un rapport de synthèse des travaux des différents ateliers qui met en exergue les stratégies adoptées de façon consensuelle ;
- un rapport qui permet d'évaluer les ressources financières nécessaires pour la mise en œuvre des stratégies proposées par le présent atelier et leur disponibilité au niveau national et régional.

Fait à Conakry, le 27 février 2004

Recommendations workshop on Contagious Bovine Pleuropneumonia (CBPP)
Ghion Hotel, Addis Ababa, Ethiopia 19-21 November 2001

It was concluded that to make effective progress in the control of CBPP in the Eastern African region there are clear actions that need to be undertaken. These are summarized below in tabular form. These actions are needed within each PACE country as well as within OAU-IBAR (i.e. PACE Epidemiology and Economics Units).

National CBPP action plans (action recommended to PACE member countries as one of the responsibilities of country PACE co-ordinators)

The following actions and time-frames were recommended:

Formation of a national CBPP task force • DVS-Leads o PACE Co-ordinator o National epidemiologist o Diagnostic laboratory representative o Others – as required No more than 7 people should serve on the national task force to avoid bureaucratic delay	1 month
Provisional policy and action plan • zoning plan • movement control assessment and plan • targeted vaccination plan • treatment policy (if appropriate) • research plan to generate scientific information on treatment • impact assessment plan • monitoring plan	3 months
Implementation Underway	6 months
Annual Reassessment	12 months

Regional CBPP action plan (responsibility for co-ordination is the responsibility of the PACE Epidemiology Unit)

Formation of regional CBPP task force • PACE – co-ordination o FAO o IAEA o CBPP World Reference Laboratory o Consultative Group – National Representatives	2 months
Draft strategy discussion document • Inputs o Summary of this workshop o Review of national strategy and zoning plans as available o Impact assessment o OIE Pathway • Outputs o Information collation – reporting format and process o Movement control strategy – recommendations o Targeted vaccination strategy – recommendations o Treatment policy o Additional research requirements o Epidemiological surveillance plan (prevalence and dynamics)	6 months
Final document adopted by consultative group	9 months
Policy harmonisation workshop	12 months

Issues requiring consolidation

1. Information
   ⇒ consolidation of info on CBPP access to the region
   ⇒ sources, dissemination & access

2. Policy
   ⇒ country policy
   ⇒ harmonization across region

3. Vaccines/vaccination
   ⇒ development
   ⇒ application
   ⇒ targeting
   ⇒ en mass
   ⇒ quality control

4. To live with the disease/control/eradicate
   ⇒ current realities
   ⇒ availability of resources

5. Movement control
   ⇒ happening in localised areas on a voluntary basis
   ⇒ is it possible regionally

Consensus PACE strategy

Future action:

1. Use results of this workshop to develop a PACE guideline for possible use by member countries based on the concept of control and recognising that eradication, while remaining the ultimate objective, is not achievable in the immediate future.
2. Institute/promote research into:
   - use of combined vaccination/treatment to control outbreaks;
   - efficacy of treatment in clearing infection from
     – individual animals
     – herds/villages
   - methods for involvement of the private and community-based sectors in CBPP control;

identification of locations where CBPP has so far not become endemic and assist countries with such areas to design strategies to maintain and expand infection-free zones.

Annexe 4

Recommandations atelier sur les stratégies de contrôle de la péripneumonie contagieuse bovine (PPCB) organisé à Accra (Ghana) du 3 au 6 février 2003

Les participants à l'atelier sur les stratégies de contrôle de la péripneumonie contagieuse bovine (PPCB) organisé à Accra (Ghana) du 3 au 6 février 2003,

Considérant :

- la persistance de la PPCB en Afrique de l'Ouest, du Centre et de l'Est avec des incursions en Afrique australe ;
- que cette maladie continue d'être l'une des principales contraintes pathologiques en Afrique subsaharienne bien que la réglementation dans la plupart des pays la classe comme une maladie légalement contagieuse et a prévu les actions de prophylaxie la concernant ;
- que les mesures de lutte adoptées jusqu'à présent et qui reposent sur la vaccination de masse n'ont malheureusement intéressé que 30 à 50 % des animaux sensibles ;
- que les autres mesures d'ordre sanitaire (immobilisation des troupeaux contaminées ou malades, contrôle des mouvements du bétail etc) sont insuffisamment appliquées ;
- que les effets de la PPCB sur la productivité du cheptel, les revenus des éleveurs et l'économie rurale sont considérables à cause des pertes directes (mortalité et morbidité) et indirectes (interdiction accès aux marchés extérieurs plus rémunérateurs) qu'elle occasionne ;
- que les réunions des Ministres chargés des ressources animales de l'Organisation de l'Unité Africaine tenues en 1998 à Mbabane (Swaziland) et en 2002 à Addis-Abeba (Ethiopie) ont reconnu la PPCB comme l'une des principales contraintes au développement de l'élevage en Afrique et recommandé la mise en place d'un programme panafricain de lutte contre cette maladie ;
- que l'OIE et la Banque Mondiale en collaboration avec la FAO et le CGIAR (Groupe Consultatif sur les Recherches Agricoles Internationales) ont retenu la PPCB parmi les maladies prioritaires à prendre en compte dans le Programme Challenge sur « la réduction de la pauvreté par la suppression des barrières du marché dues aux maladies animales » ;
- que des efforts sont encore à faire en Afrique pour mieux quantifier les dommages provoqués par la PPCB afin d'évaluer correctement ses impacts socioéconomiques et analyser le coût-bénéfice des différentes options de lutte, mais que le contrôle de cette maladie trouve sa justification dans le besoin d'améliorer la sécurité alimentaire, de réduire la pauvreté et les risques liés au commerce du bétail.

Recommandent :

L'élaboration et l'application des stratégies de contrôle de la PPCB par les pays participant au Programme PACE reposant sur les éléments ci-après :

Stratégies proposées :

Les stratégies proposées visent la réduction de l'incidence de la PPCB dans les zones endémiques et la protection des zones où la maladie n'est pas déclarée. Elles reposent sur une approche régionale prenant en compte la situation épidémiologique, les conditions socio-économiques ainsi que les modes d'élevage dans les pays. Elles devront être accompagnées et soutenues par des activités d'information, d'éducation de base et de communication adéquates.

Afrique de l'Ouest et du Centre

Les connaissances actuelles sur la situation épidémiologique de la maladie en Afrique de l'Ouest et du Centre permettent de distinguer deux grandes zones, les zones endémiques et les zones indemnes mais exposées au risque de la maladie.

Zones endémiques

La stratégie de contrôle devra reposer sur :

- une vaccination de masse annuelle du cheptel bovin pendant cinq ans suivie d'une évaluation,
- une amélioration du contrôle des mouvements du bétail,
- le renforcement des réseaux d'épidémiosurveillance,
- l'amélioration des connaissances épidémiologiques et économiques sur la maladie.

Zones indemnes mais exposées au risque de la maladie

La stratégie de contrôle devra reposer sur :

- la mise en place d'un cordon sanitaire (avec une zone tampon et une zone de surveillance) destiné à protéger la zone indemne
- une vaccination de masse des bovins de la zone tampon,
- une surveillance active dans la zone indemne et de surveillance,
- un contrôle strict des mouvements du bétail,
- la mise en place d'un plan d'intervention définissant les procédures d'admission des animaux au sein de cette zone (animaux de boucherie, d'élevage et transhumants etc).
- l'amélioration des connaissances épidémiologiques et économiques.

Afrique de l'Est

La stratégie de contrôle consistera à implanter dans chacun des pays concernés un cordon sanitaire délimitant les zones infectées et les zones indemnes.

Zones infectées
Il sera procédé à:
- une vaccination annuelle de masse du cheptel bovin pendant cinq ans suivie d'une évaluation,
- l'identification des animaux.

Zones indemnes
Il sera procédé à:
- une surveillance clinique, sérologique et aux abattoirs,
- la mise en place d'un plan d'intervention définissant les procédures d'admission des animaux au sein de cette zone.

Cordon sanitaire
Il sera procédé à:
- une vaccination de masse des bovins présents dans la zone tampon ;
- une surveillance des animaux dans la zone de surveillance.
- appliquer l'abattage sanitaire des animaux positifs aux tests de dépistage.

Concernant l'utilisation des antibiotiques dans le traitement de la PPCB, les participants à l'atelier considérant que:

- jusqu'à présent aucune donnée scientifique n'est disponible sur le bien fondé ou non ;
- bien qu'interdite par de nombreuses législations, cette utilisation demeure une pratique courante dans les pays.

Recommandent

A l'UA/IBAR/PACE en collaboration avec le laboratoire mondial de référence pour la PPCB (CIRAD-Emvt), la FAO et les laboratoires africains notamment Bingerville (Côte d'Ivoire), Bamako (Mali), NVRI (Nigeria) et Sebata (Ethiopie) de tout mettre en œuvre pour conduire dans les meilleurs délais une étude destinée à élucider ce problème.

Concernant le contrôle des mouvements du bétail, l'atelier recommande

- l'amélioration du systèmes d'identification des animaux (expérience de la Guinée),
- réactualiser les voies de passage du bétail transhumants et de commerce,
- améliorer la réglementation relative au contrôle des mouvements du bétail,

définir des modalités d'entrée et de passage du bétail à l'intérieur des zones indemnes de PPCB.

Plan d'action de l'atelier de Accra

Mesures	Responsables	Echéance
Réactualiser les données épidémiologiques sur la PPCB	Directeurs des Services Vétérinaires nationaux	31 Mars 2003
Elaborer un document provisoire de politique et de stratégies de contrôle de la PPCB au niveau national	Directeurs des Services Vétérinaires nationaux	30 Avril 2003
Transmission du document provisoire de politique et de stratégies de contrôle de la PPCB à l'Unité de Coordination	Directeurs des Services Vétérinaires nationaux	15 Mai 2003
Consolidation des documents de politique et de stratégies nationaux en un programme régional de lutte contre la PPCB	Unité d'épidémiologie du PACE	30 Juin 2003
Transmission du programme régional de lutte contre la PPCB aux pays pour observations	Unité d'épidémiologie du PACE	10 Juillet 2003
Envoi des observations et amendements des pays	Directeurs des Services Vétérinaires nationaux	31 Juillet 2003
Organiser un atelier de validation le programme régional de lutte contre la PPCB	Unité d'e coordination du PACE	31 Octobre 2003

Annexe 5

Recommendations Technical workshop on Contagious Bovine Pleuropneumonia to discuss recent information available through modeling studies (Nairobi (Kenya) 8th May 2002

The major general conclusion reached during the workshop, which is in agreement with those reached previously in Addis Ababa and Accra, is that CBPP is not eradicable from the PACE region in the foreseeable future. That being so, methods for controlling CBPP more effectively and lessening its impact on livestock need to be developed. This, it was agreed, would best achieve by reducing the occurrence and distribution of the disease in endemic areas and reduction of incidence in epidemic areas through the use of vaccination. Dr Mariner's work has shown that for vaccination to be effective, high herd immunity levels (in the region of 80%) need to be attained. How this can be achieved remains to be resolved. Most countries in the PACE region continue to rely on mass vaccination conducted by the official veterinary service – with or without cost recovery. However, as was agreed at the PACE workshop on CBPP in Accra, the geographic distribution and prevalence of CBPP in the PACE region is increasing. Therefore, it is clear that in general these campaigns are not attaining their goal. There are a number of reasons for this which cover issues such as:

- Insufficient funding to sustain mass vaccination
- Inadequate physical resources (vehicles and other equipment)
- Poor quality vaccines that induce ephemeral and/or poor immune responses
- T1-44 vaccine that produce post-vaccinal reactions that are unacceptable to livestock owners
- Lack of an *in vitro* test to differentiate vaccinated from unvaccinated cattle
- Lack of trust and co-operation between some veterinary services and the livestock-owning communities they serve.

These problems, combined with the difficulty of effective movement control, are the major constraints preventing the effects of CBPP being adequately countered in most PACE countries. The ranking exercise clearly indicated that the only way for mass vaccination to be successful would be if it were to a large extent funded from external sources. The corollary is that if external funding cannot be obtained mass vaccination would not be effective (see Table).

Dr Mariner raised the point, which was re-emphasized during the matrix ranking exercise, that effective treatment of CBPP could be as important in countering the effects of the disease as vaccination and that work on establishing the effects of antibiotics on clinical cases of CBPP is as important as efforts to improve vaccines against CBPP. The possibility was advanced that elective vaccination against CBPP could be more sustainable and, perhaps, effective than compulsory vaccination if livestock owners were given reasonable access to vaccines of good quality at an affordable price. There was general agreement that in endemic areas antibiotic treatment of clinical cases in combination with vaccination (elective or otherwise) could provide better protection against CBPP for livestock owners. This contrasts to some extent with the results of the matrix ranking exercise where elective vaccination and treatment were placed second to treatment alone.

Future activities of the PACE Epidemiology Unit (PEU) with respect to CBPP

In further discussion with some of the workshop participants conducted the following day it was agreed that the PEU would do the following:

1. Follow up on requests to PACE member countries to provide maps on what is currently known about the distribution of CBPP in their countries (free, endemic and epidemic areas) so that a composite map can be constructed to enable regional approaches to control of the disease to be developed.
2. Remind countries that a coherent policy is a prerequisite for effective control of any major disease and request them to provide the PEU with a document describing their current strategy.
3. An impact assessment on CBPP should be conducted including the following elements:

- relative economic importance of CBPP (in relation to other diseases)
- potential costs of control
- studies in representative production systems, i.e. a small number of "good" studies in a few countries such as the highlands Ethiopia and Sahelian countries (it is possible that CIRAD may be awarded an INCO project by the European Union that will assist in this direction)

4. The PEU will, taking all this information together and produce a policy document on CBPP that can be offered to AU-IBAR for adoption.

