Foot-and-mouth disease control

Summary and outcome of the electronic discussion on FMD control

(EMPRES discussion forum - 16 January to 31 March 2003)

Valérie Vion, Vincent Martin, Juan Lubroth

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# Table of content

List of participants

Acknowledgments

Introduction (context of the e-discussion on FMD)

Background information on FMD situation in Zimbabwe. A preamble

1. **Creation of Disease Free Zones for the control of FMD (concept of zoning, regionalisation and compartmentalisation)**
   - 1.1 Definitions
   - 1.2 Comments and discussion

2. **The role of FMD control in the subsistence of small-scale farmers**
   - 2.1 Equivocal opinion on FMD control – pros and cons
   - 2.2 Towards a sustainable control of FMD?

3. **FMD control/eradication: economic and political issues. Improvement for all?**
   - 3.1 Political wish for positive national return
   - 3.2 Economic benefit
     - 3.2.1 Skeptical
     - 3.2.2 Convinced

4. **Private versus public goods in the control of FMD**
   - 4.1 The necessary commitment of the private sector
   - 4.2 The contribution of private sector in FMD control: which perspectives?

5. **The role of Wildlife**
   - 5.1 "Compartmentalisation"
   - 5.2 Wildlife and FMD
     - 5.2.1 The role of African buffalo (Syncerus caffer) and other species
     - 5.2.2 African buffalo: To eradicate or use as a ‘commodity’?

6. **Who benefits - who pays?**
   - 6.1 Cooperation between developing countries
   - 6.2 Collaboration of United Nations Organisations or Non Governmental Organisations
   - 6.3 Collaboration between developed and developing countries

7. **Some solutions for FMD control**
   - 7.1 For small farmers
   - 7.2 Vaccine quality and disease control

8. **Summary of the discussion and conclusion**

Annex 1: Impact of FMD control on people’s livelihood

Annex 2: EMPRES involvement in the containment of transboundary animal diseases
Annex 3: Wildlife disease implications for the OIE/FAO Global Framework for the Progressive Control of Foot-and-Mouth Disease and Other Transboundary Animal Diseases ................................................................. 30

Annex 4: Regionalisation as an instrument for preventing the propagation of diseases, including those of Camelids ........................................................................................................ 31

Annexe 5: General definitions of the 2003 OIE Code .................................................................................................................................................. 37

Annex 6: Report of the meeting of the OIE Ad hoc Group on avian influenza ........................................ 38

Annex 7: Relevant publications and web sites used to summarize the discussion ................ 40

Annex 8: Join the EMPRES discussion forum .............................................................................................................................. 40
# List of participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohammed M. BAHARI</td>
<td>Ministry of Water and Livestock Development National Emergency Animal Disease Control Tanzania</td>
</tr>
<tr>
<td>Hans BAHNEMANN</td>
<td>Ex PANAFTOSA Chief of Labs, Germany</td>
</tr>
<tr>