Recommendations FAO-OIE-AU/IBAR-IAEA Consultative Group Meeting on CBPP in Africa Towards sustainable CBPP control programmes for Africa (Rome, 12 – 14 November 2003)

Preambule

The continuing spread of CBPP disease, has confirmed the decreased capability of the control of the disease throughout Africa. The reasons for this include gaps in the basic understanding of the disease and the implementation of effective surveillance and control programmes. This prompted FAO together with the OIE, AU/IBAR and IAEA to convene a joint meeting of specialists to review the current situation with CBPP disease and to suggest actions for improvement of this situation. The meeting was held at FAO, Rome from 12 – 14 November 2003. Specialist working groups reflected on the current knowledge brought together here and deliberated on the needs for applied research and policy under the headings:
CBPP control strategies;
Tools for CBPP Control – Vaccines, and;
Tools for CBPP Control – Use of Antibiotics and Diagnostic Tests.

The recommendations emanating from this meeting are as follows:

CBPP Control Strategies

Considerations and Specific Recommendations

The strategic approach to CBPP should be based on progressive control leading ultimately to area-wide freedom from the infection. A long-term (10 to 15 year) programme encompassing the following should be applied:
Impact assessments of CBPP at regional, national and zonal levels need to be conducted to justify the anticipated expenditure required for progressive control of CBPP. Participatory approaches are among appropriate methods to achieve this end. These studies should be applied in all sub-regions (clusters of countries) of sub-Saharan Africa;
Cost-benefit analyses of the strategies in force in selected countries of the 3 sub-regions;
Depending on the epidemiological situation strategies need to be applied to free and epizootic regions as defined in the report of the CBPP Consultative Group meeting of 2000. For endemic regions targeted vaccination or other alternative strategies need to be investigated.

A mechanism to enable independent accreditation of CBPP vaccine quality for African countries needs to be established. Ideally, this should be based on the revival of PANVAC.

Research needs to be continued into:
Antibiotic treatment of clinical cases;
Improved vaccines and diagnostic tools;
Targeted application of vaccine as a strategy to improve progressive control of CBPP.

Pilot projects located in the field and directed towards improved integrated control of CBPP (including antibiotic treatment and liberalization of vaccine availability) need to be undertaken in carefully defined areas and the results made available to all interested parties.

CBPP control programmes could be used as a model on which to base improvement of veterinary services, especially in respect of surveillance, control and private/public sector collaboration.

Disease modelling is an appropriate tool for improved understanding of the epidemiology and impact of CBPP and its use should be encouraged.

Financial planning to ensure adequate financing of the progressive control of CBPP in sub-Saharan Africa.

Tools for CBPP Control – Vaccines

Introduction

The task of this working group was to consider progress on recommendations made at the two previous consultative group meetings on research of new and existing vaccines. In particular we looked at improvements in existing vaccines, input of PANVAC and the need for independent quality control; construction of vaccines that allow DIVA type differentiation of infected and vaccinated animals; and the set up of a database of vaccine producers, their capacity and the current need for vaccine doses in Africa.

Considerations and Specific Recommendations

The group recognized that most of the recommendations made at the last two meetings had been achieved. However the use of T1 44 and T1 SR vaccines needed to be reconsidered in the view of adverse reactions seen with the former in certain circumstances. Little progress had yet been made on the development of new vaccines. To date little was known of the molecular mechanisms of pathogenicity although some progress was made on virulence factors.

Concerning the improvement of existing vaccines and their use:
PANVAC is advised to investigate improvements in vaccine formulation including the use of diluents in relation to improved titres and thermal stability. This also includes testing of current vaccines for the stability of pH after reconstitution with currently used diluents;
Results of vaccine boosting experiments which are ongoing at KARI should be published within the year;
Results of experiments to investigate the use of trehalose in the freeze-drying medium to improve the thermotolerance of CBPP vaccines should be published.

Concerning the input of PANVAC:
Independent external quality control must be re-established in PANVAC;
All vaccines used at national level should be certified by PANVAC;
AU/IBAR should fully support the operational activities of PANVAC;
PANVAC should continue to strictly apply OIE guidelines on CBPP Vaccine manufacture.

Concerning the development of new vaccines:
Encourage basic research to improve the understanding of pathogenicity and immune protection in CBPP. Data should be published promptly;
Development and improvement of new vaccine strains must follow the basic rules of biological safety for recombinant vaccines;
Future vaccines should include the capability for differentiation of vaccinated and infected animals.

Other:
List of CBPP vaccine producers and their capabilities as established by PANVAC should be sent to the OIE and FAO.

Tools for CBPP Control – Use of Antibiotics and Diagnostic Tests

Specific Recommendations: Diagnostic Tests

To establish the prevalence of infection in endemic areas cross-sectional serological surveys should be undertaken.

To confirm the absence of disease from an area clinical surveillance (including participatory techniques), abattoir/slaughter slab surveillance and serological surveillance must be undertaken.

To confirm new outbreaks isolation and identification of the infectious agent must be performed. None of the serological tests on its own is sufficient as a single diagnostic test but it may be useful if serum samples from several animals are collected and tested in the CFT and the cELISA to obtain a diagnosis on herd basis.

Detection of antibodies and duration of detection after infection, antibiotic treatment, vaccination and multiple vaccinations are important parameters and must be clearly defined. Insufficient information on the influence of antibiotic treatment and multiple vaccinations is a constraint that must be addressed.

For the confirmation of outbreaks and the early detection of circulating antigen penside tests are very useful. The existing tests need validation and if adequate should be transformed into robust tests to minimize operator bias and errors. More specific and sensitive tests based on the early fraction of the capsular polysaccharides (CPS) needs further assessment before it can be validated at the field level.

Quality assurance of the CFT is difficult. Standardized reagents and internal quality controls (high/low titre sera with a defined titre, borderline negative sera) should be introduced to limit the variation. The joint Division of FAO/IAEA, Vienna, should coordinate this activity.

The immunoblotting test is highly specific and should be introduced as a confirmatory test at critical phases of CBPP control programmes.

The differentiation between individual animals that are infected or had been vaccinated recently is important and serological tests for this purpose should be developed.

The CFT is more useful for the early diagnosis of infection; however, an ELISA that is capable of detecting animals at an early stage of infection would be highly desirable.

The quality assurance of diagnostic results is critical, and the joint Division of FAO/IAEA, Vienna should undertake its coordination.

Specific Recommendations: Antibiotics

1.Pilot trials

Introduction
IBAR/PACE has recently commissioned studies of CBPP epidemiology that accessed indigenous knowledge of pastoral communities to construct mathematical models. Sufficient understanding has accrued from these studies to suggest that a new paradigm for CBPP control using antibiotics should be investigated. The prospective benefits are such that pilot trials should be established without delay.

Considerations and Specific Recommendations

The target populations, at least initially, are the pastoral communities of eastern, central and western Africa. The trials proposed need to be based on the use of antibiotics to treat acute cases and elective vaccination. Two scenarios in pastoral communities should be studied; in order of priority these are:
Management of endemic disease;
with regard to the use of antibiotics as a therapeutic intervention;
with regard to vaccination and the possible influence of antibiotics on the immune response;
Management of acute disease from recent introduction;
In devising protocols to be followed, the antibiotics used will need to be selected carefully to ensure that:
Recently developed, and potentially more effective, mycoplasmacidal, chemotherapeutic agents are included;
Care is taken to avoid repercussions of the future use of chemotherapeutic agents for human.

PACE with FAO should embark on collaborative pilot trials in 2004 by establishing a virtual working group to draw up protocols and initiate field studies to be conducted in close collaboration with the national authorities in key countries. The collaborating partners should communicate with the pharmaceutical industry to obtain their inputs in protocol development and possible co-financing of studies. Thus, there should be three phases of the trials:
Preparatory phase: establishment of virtual working group – establish dialogue between partners and with the pharmaceutical industry; development of protocols, define logistics, source funding;
Study phase – overseen by PACE national programmes;
Analytical phase with final report produced after a workshop.

2. Studies on microbial sensitivity

Introduction
In order to facilitate the selection of candidate chemotherapeutic agents and to understand better the existing situation, there is a need to carry out MIC and MMC studies on current African strains of *M. mycoides mycoides* SC.

Considerations and Specific Recommendation
The UK Veterinary Laboratories Agency has the relevant technologies and is provisionally interested to conduct this work within its existing mycoplasma research programme. The most important constraint which needs to be overcome is that VLA lacks the field strains required.

The Veterinary Laboratories Agency (VLA) management should be requested by FAO and AU-IBAR to conduct the study and the FAO/OIE World Reference Laboratory for CBPP be requested to make available to VLA, the required strains.

3. Studies on the Safety and Impact of Antibiotics on the Consumer

Introduction
The widespread use of antibiotics and their control are increasingly important for the safety of livestock products in developing countries.

Considerations and Specific Recommendation
Antibiotic residues in milk and meat products have been widely studied but no efficient systems to monitor and enforce their recommended use in developing countries are in place.

Monitoring systems for antibiotic residues and systems aimed at achieving compliance with the recommended use of antibiotics should be encouraged to minimize the impact of antibiotic residues on the consumer.

Annexe 7

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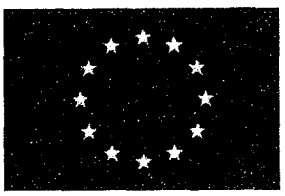
Proceedings of the workshop on the Eradication of Mild Rinderpest from the Somali Ecosystem (18-20 February, 2004)



PAN AFRICAN PROGRAMME FOR THE CONTROL OF EPIZOOTICS

PROCEEDINGS OF THE WORKSHOP ON THE

ERADICATION OF MILD RINDERPEST FROM THE SOMALI ECOSYSTEM

18-20 February 2004

KENYA WILDLIFE SERVICES HEADQUARTERS – LANGATA ROAD

PACE Epidemiology Unit
March 2004

Executive summary

This document highlights the recommendations that emanated from the first workshop on mild rinderpest held at Mbagathi in June 2002, provides a short overview of what has been achieved in the intervening almost two years since the Mbagathi meeting, before dealing with the objectives of this meeting. Short summaries of the presentations made by the country representatives and various other speakers are included as well as the outcome of the first workshop describes the *status quo* on what we *do* and *don't* know about mild rinderpest, the pros and cons of the "seek, confirm and eliminate" strategy and the lessons learned from implementing the PACE policy and from the implementation of other projects in the Somali ecosystem (mainly Emergency Project for the Eradication of Rinderpest from Kenya (EPERK)). The last chapters describe the summary and conclusions reached during workshop and the way forward.

The workshop did not come up with a classical set of recommendations, nor did it adopt a fully-fledged strategy for the eradication of mild rinderpest from the Somali ecosystem. The latter would require a full and thorough understanding of the situation on the ground. The concept strategy therefore includes a number of actions that are required to develop a fully-fledged strategy and a number of actions that are likely to be important for any future strategy.

The following is a summary of the actions and tools that were itemised by the GREP Secretary and consequently agreed upon by the participants of the workshop.

Agreement was reached that the ideal strategy requires the application of the actions and tools that are listed in chapter 19 (summary and conclusions). It was agreed that *actions* and *tools* are not equivalent to a strategy but form part of the strategy, i.e. mass vaccination is an action not a strategy.

A realistic timeframe should be set for the elimination of rinderpest virus from the infected ecosystem through a managed and flexible process. Progress needs to be reviewed constantly and, when required, the direction amended.

Although very good disease searching work was done in Kenya, we still do not conclusively know whether the syndrome detected is caused by rinderpest virus and if so which lineage. The reason is that the level of laboratory support has been inadequate and the results equivocal. It is therefore recommended that an autonomous Regional Reference Laboratory for Rinderpest be established at Muguga.

For the next two years, 2004/05, actions should include further definition of the mild rinderpest-like syndrome observed in the pastoral areas. This requires that the diagnostic services at the regional reference laboratory be strengthened urgently. Further delineation of the area of

endemic maintenance, especially in Ethiopia and Kenya should be finalized within a year. In addition to a sero-survey in cattle, major wildlife surveillance will be required. The budget for wildlife surveillance should be included in the regional budget to enhance flexibility. After having compiled these data and in order to frame the national policy, free and endemic zones should be defined and reported to the OIE. Simultaneously, alternative options to facilitate safe trade should be pursued with the OIE, especially vaccination and marking of trade cattle.

Two major activities that require much time and attention during the next two years include communication and strengthening delivery systems. It became clear during the workshop that the "seek, confirm and eliminate" strategy adopted in Mbagathi was not well understood and of the strategy are communicated to the international suffered from poor "buy-in" by the stakeholders. It is therefore important that all aspects of the strategy are communicated to the international scientific community, donors, policy makers, technicians, traders and the livestock owning community at large in order to establish community co-operation. The second activity, which will require much attention and input, is strengthening of delivery systems involving private and public veterinarians and community-based animal health workers (CAHWs). It will require the establishment of a network of CAHWs that are supervised by private and public veterinarians. It needs to be borne in mind that a delivery system will be required throughout the area of endemic maintenance that will be able to deliver the veterinary services the pastoralists require, bi-annual vaccination of the whole cattle population against rinderpest within a period of one month and the performance of the required surveillance and monitoring activities. It was agreed that the PACE country programmes would do an assessment and identify the needs.

Where infection is detected during the first two years, the foci will be eliminated through focused vaccination.

By the end of 2005 at the latest, a 3-year programme consisting of immuno-sterilisation of the primary endemic focus will begin. Vaccination programmes will be focused as far as possible in order to increase the chance of success in achieving immuno-sterilisation. Elimination of the virus will probably comprise at least 3 years of pulsed bi-annual vaccination, each vaccination programme to be completed within a period of 1 month. As soon as it becomes available a vaccine and test that enables differentiation of infected from vaccinated animals will need to be employed. Performance of sero-monitoring and if necessary revaccination will need to be catered for. During the same time active surveillance and rapid reaction in surrounding areas should be established and the verification of freedom should be initiated, whilst continuing to support enabling activities.

Managing the eradication of any disease is fraught with uncertainty. The need to recognize altered circumstance and the flexibility to adapt quickly to changed circumstance is crucial for any eradication programme to succeed. It requires managemental judgment and independence! From analysis it became clear that the current operational procedures, i.e. annual work programmes, involve project administration rather than project management. This is not suitable

for implementation of an eradication strategy. The latter requires the establishment of a system of adaptive management in both AU/IBAR and the national programmes. Monitoring and evaluation become vital issues that should be performed by an independent body with the necessary technical and socio-political insight. It will be the task of GREP and IBAR to negotiate these modalities with the donor.

Clearly rinderpest will not be eradicated from the Somali ecosystem within the remaining lifetime of PACE. It was therefore recommended that a start be made immediately with the development of a follow-on project. It was agreed that IBAR/FAO develop a concept paper and send it to the countries involved by 2nd April 2004 and that the countries work out their respective country-level proposals and send them to IBAR/FAO by the same date. IBAR and FAO will jointly complete the project document by end of April. This project proposal will be presented to the countries, the PACE Annual Coordination Meeting and the GREP Technical Consultation or Advisory Group Meeting that will be organised in Nairobi, with the aim of building a consensus and obtaining donor support.

A listing of the required actions at national, regional and international level is provided in chapter19 (Summary and conclusions).

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1 Registration

The list of registered participants is attached in annex 1.
List Of Participants

It should be noted here that initially the workshop was planned for a small number (35) of participants, but grew to almost twice that number.

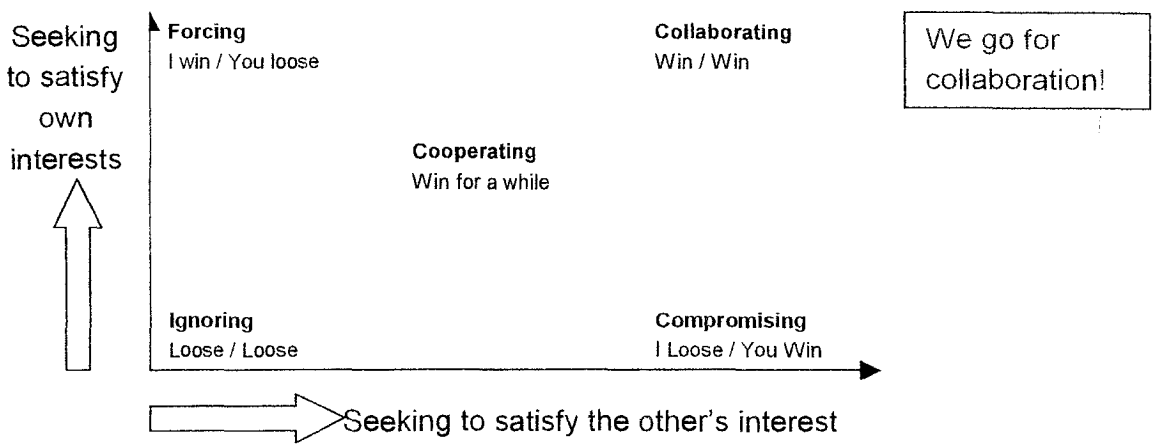
2 Agenda of the Meeting

The Agenda of the Meeting is attached in annex 2.
The Agenda was adopted.

3 Opening

The meeting was opened by Dr. Jotham Musiime, Director of AU/IBAR, after a short introductory speech by Dr. Rene Bessin, the PACE Regional Coordinator.

The workshop was facilitated and moderated by Mrs. Apondi and Mr. Justus A. Nyang'aya and paid for by the CAPE unit. After an introductory round, Apondi introduced the following concept:



4 Recommendations of the Mbagathi Meeting, June 2002

Recommendations of the mild rinderpest workshop that was held in Mbagati in June 2002, were presented by Gijs van 't Klooster as well as the progress made during the past year.

It was decided in the Mbagathi meeting that the elimination of the last area of endemic maintenance in Africa was based on a time-bound regional strategy that involves active disease search that *permanently* monitors the situation in the high-risk areas and where detection of rinderpest infection leads to rapid and intensive eradication through vaccination.

The overall strategy that was agreed upon was one of "*seek, confirm and eliminate*".
Surveillance is to identify areas where infection is active and current is perform through participatory disease searching, a special form of active disease surveillance. Regular and frequent monitoring of wildlife populations in the Somali ecosystem and adjacent areas be undertaken, in particular in areas near the interface between wildlife and livestock. Sero-surveillance as well as wildlife surveillance was to be conducted to delineate the area of endemic maintenance.

Confirmation or high index of suspicion - rapid and intensive and targeted vaccination - immuno-sterilisation

Other recommendations included:

- Increased support to the regional reference laboratory for further study of the biology of lineage II type of rinderpest virus.
- Improved capacity in the region to deal with wildlife disease issues.
- A manual of recommended samples, procedures and tests for rinderpest, including infection with mild strains, is produced and circulated to all appropriate authorities by October 2002.
- National/regional laboratories participating in PACE are furnished with resources essential for prompt testing of samples in accordance with the serological test strategy.
- Research continues to develop serological tests that are able to differentiate vaccinated from infected animals as well as serological tests for early detection of virus infection and lineage identification.
- Licensed vaccines that enable the differentiation of vaccinated animals from those that are naturally infected be made available as soon as possible.

5 Progress made with Rinderpest Eradication in East Africa over the past year

A broad overview of the progress made since the Mbagathi meeting was presented by Gijs van 't Klooster. And since the Mbagathi meeting adopted the "*seek, confirm and eliminate*" strategy it provided an overview of the progress made with the implementation of this strategy.

Progress made with the "Search" the first step of the adopted strategy:

- The CAPE Unit established the capacity to perform Participatory Disease Searching (PDS) in all three countries through a hands-on workshop conducted in Griftu in November 2002. This training provided the participants with basic skills in Participatory Rural Appraisal (PRA) and PDS, and developed a harmonised plan of action.
- To stimulate further training at country level the CAPE unit organised in February 2003 a Training of Trainers workshop on PDS, after which a national training was conducted only conducted in Kenya.

Implementation of the first part of the adopted strategy, i.e. "search", was delayed in all countries because this activity was not planned in the work programme that was running from November 2001 to 31 October 2002. All countries planned for PDS in their next work programme that was supposed to start in November 2002. However, both Kenya and Ethiopia only received their first advance in April and June 2003 respectively.

EC project implementation procedures alone caused a delay of 1 year in the implementation of the first step of the adopted strategy!

Somali PACE performed its first questionnaire based active disease search in February 2003. It detected an outbreak of "mild rinderpest compatible disease" or "mild rinderpest like disease" within 10 days. In Sakew, Middle Juba, 6 young stock showing signs of bilateral ocular discharge were positive by pen-side test. However, it could not be confirmed in both the regional and world reference laboratory.

Dec 2003: Workshop to assess the implementation of PDS in the Eco-system. It concluded that PDS was able to find mild rinderpest compatible disease within weeks.
Unfortunately all PACE Ethiopia staff trained in PDS left the Ministry, mainly due to delayed release of funds under work plan 3

Progress on the delineation of area of endemic maintenance:

- Kenya could not perform sero-surveillance to delineate the area of endemic maintenance as the timespan since the last vaccination was too short. The pre-vaccination serology carried out in Garissa district is suggestive of virus circulation.
- Especially PACE Somalia has made much progress in delineating the area of endemic maintenance, but some data are now quite old:
  - Sept 2002: sero-survey Lower and Middle Juba.
  - Oct 2002: sero-survey Central Somalia.
  - Sept 2003: Gedo, Bay, Bakol and Lower Shabelle
  - Planned for Puntland and Somaliland.
- Ethiopia started a sero-survey in the "surveillance zone" of Region 5 in January 2004. Preliminary results are presented during this meeting. Except for Dolo Odo wereda, all districts bordering Somalia and Kenya are still clean.

Progress made on the "Confirm" part of the strategy, i.e. Laboratory Diagnosis:
Besides the late release of funds under the last work programme, this was clearly the weakest part of the strategy.

- It took Muguga at least 5 weeks to release partial and preliminary laboratory results. And the PCR products produced were characterised as similar to "Kabete O" strain.
- The virus not isolated.
- Serological results were produced by Kabete lab within the specified time;
- Forwarding of a second batch of samples to WRL took 2 months;
- Conclusive results of a sero-survey conducted in Southern and Central Somalia in October 2002, were only available in August 2003. The situation has improved greatly afterwards.

Progress on the "Eliminate" part of the strategy

- Due to delays in confirmation of the diagnosis and due to political pressure, Kenya responded to the confirmatory diagnosis with an area wide vaccination of Garissa district. A total of 150 thousand "emergency" vaccinations were conducted during the months of Oct/Nov 2003. CAHWs utilised in the vaccination programme
- PACE Somalia under political pressure conducted 50 thousand "emergency" vaccinations, performed in an area adjacent to the location where clinical mild rinderpest was observed (Sept 2003) and confirmed (Oct 2003) in Garissa Kenya.
- PACE Ethiopia did not conduct any vaccinations. It retrained and improved supervision and coordination of the existing network of CAHWs.

Progress OIE Pathway:
A special session was organised during the PACE Annual Coordination Meeting in Arusha and although no agreement reached on how to progress, much progress was made understanding the OIE pathway. Special rinderpest working group meetings were held by Kenya and Somalia in July and August 2003 respectively and a harmonisation meeting between Kenya and Somalia. However no agreement was reached on declaring an infected zone to the OIE.

An one day workshop was organised to obtained agreement at a regional level on to progress along the OIE pathway. Most countries in East Africa except for Kenya and Somalia will apply for freedom from rinderpest disease by the end of 2004, either on a zonal or a country-wide basis.

In Summary

- We have a better, but not complete understanding of the area of endemic maintenance;
- We still do not have a full picture of the epidemiology of this mild virus;
- Participatory Disease Searching (PDS) is able to detect rinderpest compatible disease events;
- Wildlife sero-surveillance provides useful data for delineating remaining foci;
- Search and eliminate policy will not work if laboratory results are not out in a matter of days;

- Somalia seemed not to have adopted the strategy as it proposed in February 2003 an alternative strategy, i.e. a risk based action plan;
- Pastoralists wish to see other problems addressed.

6 Objectives of this workshop

The objectives of the workshop included:

1. Establishing a current and common understanding of the mild rinderpest situation in the Somali ecosystem.
    a. Country presentations.
    b. At the end of day 1 we should have a common understanding of what we do know and what we don't know.
2. Assess the progress made with the current strategy of "search, confirm and eliminate"
3. Identify different strategy options and assess them on:
    a. Technical feasibility
    b. Implementation capacity
    c. Robustness
    d. Funding requirements
    e. Likelihood of success
4. Reach agreement on the way forward and establish a commitment for implementation.
5. Draw up conditions and requirements for implementation of the strategy

7 Presentations on the understanding of the current status of mild rinderpest in the countries that are part of the Somali eco-system

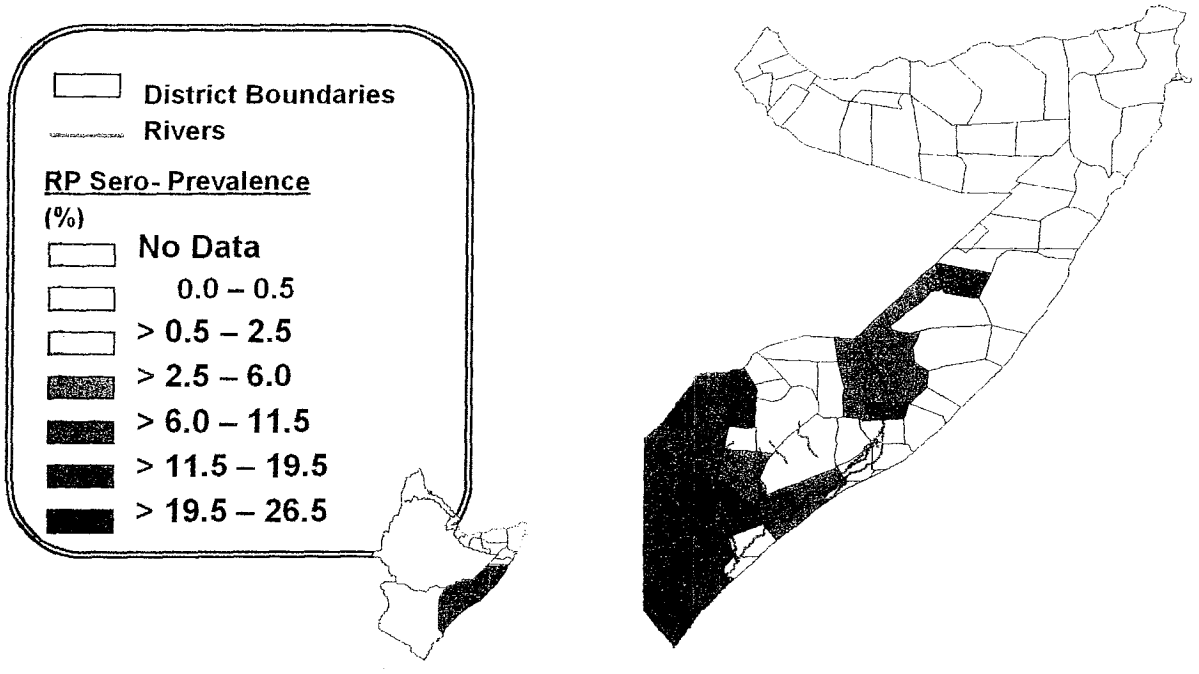
a. Somalia (PowerPoint presentation)

PACE Somalia presented a series of maps showing the cattle population density by province, the last vaccination conducted (Gedo and Lower Juba 1999) and the date that vaccine was removed from the field.

During the year 2003, active disease search was conducted in Lower and Middle Juba, Hiran and Middle Shabele. In February 2003, it detected an outbreak of lachrymation in Middle Juba, where 6 animals became penside test positive. Follow-up laboratory investigations were all negative for PCR.

During disease investigation work that was conducted in September and October 2003, in the area bordering Ruga in Kenya, 35 Inn biopsies and 22 eyes swabs were collected and tested negative by PCR for PPR, BVD and Rinderpest. A number of samples are still being tested.

The results from the serological random sample survey that was conducted in October 2002 (lower and Middle Juba, and most of Central Somalia and in 2003 in Gedo, Bay Bakool and Lower Shebele were presented in detail. It shows sero-prevalence of between 15-17% in Gedo, Lower and Middle Juba. Bay and Bakool are nearly negative while some positives are found around the trade routes in Central Somalia.



During PARC, Terra Nuova vaccinated roughly 150,000 head of cattle of population of over 2 million head of cattle in the vaccinated area, in other words less than 7.5%. The vaccination programme cannot explain the antibody prevalence of 15-17%. On top of this the animals, 1-3 years of age, that were sampled in October 2002 were not vaccinated in the last round.

Follow up proposed by PACE Somalia:

1. Sero-survey in Puntland and Somaliland
2. Mass vaccination in Gedo, Middle Juba and Lower Juba, i.e. the cluster of high sero-prevalence
3. Vaccination of districts along the trade routes and rivers in Lower Shabelle, Middle Shabelle and Hiran, i.e. the areas with low sero-prevalence along the river and trade route
4. PDS and sero-surveillance in wildlife in Bay, Bakool, Mudug and Galgadud.

PACE Somalia has 86 veterinary professionals in Central Somalia and 76 veterinary professionals and 200 CAHWs in Southern Somalia to perform all duties of the veterinary services.

b. Kenya (PowerPoint presentation)

The Kenya presentation started with a historical overview of the rinderpest outbreaks in the past decennium, i.e. the ones in Tsavo, Nairobi and Meru national parks. It went on to present the various zonation strategies over the past years. All vaccination had ceased as of December 2001. Both the Laikipia and the Samburu rumours in 2002 were put to rest. There is no evidence of virus circulation in these areas based on the wildlife survey conducted in the area.

The second part of the presentation dealt with the participatory disease searching work done by PACE Kenya. Many veterinarians were trained in participatory disease searching starting from November 2002 and searches were performed throughout Eastern Kenya starting from September 2003. The delayed start of PDS was due to the late release of funds under work programme 3. Once PDS started it detected a mild rinderpest compatible disease with a week's time. The presentation included tables of clinical signs observed. Many samples (Sera 206, whole blood 74, Inn aspirates 124, eye swabs 21, nose swabs 5 and mouth scrapings 5) were collected and forwarded to Kari/Muguga for diagnosis. See table 1 below.

A wildlife survey was conducted in Tsavo national Park in September 2003. All sera were negative in the H cELISA. The VNT results are not yet available.

Table 1: Laboratory results, Eastern Kenya.

Collection site / Test and lab		Ruga	Fafi	Yumbis	Meri	Bodhai
AGID (Muguga)		All -ve	All -ve	All -ve	All -ve	All -ve
C-ELISA (Muguga)		1/69	1/8	1/12	0/8	0/7
VNT (Muguga)		N/D	N/D	N/D	N/D	N/D
PCR-RP (Muguga)		5/18	N/D	N/D	0/2	N/D
PCR-PPR (Muguga)		0/6	N/D	N/D	0/2	N/D
PCR- BVD (Muguga)		0/6	N/D	N/D	0/2	N/D
PCR-RP (Pirbright)*		4/7	N/A	N/A	1/1	N/A
IC-ELISA RP (Muguga)		2/20	0/3	0/2	N/D	N/D
IC-ELISA PPR (Muguga)		0/23	0/3	0/2	N/D	N/D

The outbreak was confirmed on the basis of 5 PCR positives and 2 immuno-capture ELISA positive results. One animal was both positive on PCR and Immuno-capture ELISA. However typing in Pirbright revealed that the PCR product was not RP African Lineage 2, but similar to the vaccine strain Kabete O.

In conclusion: the mild rinderpest compatible syndrome observed in Eastern Kenya is not yet conclusively diagnosed as rinderpest. A table showing the time span between

submission and receiving results was presented. It clearly indicated that the results from Muguga took more than 2 months, certainly too long for a strategy of "seek, confirm and eliminate".

The wildlife survey that was identified to be conducted in north-eastern province and for which funding was agreed in the steering committee meeting of August 2003, has not been conducted because the EC Delegation did not release the funds that were identified under work programme 2.

PDS work continued to detect mild rinderpest like syndrome in:

- February 2004: Churu (South-Eastern Marsabit) and various points in Mandera districts along border with Somali (Kutayu, Damasa, Fino, Arabia & Libehiya)
- December 2003 in Isiolo.
- November 2003 in Southern Wajir and Garissa.

Clearly the about 150,000 vaccination conducted in Garissa district did not stop the spread of the mild rinderpest-like syndrome.

c. Ethiopia (PowerPoint presentation)

Zones and districts that are assumed to be at risk for the introduction of mild rinderpest include:
Region 5: Gode (Mustahil, Kelafo, Ferfer and Shilabo district)
Region 5: Liben zone (Dolo Odo, Filtu and Moyale)
Region 5: Afdera Zone (Dolo Bay district)
Region 4: Borena (Moyale district)

Vaccination throughout this area stopped in 1991, except for Borena and Liben Zones in 1994. All populations are fully susceptible.

A survey team from regional laboratories namely: Dire Dawa, Sodo and Assela travelled to suspected districts and came with the following preliminary results:

- Samples of Dolo Odo and Dolo Bay were not received at the time of the workshop.
- In all other areas the surveillance teams did not receive reports or rumours mild rinderpest like disease
- The teams also did not observe clinical disease in cattle
- 780 sera collected from apparently healthy cattle aged 1-3 years. The samples from Dolo Odo and Dolo Bay were expected to arrive at the time of the workshop.

Zone	District	No herds	No of Samples
Gode	Kelafo	8	160
	Mustahil	6	120
Liben	Moyale	12	240
	Filtu	1	20
Borena	Moyale	3	60
Total		**33**	**780**

All samples tested negative for H-cELISA.

The following results from Dolo Odo and Dolo Bay were received after the workshop: All 260 serum samples collected from Dolo Bay district, Afder zone were negative in the H-cELISA, while 11 out of the 136 samples collected from Dolo Odo, Liben Zone were found positive in the cELISA H.

8 Current understanding of rinderpest virus circulation based on wildlife data

Full presentation

Eradication means extinction of virus from all susceptible species.
There are 4 main issues:

1. What can wildlife data tell us about the zone of endemic maintenance?
2. What role is wildlife playing in the epidemiology of rinderpest?
3. How long can the virus persist in wildlife populations alone?
4. What strategy will ensure the virus burns out in all species and locations?

Summary on current status of rinderpest in wildlife populations in East African Ecosystems

a. Virus is absent in the Western and Eastern Great Rift Valley – but the latter is potential epidemic risk zone.
b. Virus is apparently absent from the Tsavo Ecosystem and Central Northern Kenya but these are epidemic risk zones.
c. Virus has died out in the Meru ecosystem but remains a high-risk zone.
d. The status of wildlife in North Eastern Kenya is not currently known, but over the period 1993–2000 there was regularly sero-conversion in wildlife.
e. The status of wildlife in Somalia is not known.
f. Large number of potential wild hosts and our understanding about the pathogenesis of the disease in many species is poor. Viruses can produce severe or mild or no disease.
g. Wildlife disease was often associated with mild cattle disease.
h. Our understanding of the transmission of virus between species and between cattle and wildlife is poor.

i. Reasonable data are available from the field and the laboratory for buffalo.
j. Other species possibly important in the dissemination of virus are eland and kudu.
k. Some species may be good indicators of cattle origin virus - Warthog?

Persistence In Wildlife

The following are observations from outbreaks observed in the field:

a. Persistence in a herd of buffalo is approximately 90 days;
b. Persistence in a naïve population of buffalo within an ecosystem is between 3 – 6 years.
c. Persistence in a partially immune population of buffalo is 6 months to a year.
d. Persistence in other species is unknown but as sero-prevalence data show most species show <25% sero-conversion this is likely to be shorter.
e. Persistence in kudu is a question as it appears it can persist in low density evenly distributed populations for longer than buffalo + 6 months?
f. It appears if no further cattle – wildlife transmission, the virus will eventually die out in wildlife completely.
g. Evidence for extinction of virus in wildlife

Major Questions To Be Answered Before Applying Mass Vaccination

a. What is the true link between cattle and wildlife?
b. Where (outside the laboratory) is there confirmation of infection of cattle with the wildlife strain?
c. Is the strain isolated from wildlife (lineage II) the only strain remaining?
d. If the link is confirmed how frequently will mass vaccination of cattle need to be implemented to ensure the virus has burned out in wildlife and cannot re-infect susceptible cattle (and vice versa)?

Conclusion

a. In my opinion wildlife is not a major constraint on eradication if the implications of the persistence of the virus in some species are taken into account in the planning.
b. If flexible, focused and adaptive management of the eradication process is not possible – the attempt will fail. The most important element of this is the finance.

9 Implications of Rinderpest Lineage II persistence on the wildlife and tourism sector – Elisabeth Wambwa

Impact of rinderpest on wildlife:

The 1889 Panzootic irreversibly changed the ecology of flora and fauna on the continent. The high wildlife mortality led to reduced numbers, extinction of some species and a change in distribution of range of species.

Impact of rinderpest on wildlife in Kenya include:

- Decline of rare species such as the Bongo antelope;
- Generally a decline in different species of ruminants, i.e. during the 1994-97 outbreak in the Tsavo ecosystem, by mid-1995 the number of buffaloes was reduced by 44%. Similar trends were recorded in giraffe, eland and other ruminants in Meru ecosystem

Rinderpest eradication will not only provide gains for the livestock industry, but also benefit wildlife, biodiversity and associated tourism. Especially in East Africa, wildlife is a significant foreign exchange earner. Once species numbers decline, it is very expensive to engage in restocking programs.

As wildlife is not vaccinated, they are good sentinels for the monitoring the disease. Wildlife surveillance has provided important information on the epidemiology of the disease.

KWS Veterinary Unit experiences constraints in execution of these surveillance tasks:

- Because the core mandate of KWS is conservation and management of wildlife, most of its corporate funding is directed towards park management activities.
- Though KWS carries out its activities independently, it is financially dependant on Ministry of Livestock (MOL) as finances for wildlife sero-surveillance are channeled through MOL. Direct support would allow KWS to improve planning.

10 Plenary discussion on all topics presented today.

The most important issues brought forward in the discussion are attached in annex 3. The discussion mainly focussed on wildlife as these were the last presentations.

11 Analysis of the "seek, confirm and eliminate" strategy – pros and cons.

Possible **vaccination** "strategies" [1] for eradication:

1. Search, confirm and eliminate
2. Risk based vaccination strategy as proposed by PACE Somalia
3. Mass vaccination of a geographically identified area of endemic maintenance (delineated zone). This might include intensive pulsed vaccination, i.e. National Immunisation day approach like in the Polio campaign.

Based on "Intensified GREP" PACE adopted the "search, confirm and eliminate".
It has become clear during the months prior to the workshop this strategy is not well understood.

[1] Note here that vaccination is only part of an eradication strategy. An eradication strategy comprises, surveillance, communication activities, establishment of delivery systems, justification for funding, establishment of an adaptive and dynamic management system etc.
These are often preconditions for a successful implementation of the adopted strategy.

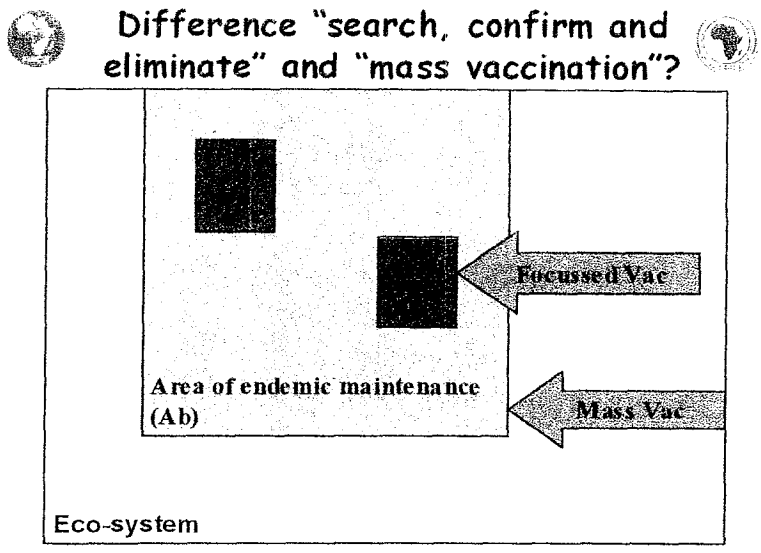


Figure 1: Difference between targeted or focussed vaccination and mass vaccination

Focussed vaccination: targets the elimination of circulating antigen directly. Only infected and in contact herds are vaccinated.

Mass vaccination: After an area of endemic maintenance is established through serological surveys this area is targeted for mass vaccination.

Pros and cons of a "Search, Confirm and Eliminate" strategy:

Advantages Search:

- **PDS is the lead in to confirm and eliminate,** it increases the sensitivity of RP surveillance
- Improves the epidemiological understanding of mild rinderpest virus circulation.
- Improves the general knowledge, understanding and motivation of veterinary professionals
- Improves relationship with the communities. (If perceived problems are addressed by the vets)

Pros of "Confirm":

- Stimulate the development of laboratory confirmation procedures
- Creates links between laboratory and field services
- Stimulates epidemiological thinking
- Stimulates transparency (field vets want to know the results and its interpretation)
- Improves the epidemiological understanding of veterinary personnel on the ground
- Veterinary knowledge challenged (Professionalism)

Pros of elimination by focussed vaccination:

- If performed as proposed, limited number of animals to be vaccinated;

- High chance of achieving the target immunity level and thus higher chance of elimination of virus
- Cooperation by livestock owner in both vaccination and marking, especially when other problems are simultaneously addressed;
- Less interference with ongoing surveillance activities;
- Less costly;
- Performance monitoring and accountability can easily be built in.

Cons of "Search, Confirm and Eliminate" strategy:

Cons of "Search"
- Might not detect all foci
- Needs specialist trained personnel
- Needs mobility - vehicles / DSA
- Requires continuous surveillance
- Requires continuous monitoring of wildlife

Cons of "Confirm"
- Authorities forced to acknowledge presence of infection
- Existing legislation leads to action, which antagonises pastoral communities (counterproductive closure of markets)
- Poor laboratory services leads to delayed action in the field

Cons of "eliminate"
- If TC vaccine is used, and vaccinated animals are not 100% marked there will be interference with sero-surveillance
- Partial immunity from sub-optimal vaccination may assist virus persistence

12 Workshop: "Current understanding of the mild rinderpest situation in the Somali Eco-system".

We DO know that:

1. PDS has detected a mild rinderpest-like syndrome in Eastern Kenya.
2. Wildlife surveillance has provided an unequivocal picture of the rinderpest circulation in the Somali ecosystem.
3. Sample collection and forwarding is poor and we have to improve sampling protocols and laboratory procedures to ensure a higher detection rate.
4. It takes too long for a definitive laboratory diagnosis to be made and that this is mainly due to the poor diagnostic capacity/capability in the Regional Laboratory
5. It takes too long to forward samples to WRL.
6. Only sequencing can differentiate the lineages and this is currently only possible in the WRL.

We DON'T know

1. where the virus has been circulating in cattle over the past 10 years and how these mild strains circulate in different populations
2. whether the "mild rinderpest compatible syndrome" detected during PDS is truly rinderpest. The specificity of PDS is still to be determined.
3. what are the best specimen to be collected
4. the sensitivity of laboratory tests like PCR and Immuno-capture ELISA for African Lineage 2.
5. whether we have 1 or 2 strains of rinderpest virus circulating, i.e. African lineage 2 and RBOK / Kabete O.
6. whether the mild strain will revert to virulence. (But according to Plowrignt would we be foolish to assume that the virus will not revert)
7. the current geographical delineation of the areas where this (these) strain(s) of mild rinderpest circulate.
8. the role of lesser kudu in the epidemiology of mild rinderpest.
9. how wide traditional "vaccination" practices using cattle/kudu urine are used or the immuno-genetic effect of such practices.

Details are attached in annex 4.

13 Lessons learned from the implementations of "mass vaccination strategies"

Blanket vaccination versus mass vaccination:

Blanket vaccination:

- Vaccination of a geographically defined area, without knowing much about its status.
- Often performed on an annual basis

Mass vaccination:

- Vaccination of a geographically defined area, known to have virus circulation.
- Often done in a response to a somewhat improved knowledge
- Continuous, pulsed, once or twice a year

Mass Immunisation

A major drawback is the narrowing of our thinking and approach to the control of disease, as considerable emphasis has been placed on this single measure Martin 1983

EPERK - Emergency Programme for the Eradication of Rinderpest from Kenya implemented from 1998-1999.

The programme used both community sensitisation and field staff sensitisation to achieve high coverage of the targeted population.

Expected to vaccinate 100% (or close) of the population in North Eastern Province

Cattle population	828,000
Total vaccinated	653,000
% of population vaccinated	79%
Average ab level (5 districts)	51%
Vaccination efficiency	64.5%

The EPERK evaluation document listed the following reasons for the low immunity level achieved:

- Insecurity
- Poor timing of vaccination exercise
- Shortages of vaccine
- Too short a time at any one vaccination post
- Inadequate involvement of all relevant and appropriate stakeholders
- Inadequate supervision

Possible reasons for low vaccination efficiency:

- Viability of vaccine at the time of vaccination
- Vaccination technique

Other experiences

- Performance bonus system difficult to implement
- Creates expectations
- Assessment of work quality is subjective
- Immunity level in areas with PPR might not be a good performance test.
- In some areas cattle owners did not allow to have their animals ear-notched
- Vaccine shortage and cold chain problems due to combined vaccination with CBPP or FMD
- Offering combined vaccination more attractive to livestock owner.
- Only 2 out of the 23 districts involved in the second round vaccination achieved an immunity level of 80%

Important issues while planning a vaccination programme

- Performance monitoring
  - % of animals vaccinated
    - risk: in order to achieve "good" results, livestock population are intentionally under estimated
- % RP antibody positive is a better but more costly indicator
  - Vaccination efficiency
- A system of accountability has to be planned in.
  - Different levels with different tasks
  - Checking percentage of ear-notched animals in the population
  - Check vaccination in remote corners

14 Vaccination options for the eradication of mild rinderpest from the "Somali Ecosystem"

Dr. Henry Wamwayi. - Full presentation

The total cost of programmes like JP15, PARC and PACE that had elements of rinderpest control in Africa amount to over 250 million Euros.

According to USAID the shortfalls of JP/15 were:

- Logistics of vaccine production
- The logistics of vaccine delivery
- Heat stability of the vaccine
- Lack of human resources
- Poor infrastructure development

While Dr. James Thomson mentioned the following problems in eradicating rinderpest during PARC:

- Gaps in Funding
- Lack of projects in key countries
- Difficulties in diagnosing some of the strains
- Civil unrest
- Remote regions
- Presence of wildlife
- Lack of maintenance of Veterinary Services

Arguably, the most significant failing was that of not understanding the epidemiology of the disease. There was too much accent on vaccination without having the supporting technology.

Problems of mild rinderpest in the Somali Eco-system

- The only remaining focus of active rinderpest in the world?
- Insecurity and lack of access in remote areas
- Persistence since 1993/94 and likely much earlier
- Origin and sources of recurrent outbreaks in wildlife and cattle unknown
- Epidemiology and role of wildlife might not be fully understood or appreciated
- No reports from stockowners and herders
- Laboratory confirmation of disease in cattle is difficult, delayed and results so far obtained are equivocal
- Patchy and uncoordinated vaccination responses

Past successes in rinderpest control and eradication using "Stamping out" and vaccination with rinderpest tissue culture attenuated vaccine were highlighted.

Vaccination Strategy Options for the Somali Ecosystem

1. Do nothing is not a strategy

2. Study the disease to understand key elements of its epidemiology and the role of different species to facilitate the development of an effective eradication strategy.
   - For how long?
   - At what cost?
   - How to guarantee success?
   - How to contain rinderpest within the ecosystem?
   - How to allay fears of trading partners?

3. Search, confirm eliminate through targeted focal vaccination
   - Elusive so far, and how long do we have to try?
   - How to contain the disease in the ecosystem
   - Effects on markets and livelihoods?
   - Requires access to all cattle at risk, a strong commitment of veterinary services and the support of livestock keepers and traders.

4. Vaccination and surveillance based on risk factors for rinderpest virus maintenance and spread.
   - Surveillance to identify foci of endemic maintenance and epidemic extensions
   - Identify existence of risk factors that favour endemic maintenance (cattle density, cattle movements and husbandry system, presence of susceptible wildlife spp., contact between cattle and wildlife, cattle trade routes, cattle markets, RP vaccination history)
   - Classify endemic, epidemic, clean high risk and clean low risk areas.
   - Carry out targeted vaccination on a priority basis dependent on level of risk.

   Pros and cons of risk-based vaccination

   Pros
   - Cost effective
   - Timely intervention
   - Responsive to the needs of livestock keepers, traders, transporters etc.

   Cons
   - Different strategies for different areas of risk
   - Seasonal variations in risk factors?
   - Risk factors not uniform in all areas of the ecosystem
   - May become a mass vaccination campaign
   - Needs rapid laboratory diagnostic support

5. Mass Vaccination of cattle in delineated area
   - Requires a good vaccine

- Access to all cattle
- Effective marking of all vaccinated animals

The criteria for the ideal vaccine and the vaccines that are currently being developed were discussed (see PowerPoint presentation)

The current available vaccine is tissue culture attenuated rinderpest vaccine (TCRV)

- Currently accepted globally as the vaccine of choice
- Solid life-long immunity in successfully immunized animals.
- Thermostable TCRV successfully used to eliminate rinderpest in Southern Sudan
- Maternal antibodies interfere with vaccine take
- Laboratory tests to distinguish vaccinated from infected animals not available

Heterologous PPR vaccine:

- Evidence of cross-protection with rinderpest
- Safe for use in sheep and goats
- Easy to administer
- Use in cattle will provide distinction from natural infection with mild rinderpest.

Questions on Heterologous PPR Vaccine:

- Thermostable PPR vaccine available
- How long for experimental evaluation of PPR vaccine against rinderpest?
- Are results of confined lab trials adequate to recommend field use of the vaccine?
- Need for limited field trials for final recommendations?
- Need for OIE endorsement for use in cattle?
- Scarce data on PPR occurrence in the Somali Ecosystem
- Need for baseline surveys to establish PPR antibody prevalences in different species?
- Safety of the vaccine in cattle?
- What is the duration of immunity against rinderpest in vaccinated cattle?
- What is the acceptance of countries in the ecosystem to the introduction of PPR antigens on a massive scale in cattle?
- Who will take responsibility and liability for Somalia in absence of government legal and regulatory frameworks?

Proposed Rinderpest Eradication Strategy for the Somali Ecosystem

Delineation of areas of endemic maintenance and spread of mild rinderpest followed by Mass vaccination of cattle using tissue culture attenuated vaccine

- Use participatory disease searching (PDS)
- Serological searches in unvaccinated animals
- Impact of recent vaccinations in Kenya on sero-surveillance?
- Update serological and PDS surveys in Somalia?

- Define time scale for end of delineation activities (October 2004?)
- Plan for mass vaccination in delineated areas
- Must access all animals in delineated areas
- Sustain vaccination campaigns to ensure eradication
- Campaigns to be harmonized and coordinated in all (two?) countries (AU/IBAR/PACE)
- Agree modalities for vaccine delivery:
    - Government veterinarians
    - Contracted private veterinary professionals/associations
    - Community based animal health workers
- Sero-monitoring after each round of vaccination to assess herd immunity
- Surveillance maintained in wildlife within identified areas (sheep, goats, camels?)
- Surveillance in cattle and wildlife in contiguous areas at risk
- Follow-up sero-surveillance to ensure freedom from disease and infection

Considerations

- Recognize shortcomings of current approach
- Plan activities leading to mass vaccinations
- Logistics of the vaccinations and surveillance
    - Finalize strategy through consensus
    - Risks and contingency plans
    - Secure funding
    - Awareness creation and stakeholders support
    - Timing and coordination of vaccinations
    - Motivation of vaccination teams
    - Laboratory support (diagnosis, sero-monitoring and surveillance)
- Must have flexible, focused and adaptive/dynamic management systems

- How to sustain surveillance systems in hostile environments and with limited funds.
- How to sustain effective veterinary services to ensure control of other major diseases.

15 Presentation by the OIE regional representative for the Middle East.

Dr Yehia Ghazi presented the paper as attached in annex 5 and distributed the paper copies of the following OIE documents and presentations:

4. A presentation of Dewan Sibartie on the OIE Pathway for the recognition of freedom from rinderpest that was prepared for the FAO/OIE Advisory Group Meeting in Beiroet, Lebanon, 18-20 November 2003.
5. The final report of the joint FAO/OIE Technical Advisory Group Meeting on the *Accreditation of Freedom from Rinderpest*, Beiroet, Lebanon, 18-20 November 2003.

6. Appendix 3.8.2. to the OIE Terrestrial Animal Health Code: Recommended standards for epidemiological surveillance systems for rinderpest.

Dr. Yehia Ghazi stressed the facts that:

1- Countries of the Greater Horn of Africa and the Middle East are epidemiologically coherent.
2- The inevitable trade of in livestock and livestock products between the two regions.
3- The agreement of the FAO, OIE and other international and regional organizations to strengthen their collaboration at the regional levels.

16 Relationship of the Eastern African Rinderpest Situation to the Broader GREP Objectives

Peter Roeder, GREP Secretary.

The End Game: Elements Of The Problems We Face

Need to eradicate the last remnants of the virus whatever the clinical manifestation

- The virus is currently of low pathogenicity for cattle most of the time
- The cattle owners don't care
- Some of our colleagues don't care
- Economists don't care
- It is already difficult to maintain commitment

However, the GREP timetable is still to achieve global freedom from rinderpest by 2010!

Why do anything if

- only a small area is involved
- it is a "non-disease" - minor impact on livelihoods and food security
- there are many other pressing issues
- "trading countries are vaccinating imports, why do we need to do more?"

RINDERPEST ERADICATION IS NOW AN INTERNATIONAL PUBLIC GOOD!

- to safeguard investments made over the past 40 years
- "We would be foolish if we assumed that the virus could not revert to virulence" [Plowright]
- prospect of reversion to virulence and epidemic resurgence if virus moves to new susceptible population, like it has done in the past:
    - Tanzania 1950s-1960s, 1980-1982
    - Kenya/Tanzania 1997
- Direct trade constraint – trade vulnerable
    - 1983 ban
    - Middle Eastern countries fear rinderpest
- Africa's wildlife heritage at risk – fragmented relict populations vulnerable
    - Tsavo 1993/95; Nairobi NP 1996; Meru 2001

- restocking programmes expensive and vulnerable
- credibility of national veterinary services
  - Eradication of rinderpest and the process of accreditation of rinderpest freedom is a way of demonstrating that a country has an effective veterinary service.

REGIONAL IMPLICATIONS IF NOTHING IS DONE

- Neighbouring countries unable to finalise rinderpest freedom accreditation
- More distant countries – Middle East trading partners - unable to progress with rinderpest freedom accreditation
- GREP will FAIL
- Countries return to institutionalized vaccination and endemic rinderpest

WHAT IF ACTION IS TAKEN AND IT FAILS?

- Failure to eradicate rinderpest
- Poor expectation of renewed assistance for rinderpest eradication in future. This should be considered the last chance!
- Poor expectation of assistance for other animal health interventions in future
- Cattle prices depressed by continued trade uncertainties
  – vulnerable to rumours
- Countries return to institutionalised vaccination and endemic rinderpest
  – costly

WHAT IF MASS VACCINATION PRACTISED WITH NON-MARKED VACCINE?

- Middle Eastern countries are committed to OIE accreditation of rinderpest freedom within 2 years.
- After entering on the OIE Pathway [Declaration of Provisional Freedom] current practices will be prohibited – stop importing rinderpest antibody positive animals.
- Kenya-Tanzania: rinderpest antibody positive cattle entering into Maasailand will compromise Tanzania's ability to become accredited as free from rinderpest.

17 Management requirements for a mild rinderpest eradication campaign

The crucial question is: "Could rinderpest be eradicated under a PACE type of management?" The answer to this question is unlikely. The PACE programme was designed with other main objectives.

We would first of all require an agreement on the objective and approach to achieve the objective of eradication and consequently the buy-in by all major stakeholders including politicians, technicians, livestock owners, donors and the international scientific community.

Note – can try to "sell" the intended approach or reach consensus by open consultation
Achievability must have a high probability of success and based on objective criteria.

Resources

Personnel – "managing people is like herding cats": hence need for direct management authority and tools;

Finance – needs to be management with an authority to redirect finance when necessary without unnecessary delay;

Procurement needs to be efficient and practical.

The uncertainty principle particularly applies for a disease as poorly understood as mild rinderpest. It is therefore obvious that detailed planning, while important, can serve only as a guideline.

Uncertainty principle

Managing the eradication of any disease is fraught with uncertainty. The need to recognize altered circumstance and the flexibility to adapt quickly to changed circumstance is crucial for any eradication programme to succeed. It requires managemental judgment and independence!

Monitoring and evaluation become vital issues that must be done by independent body with the necessary technical and socio-political insight.

18 Participant Analysis of Rinderpest Eradication Strategies

The participants were provided with a matrix that assessed four strategy options against a number of parameters.

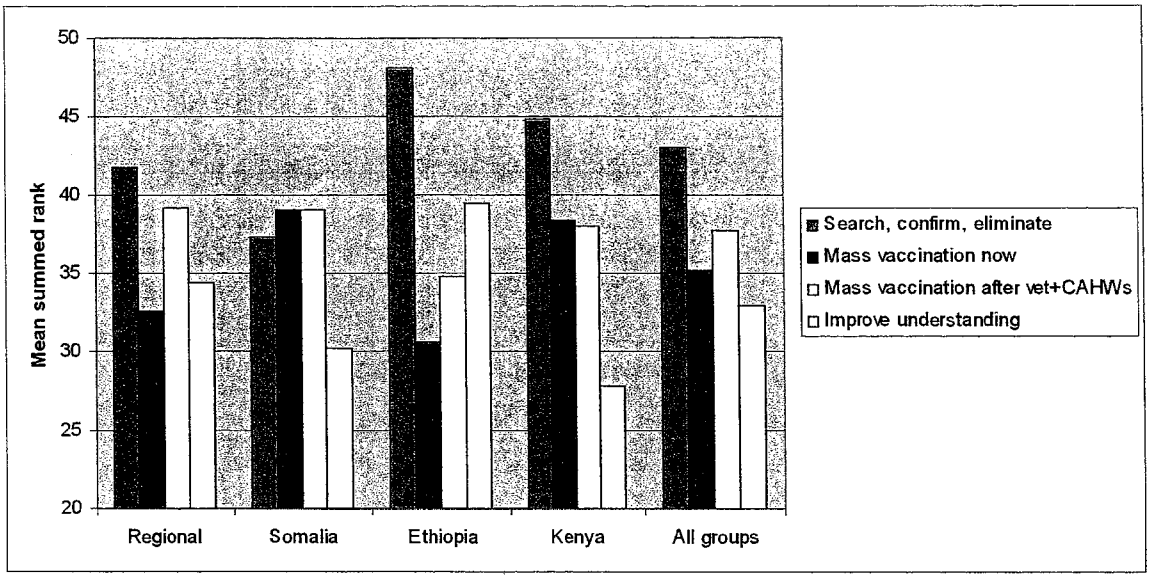
The matrix and the explanation are attached in annex 6.

Preliminary Results (see figure 2 and table 2 below)

Comments

- Ethiopia and Kenya have a preference for a search, confirm & eliminate strategy. Plus, there is agreement on this within these groups regarding the analysis of the four strategy options.
- The current strategy promoted by PACE is "search, confirm & eliminate".
- Somalia has a preference for mass vaccination, though there is disagreement within the group over the analysis of the four strategy options.

Figure 2: Preferences for rinderpest eradication strategies



Significant differences between the four groups (Regional, Somalia, Ethiopia and Kenya) for all four eradication strategies (Kruskal-Wallis test)

Table 2: Do individuals within groups agree on their ranking of the indicators?

	Agreement of ranking of 15 indicators[1]		
Group	Strong agreement ($p<0.01$)	Moderate agreement ($p<0.05$)	Weak agreement ($p>0.05$)
Kenya (n=17)	12/15	1/15	2/15
Ethiopia (n=5)[2]	9/15	4/15	2/15
Somalia (n=16)	1/15	4/15	10/15
Regional (n=15)	2/15	2/15	11/15

[1] Kendal coefficient of concordance
[2] Small sample size

19 Summary and conclusions

In developing strategies it is important to understand that ACTIONS and TOOLS are not equivalent to a strategy but form part of a STRATEGY, i.e. mass-vaccination is an action not the strategy.

Agreement was reached that the strategy comprises the application of the following Actions and Tools:

- **OWNERSHIP GENERATION**
  - Communication

- **FRAMING NATIONAL POLICY**
  - Define free and endemic zones and report them to the OIE
- **STRENGTHENING DELIVERY SYSTEMS**
  - Establish a network of private vets who supervise community based animal health workers
- **SURVEILLANCE**
  - Syndrome confirmation – case definition
  - Geographical area definition
  - To ensure that infection is contained
  - Assure a timely virological service
  - Wildlife surveillance continuous in the area identified to endemically maintain the virus and focused to sort out specific issues.
- **FUNDING SUPPORT**
  - Follow-on project development
  - Build consensus and find donor support
- **VACCINATION USE**
  - Make use of a marked vaccine and DIVA as soon as it becomes available
  - Vaccination programmes should be focused as much as possible to increase the chance of success in achieving immuno-sterilisation
  - Sero-monitoring
- **ESTABLISH ADAPTIVE MANAGEMENT STRUCTURE**
  - In IBAR
  - In country programmes
  - Negotiate modalities with donor.

TIME FRAME

The timeframe should be set aiming at elimination of rinderpest virus from the infected ecosystem in the shortest possible time through a managed flexible process. Its progress is constantly reviewed and when required direction amended.

The timeframe includes - 1 to 2 years maximum – for intensivation of the following activities

- Communication – community ownership
- Definition of the syndrome
- Delineation of the area of endemic maintenance
- Strengthening delivery systems
- Strengthening of diagnostic services
- In case foci of infection are detected elimination of these foci

Latest by the end of 2005 start a 3-year programme consisting of

- Immuno-sterilisation of primary endemic focus
- Active surveillance and rapid reaction in surrounding areas

- Verification of freedom initiated
- Continue enabling activities

IMMUNOSTERILISATION BY INTENSIVE VACCINATION

- Minimize the area to give highest chance of elimination of the virus, which will probably comprise at least 3 years of pulsed vaccination, 2 vaccinations per year, each within a period of maximum 1 month.
- Perform sero-monitoring and perform revaccination if necessary
- Start the use of a DIVA vaccine as soon as possible.

NATIONAL ACTIONS

- Prioritize rinderpest eradication in national PACE programme
- Establish an adaptive management structure
- Strengthen delivery systems involving CAHWs, private veterinarians and public veterinarians to implement both surveillance and vaccination activities
- Notification of free zones and areas of endemic maintenance to OIE
- Develop and implement communication campaign
- Initiate rapid information exchange through informal animal health networks
- Ensure national diagnostic capability
- Making marked vaccine available

REGIONAL ACTIONS (IBAR)

- Develop follow-on project proposal
- Communication of workshop outcome to national and international policy makers – sell strategy agreed by technicians
- Prevent funding gaps of national programmes
- Establish adaptive management structure and specific executive working groups for harmonizing national actions
- Coordination of the notification of free zones and areas of endemic maintenance to OIE
- Develop and implement communication campaign to gain the support of all stakeholders.
- Establish rapid information exchange through regional networking
- To enhance flexibility include wildlife surveillance in the regional PACE budget (away from national budget)
- Ensure and support national diagnostic capability
- Prepare manual of diagnostic SOPs
- Making marked vaccine and DIVA test available

INTERNATIONAL ACTIONS

- Regional rinderpest diagnostic laboratory
- Assist in the develop of an follow-on project proposal

- Making marked vaccine and a DIVA test available

20 The Way forward

1. Countries work out their respective proposals at country level (send to IBAR/FAO by 2nd April based on the outputs of the workshop.
2. IBAR/FAO develop a concept paper based on this approach (send to countries by 2nd April).
3. IBAR and FAO are to jointly complete the project document by end of April.

Project proposal will be presented to

- The countries
- PACE Annual Coordination Meeting
- GREP Technical Consultation or Advisory Group Meeting that will be organised in Nairobi.

The aim of these presentations is to build consensus and obtain donor support.

Annex 1: List of participants

PACE (PAN AFRICAN PROGRAMME FOR THE CONTROL OF EPIZOOTICS

ERADICATION OF MILD RINDERPEST FROM THE SOMALI ECOSYSTEM WORKSHOP

18-20 FEBRUARY 2004

KENYA WILDLIFE SERVICES HEADQUARTERS – LANGATA ROAD

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Annex 2: Workshop Agenda

AFRICAN UNION
Interafrican Bureau for Animal Resources
Pan-African Programme for the Control of Epizootics

WORKSHOP: STRATEGY FOR THE ERADICATION OF MILD RINDERPEST FROM THE SOMALI ECOSYSTEM
18-20 February 2004

Venue: KENYA WILDLIFE SERVICES HEADQUARTERS
Veterinary Unit, Langata.

PROPOSED AGENDA

18th February 2004 - Wednesday

08:30 – 09:00	Arrival of Guests – Registration of participants	
09:00 – 09:30	Opening	*Ag. Director AU/IBAR*
09:30 – 10:00	Recommendations of the Mbagati meeting, June 2002. Brief Summary of progress made over the past year and Objectives of this workshop	*Gijs van 't Klooster*
10:00	***COFFEE BREAK***	
10:30 – 12:00	ntation on the understanding of the current status of mild rinderpest in the countries that are part of the Somali eco-system - Somalia - Kenya - Ethiopia	*PACE National Coordinators*
12:00 – 12:30	Current understanding of rinderpest virus circulation based on wildlife data.	*Richard Kock*
12.30 –13.30	***LUNCH BREAK***	
13:30 – 13:45	Implications of Rinderpest Lineage II persistence on the wildlife and tourism sector	*Elisabeth Wambwa*

13:45 – 14:00	Analysis of the "seek, confirm and eliminate" strategy - advantages and disadvantages.	*Gijs van 't Klooster*
14:00 – 14:45	Discussions and summarize current understanding	*Peter Roeder* *Rapporteur Gavin*
14:45 – 15:00	Introduction to workshop: "Current understanding of the mild rinderpest situation in the Somali Eco-system". - what we DO know - what we DON'T know"	*Gijs van 't Klooster*
15:00 – 15:30	Group work	
15:30	***TEA BREAK***	
16:00 – 16:30	Group work	
16:30 – 17:30	Presentation to plenary and discussion	

19th February 2004 – Thursday

08:30 – 09:00	Lessons learned from implementation of mass vaccination strategies.	*Gijs van 't Klooster*
09:00 – 09:30	Discussion	
09:30 – 09:50	Strategy options for the eradication of mild rinderpest from the "Somali Ecosystem"	*Henry Wamwayi*
09:50 – 10:30	Discussion	
10:30	***COFFEE BREAK***	
11:00 – 11:20	Issues to be addressed in management of a rinderpest eradication campaign	*Gavin Thomson/* *Bidjeh Kebkiba*
11:20 – 11:50	Discussion	
11:50 – 12:10	Relationship of the Eastern African rinderpest situation to broader GREP objectives	*Peter Roeder*
12:10 – 12:30	Discussion	
12:30	***LUNCH BREAK***	
14:00 – 14:30	Introduction to workshop, advantages and disadvantages of different of different strategy options.	*Andy Catley*
14:30 – 15:30	Group work and summary	

15:30	***COFFEE BREAK***

16:00 – 16:10 Workshop Communication: How to ensure success?
- political support
- how to obtain and retain support of the livestock owners

16:10 – 17:30 Working groups plus plenary presentations

20th February 2004 – Friday

08:30 – 10:30 Workshop Delivery: How to ensure success?
- Surveillance requirements
- Delivery systems, i.e. manpower, motivation, capacity on the ground

10:30	***COFFEE BREAK***

11:00 – 11:30 Presentation to plenary
11:30 – 12:00 Discussion
12:00 – 12:30 Workshop: What is the likelihood of success and what are the consequences of failure?

12:30	***LUNCH BREAK***

13:30 – 14:30 Discussion
14:30 – 15:00 Reaching a consensus on the way forward, responsibilities and timeframe

15:00 – 15:30 Preparation of draft resolutions (groups)

15:30	***COFFEE BREAK***

16:00 – 16:30 Presentation of draft resolutions
16:30 – 17:15 Discussion
17:15 – 17:30 Adoption of resolutions
Closing remarks

Annex 3: Plenary discussion on the topics presented during day 1, 18th February 2004.

Gijs van 't Klooster (GvtK)

Q: Henry Wamwayi – PDS and active disease search in the Somali ecosystem have provided useful information.

A: GvtK – Agreed

R. Kock - Wildlife

Q: Bengat – what does the data represent in terms of time? What were the results of the sampling in Wajir and other northern areas of Kenya in the mid 90s after the Tsavo epidemic?

A: Kock - The data was presented with spatial and temporal components based on GPS positions for sampled buffalo herds with colour circles (positive) and triangles (negative) representing serological results. The negative (colour) represents the time of sampling and the positive by the earliest year the data could represent infection, based on the age of the animals sampled (antibody persists for life so in an individual a positive could be acquired at any stage during that life). This provides evidence for historical and/or recent presence and/or absence of virus in buffalo populations over a wide geographic zone.

The results from the sampling of wildlife in the north of Kenya were inconclusive because VNT was not performed at the time and only c ELISA H results were available. The apparent insensitivity of the test was not known at that time. Any data that is not verified therefore was not included in this analysis. The recent and historical rinderpest status of wildlife in the North of Kenya remains a question.

Q: Musiime – what is the proof of the supposition that the virus can persist for up to 6 years within buffalo or wildlife populations at the ecosystem level?

A: Kock – there are 3 historical sets of data. From the Serengeti in the 1960s (Plowright and others), again in the same location in the 1980s (Rossiter, Anderson, Nyange and others) and from Tsavo in the 1990s (Kock and others). In these epidemics the period from the "index" case in the ecosystem to the last known case based on clinical observation and retrospective serology is from 5-6 years. This does not confirm whether the virus spread in each species independently or whether there was cross specific transmission within wildlife species or between wildlife and cattle throughout. Presumably at some point cross-specific transmission must have occured even if as a rarer event.

Q: Mohamed Bahari – what correlations are there with the results coming from eastern Kenya currently and wildlife.

A: Kock – the zone has historical evidence for infection in a range of species but as we have no data since 2000 we cannot make a direct correlation with the current set of data from Kenya Somali livestock.

Q: Henry Wamwayi – What is the explanation for the Meru outbreak in 2001 in a spatial and temporal sense?

A: Kock – This is interesting as this buffalo population is isolated and unlike the Tsavo ecosystem where there is more or less a continuous population of wildlife and in particular buffalo from the Somali border to the Tanzania border. In this case some other species or cattle must have introduced the virus into the system (or it had been maintained cryptically within the system since the last infection in 1995). We are still waiting for results from sampling in 2003, which might answer whether eland, waterbuck or hartebeest were involved in the outbreak, so no conclusions can be made as yet. Circumstantial evidence exists however, recorded by the Wardens of the National Park that the disease was coincident with the end of a long dry period and a large build up of livestock in the protected area system and on its periphery.

Q: Since JP 15 failed and it appears attempts to vaccinate and eradicate the virus in Kenya seem to have failed based on current data how can this problem of wildife – livestock interface and disease persistence be solved.

A: Kock - There are plenty of examples of countries (with wildlife), which have managed to eradicate the virus completely, through concentrating on effective vaccination of cattle and reducing the contact rates between cattle and wildlife. The peculiarities of the Somali ecosystem need to be examined to see what are the critical factors to be addressed to enable eradication.

Annex 4: Summary of group sessions on what we do know and what we do not know regarding rinderpest in the Somali ecosystem

What we do know

With the recent situation in Eastern Kenya it looks as if PDS has detected a mild rinderpest-like syndrome and there has been identification of rinderpest nucleic acid (RNA) by PCR and ICE. The problem is the viral genotype was not the expected lineage II but related to Kabete O. This casts doubt on the virological findings. We need to confirm if the isolation of RBOK is linked with the syndrome.

PDS is adequate in detecting mild rinderpest-like disease but its specificity remains to be determined. PDS should be used in conjunction with the existing tools.

Wildlife has provided an unequivocal picture of the rinderpest (in this case a lineage II virus) circulation in the Somali, Tsavo and Meru ecosystems affecting buffalo and some other species over the last 10 years. The clinical syndrome, virology, serology and epidemiology is relatively clear.

A major problem is the intermittent shedding of the virus in cattle based on experimental results. Need to explore improved sampling protocols and laboratory procedures to ensure a higher detection rate and unequivocal investigation results.

We do have lab standards for diagnosis including protocols, which involve multiple tests for both antigen and antibody detection. Paired sera samples are required to make a diagnosis from serology whilst virus isolation is confirmatory. PCR has proven to be a useful technique with these strain(s) both in wildlife and cattle. For wildlife serology relative insensitivity of the c ELISA H can be compensated for by VNT. However, the virology of the lineage II strain (isolated from wildlife) in cattle is confusing. The tests that are currently in use are validated and will detect rinderpest virus e.g. ICE. The reasons for the tests not proving to be reliable is more probably a case of absence of viral antigen in the samples. There is still a need for more test validation in relation to the clearview and improved systems for detection including the provision of a pool of cattle for in vivo diagnostics – inoculation studies. The regional laboratory needs improved capacity for diagnosis including e.g. for virus isolation. Laboratory diagnosis is too slow with the current set-up and cannot provide a service appropriate to decision making in the rapidly changing field situation. For the laboratory to produce prompt results, it should be facilitated financially to ensure availability of strategic test reagents and lab consumables in case of emergency outbreaks. This is not the situation today. Money expected from IAEA was not forthcoming. It is unlikely to come in the short term. A dynamic investigational system is an essential pre-requisite to the process of eradication of the virus.

Using appropriate protocols and maintaining a high standard of professionalism is important to ensure samples are provided to the lab in an optimal condition for diagnosis. There are some questions and concerns over sample quality in relation to the recent sampling in eastern Kenya.

Only sequencing can differentiate the lineages and this is currently only possible in IAH Pirbright.

What we don't know

We have an incomplete understanding of where the virus has been circulating in cattle in the Somali ecosystem over the last 10 years.

We do not have a current data set on wildlife from the Somali ecosystem (last data is 3 years old) but we know from the outbreak in Meru in 2001 that it is still in circulation.

What constitutes a diagnosis? – We still do not have a good case definition based on an unequivocal diagnosed outbreak in cattle in the Somali ecosystem. However during the PDS implementation assessment workshop Dec 2003 participants came up with the following tentative clinical case definition: infectious disease of cattle with lachrymation, stomatitis and enteritis (LSE) in a herd (not individual) plus any of the following: fever, nasal discharge, reports of illness or death in wildlife (and owner reports the disease). We should focus on cattle in this regard where diagnosis is a problem as the situation in wildlife is clear.

There are still some unexplained aspects of mild rinderpest virus behaviour in cattle both in the lab and in the field. We don't know if the PDS defined syndrome currently active in the Somali ecosystem is in all cases rinderpest, although the situation in Garissa would appear to be. However the phylogeny of the RNA detected is confusing. Where did the Kabete O strain appear from? Contamination, vaccine or field virus? This enigma demands urgent resolution

Where we have a suspicion in cattle and they are in contact with wildlife, examination of samples from wildlife species; clinically, antigenically and serologically should speed up diagnosis.

With the mild virus we do not know if it will revert to virulence in cattle. We would be foolish to assume that the virus could not revert to virulence (Plowright). We do know that the same strain can be mild or severe in a range of wildlife species even during the same epidemic and this appears to relate to the size of the susceptible population affected at any given time.

We do not have proof of the link between wildlife and cattle in relation to virus transmission. There are no confirmed concurrent outbreaks. Nevertheless, circumstantial evidence suggests there is a link as increased contact rates between pastoral/trade cattle were associated with presumed index cases in wildlife (In Tsavo and Meru). We need to understand the epidemiology

of the current strain taking into consideration the role of and the relationship between all susceptible species within this environment. A major question is where is this virus maintained when there is not an obvious ongoing epidemic? We have good data on buffalo and some data on warthog, giraffe, impala, eland, hartebeest, gazelles, hirola, waterbuck. There are questions with e.g. lesser kudu, gerenuk and dikdik, which are relatively common in the Somali system.

Historical data on camels show that they can be infected and seroconvert but are not clinically affected. They do not appear to have been a significant factor in the epidemiology of the virus historically. However their potential role as sentinels could be explored as 2 sera recently obtained in NE Kenya in aged animals were found to be positive.

There is some inconsistency in choice and application of the available sample survey methods. This should be examined on regional basis to be consistent and comparable especially with transboundary surveys. The question of the apparently inconsistent results across the Somalia Ethiopia border could be due to the fact that the populations discussed are not necessarily homogeneous – it may be a problem with interpretation of the maps presented covering whole districts.

We don't know how to bring laboratories currently working in the region up to the standards required for diagnosis in a timely manner (isolation 3 weeks, AGID 1 day ICE 1 day etc).

A guidelines manual prescribing the diagnostic confirmation process from selection of animals and sampling for confirmation and virus sequencing at the WRL is urgently needed and should be adhered to on a regional basis.

Annex 5: Presentation made by the OIE regional representative for the Middle East.

Mr. Director of AU/IBAR

Dear Colleagues and representatives of the Regional and International organizations,

Distinguished attendees and participants, on behalf of the OIE, I would like to express my thanks for the invitation to participate in this event, which is dedicated for a subject that occupies the top of the list of animal health and trade concerns in the Middle East and Eastern Africa.

The foundation of the OIE in 1924 was linked to rinderpest in particular and the standardization activities of the OIE has been considering Rinderpest the cornerstone in animal health parameters. The current goal of rinderpest control is to achieve freedom of countries and later of entire world regions from rinderpest with the ultimate aim of achieving global eradication through GREP by the year 2010. It is therefore necessary to institute a system for verifying the steps towards these short and long term aims, and to assist countries, which wish to trade in livestock and livestock products, but face difficulties due to the presence or past occurrence of rinderpest. This system, elaborated during the expert consultation held in Paris (August 1989) on Rinderpest Surveillance Systems, has since become informally but widely known as the OIE PATHWAY. These standards were adopted and now form part of the Terrestrial Animal Health Code.

The efforts of the OIE regional Representation for the Middle East in strengthening the regional solidarity and cooperation in controlling the epizootics and in harmonizing the regional veterinary measures in addition to establishing regional standards consistent with the international measures for the trade in animals and animal products made its participation in this meeting of an exceptional importance because of the following facts:

4- Countries of the Greater Horn of Africa and the Middle East are epidemiologically coherent.
5- The inevitable trade of in livestock and livestock products between the two regions.
6- The agreement of the FAO, OIE and other international and regional organizations to strengthen their collaboration at the regional levels.

There is evidence of the presence of rinderpest virus only in Eastern Africa (Somali ecosystem) with confirmed demonstration of virus in wildlife and cattle in 2001 and 2003 respectively. Therefore, we are looking forward to close working with colleagues from the African Union Inter-African Bureau of Animal Resources and colleagues from PACE and other regional agencies.

As we al realize that rinderpest is an important element n the intra-regional trade and trade between the region and partners, eradicating rinderpest is a fundamental step in this respect.

The Join FAO/OIE Technical Advisory Group Meeting on the accreditation of freedom from rinderpest that was held in Beirut (Lebanon), 18-21 December 2003 was the first initiative in this long track. This meeting was a turning point in the regional course of the eradication of rinderpest in line with the global eradication of the disease through FAO/GREP and the OIE Pathway and for the accreditation of rinderpest freedom.

In this meeting it was recommended that the OIE Regional Representation for the Middle East in Lebanon could act as a regional reference focal point for coordination of rinderpest surveillance and freedom accreditation.

The important conclusions reached and the significant recommendations formulated will be an example of intra and inter-regional solidarity in combating and eradicating other transboundary animal diseases that threaten the socio-economic stability at the regional level.
The OIE Regional Representation for the Middle East will cooperate with GREP Secretariat to coordinate the implementation of the proposed regional programs for the rinderpest surveillance and eradication. The International organizations are urged to provide support and assistance to the efforts of eradicating the reservoir of rinderpest in Eastern African countries which triggers a negative impact on the inter-regional trade and on the disease status in the Middle Eastern countries.

We hope he activities of this meeting will result in significant and applicable recommendations that lead to create a new perspective to support the efforts of the international organizations in combating animal diseases.

In a world of globalisation the spread of animal diseases is no more limited and a zone or a country but is endangering the whole region and has impact on the entire world animal health and trade systems. Each one of us has his part of action and responsibility. Lets stick together now and join efforts order to achieve successfully our common target.

Thank you

Annex 6: Analysis of rinderpest eradication strategies

The matrix overleaf (page 2) contains four different strategies for eradication of rinderpest. The matrix also contains 15 indicators to assess the feasibility of the four eradication strategies. Detailed descriptions of the indicators are provided on page 3.

Please complete the matrix according to the country where you work:
if you work in Ethiopia, Kenya or Somalia you should assess the four strategies in relation to the situation in your country of operation
if you work in Uganda or Tanzania, or if you work for a regional/international agency please complete the matrix on a ecosystem basis i.e. consider the Somali ecosystem as a whole.

Step 1
On page 2, circle one of the countries to show whether you represent Kenya, Somalia, Ethiopia, Tanzania, Uganda or a Regional/International Organization.

Step 2
Look at the first indicator in the matrix on page 2. 'Sufficient information exists now to begin implementation of the strategy'. For this indicator, rank the four strategies from 1 (low rank) to 4 (high rank). You cannot assign the same rank to more than one strategy.

Example

	Strategies			
ors	"Search, confirm and eliminate" strategy (Focussed vaccination)	Mass vaccination with the current capacity and knowledge	Mass vaccination after establishment of a delivery system based on a network of Vets and CAHWs	Improve understanding for a period of 1-2 years while promoting development of a marker vaccine; then design a strategy.
ient information exists now to iplementation of the strategy	4	2	3	1

This ranking shows a strong preference for the focussed vaccination strategy (rank=4) and a low preference rank=1) for the 'improve understanding' strategy, for this particular indicator.

Step 3
Repeat the ranking for the other 14 indicators. Do leave any blank spaces in the matrix.
When you have finished the ranking, each cell of the matrix should contain a number - 1,2,3 or 4.

Step 4
Using the far left column of the matrix, assign a rank of 1,2 or 3 to the 15 indicators as follows:
This is not a very important indicator" Assign rank = 1
This is a moderately important indicator" Assign rank = 2
This is a very important indicator" Assign rank = 3
Be sure to assign a rank of 1, 2 or 3 to all 15 indicators i.e. do not leave any blank spaces in the far left column.

Indicate where you work by circling one of the options below:

Kenya Somalia Ethiopia Uganda Tanzania Regional/International Agency

	Strategies			
Indicators	Search, confirm and eliminate strategy (Focussed vaccination)	Mass vaccination with the current operational capacity and knowledge	Mass vaccination after establishment of a broad network of Vets – CAHWs	Improve understandin for a period of 1-2 year while promoting development of a marker vaccine; then design a strategy.
1. Sufficient information exists now to begin implementation of the strategy				
2. Sufficient operational, management and technical capacity exists now to begin implementation				
3. Strategy is independent of knowledge of true geographical distribution.				
4. Acceptable to average livestock owner				
5. Acceptable to veterinarians				
6. Acceptable to national veterinary administrations & policy makers				
7. Acceptable to donors				
8. Low risk of failure to reach the ultimate goal of eradication				
9. Does not require strict identification of vaccinated cattle				
10. Not dependant on unhindered access to all areas				
11. Enhances future strategy management				
12. Failure of strategy will not inhibit future control/eradication strategies by a few years				
13. Accountability/quality control of field-level implementors can be assured				
14. Can be implemented with existing vaccines				
15. Can be implemented with capacity of existing laboratory diagnostic system				

xplanation of indicators

. **Sufficient information exists now to begin implementation of the strategy.** This indicator relates to the echnical, organizational or political information required to implement a strategy. Strategies that can be nplemented with existing information should be ranked highly.

. **Sufficient operational, management and technical capacity exists now to begin implementation.** This idicator relates to the existing technical and operational capacity of all implementers or partners, including ıternational agencies, government departments, NGOs, laboratories, the private sector and others.

. **Strategy is independent of knowledge of true geographical distribution.** If knowledge of the precise eographical distribution of rinderpest virus is not required, a strategy should receive a high rank.

. **Acceptable to average livestock owner.** Will livestock keepers cooperate with the strategy? Does it meet ıeir main concerns with regards animal health priorities? Acceptable strategies should receive higher ranks.

. **Acceptable to veterinarians.** Veterinarians may be in the public or private sector. Is the strategy acceptable) them?

. **Acceptable to national veterinary administrations and policy makers.** Is the strategy acceptable to eterinary authorities and the policy makers who may be required to allocate resources to the strategy?

. **Acceptable to donors.** Is the strategy likely to be acceptable to donors?

. **Low risk of failure to reach the ultimate goal of eradication.** Strategies with a high chance of eradicating nderpest should receive higher ranks.

. **Does not require strict identification of vaccinated cattle.** Identification of vaccinated cattle is problematic ı some areas. If a strategy does not require such identification, it should receive a high rank.

0. **Not dependant on unhindered access to all areas.** Some strategies require good access to all areas, and ıis can be problematic. A strategy, which does require wide access or which aims to address accessibility sues should receive higher ranks.

1. **Enhances future strategy management.** Some strategies enable improved understanding of the rinderpest tuation as an inherent part of the strategy. Such strategies should receive higher ranks.

2. **Failure of strategy will not inhibit future control/eradication strategies by a few years.** With existing ıols, some strategies may hinder future rinderpest control e.g. by 'hiding' the virus.

3. **Accountability/quality control of field-level implementers can be assured.** Field-level operators should e accountable to official, regulatory bodies. Strategies that enable this process should receive higher ranks.

4. **Can be implemented with existing vaccines** i.e. Plowright or thermostable Plowright vaccines.

5. **Can be implemented with existing capacity of laboratory diagnostic system.** Relates to national ıboratories, Pirbright and others, plus the current reporting periods.

Annex 7: Summary of group work of day 2 workshop by subject area.

Ownership

1. Change attitude towards importance of communication.
2. Community motivation – collaboration and awareness. Explain (in person) mass vaccination, increased trade, reversion to virulence risk, use PDS entry point.
3. Consider communities perception to the strategy
4. Community monitoring – awareness, participation in planning, organisation, lines of reporting to local authority- donor monitoring – transparency – accountability.
5. Communication must first be valued as an important tool in strategy formulation and implementation.
6. The process should be livestock owner to field staff and on to investigation centre/lab epidemiology units and DVS.
7. We must know what we want first.
8. Local veterinary professionals (government or private) should be more accessible to the CAHWs livestock owners.
9. Stakeholder analysis and awareness generation.
10. Sell strategy of eradication.
11. Identify one strategy first which to sell to community.
12. Make them understand that it is a process.
13. Farmers accept that it's a disease to deal with.
14. Get consensus with community that our problem is their problem.

Networking

1. Crucial to harmonize and coordinate surveillance between countries.
2. Improve the linkages between the CAHWs and farmers/vets.
3. Need to sit together be transparent and identify roles.
4. Train extension staff on communication skills.
5. There must be feedback to livestock owners.
6. Regular meetings involving all stakeholders.
7. Give feedback to the livestock owners and all the stakeholders.
8. Informal animal health networks.
9. Communication must reach people.
10. Policy makers need to be well sensitized and the link between them and technocrats improved.
11. Proper channels for release of lab results should be made clear to all.
12. Allow sampling and surveillance of animals (participation).
13. Use of community DSE committees.
14. Explain the process state point where we are.
15. Link to communication to other units – epidemiology and economics.
16. Involve MPs (PPG), Pastoralist opinion leaders Associations ADC others.
17. Stakeholder consultation should be a process of ongoing sensitisation.
18. Modalities to influence and get feedback.
19. Use channels Elders and BBC radio.

0. Communication is not only distribution of posters it is an issue for everybody.
1. Communication should be involved in the whole process of eradication.
2. Identify gaps (KAP)

Geographical Coverage

Funding

Regional laboratory should be founded directly by PACE / donor.
Funding for wildlife surveillance should be funded directly by the wildlife authorities; reduced bureaucracy.
Make available adequate resources (equipment and funds) in timely manner in allow to permit rapid response.
Timely release of funding for field and laboratory activities.
Consider the cost of it (social and economics).
Longer option: contract work to private vets + governmental vets regulate + plan (1 year).
- more sustainable use of funds.
There is now a distinct opportunity to privatise vets in the Somali ecosystem, as they will be assured of work through contracts for rinderpest vaccination.

Delivery:

Make CAHW more accessible to farmers.
Identify their needs (producers, traders).
Professional associations should supervise veterinary staff where they are no government's vets.
Random checks and supervision of field staff to monitor performance of government staff.
Noted that there is apathy in producing field reports. Mechanisms to improve this including monitoring + supervision of field staff to be implemented.
Key areas to address to ensure success:

- Manpower (top – bottom): private vet professionals established and linked to CAHWs; local vet authority able to regulate + enforce; livestock owners –cooperating, aware, monitoring.
- Logistics
- Outreach
- Incentives
- Accountability: How? Eg. Quality of activity done; results oriented (recording activities, seromonitoring, ear tagging/notching); build capacities of local authorities.
- Communications
- Harmonisation

Field officers should actively report RP-like cases without fear.
Institutional strengthening process.
Assumption: delivery system must:

- Do normal vet service
- Mass vaccination 2* per year
- Sero-monitoring / PDS
- Quality control, etc...

- Community motivation: provide access to improved clinical services; private SVP + CAHWs; payment for service
- North east Kenya: how long to get delivery system to ensure success: short option is to use existing government vets + CAHWs (1 month) but: EPERKS lessons; long term sustainability; policy – increase privatisation?
- South Somalia: How long? To get delivery system to ensure success (2-3 years)
- Continuously strengthen capacity
- Motivate and facilitate field staff to enable them provide quality services.
- Modalities of 3 Ms needed.

Policy:

- Politicians: Somali – identify constituencies / stakeholders.
- IGAD; Red Sea Livestock Trade Com.
- Arid lands A.H. in office of president.
- Ministry of Livestock and Fisheries Development (minister).
- Improve the terms of ref.: more proactive; specific to RP issues in East Africa.
- Lets elevate status of communication.
- Politicians to understand issues at stake.
- Note – OIE guidelines on quality of vet service spell out fundamentals (chapters 1.3.3 and 1.3.4).

Surveillance:

- Definition of surveillance is gathering of reliable data for a timely action and intervention.
- Proper coordination between field operations and the laboratory.
- Timely release of lab results to enable action, follow-up and feedback to the stakeholders.
- Need to urgently validate the "penside" test to help the PDS activity.
- Types of surveillance: active and passive.
- Active surveillance:
    - Disease search (questionnaire)
    - PDS
    - Wildlife investigation
    - Outbreak investigation
    - Lab diagnosis
    - Random sample surveys
    - Activated disease reporting
- Only OIE recommended tests should employed.
- Provision of the necessary knowledge and tools to field staff for sample collection and cold chain storage and speedy submission of samples.
- Where courier services exist, the possibility of contracting them for speedy sample submission should explored.
- Train field officers in data collection and management.
- Include sheep, goats and camels in serosurveillance along with wildlife, especially where vaccination occurs.

Sensitise park management staff about disease reporting (horizontal and vertical).

Continuously build wildlife surveillance expertise.

Sensitisation of pastoralists to report all diseases with emphasis on mild rinderpest (include community leaders).

Issues to address with communities:

- Ear notching
- Sampling
- PDS fatigue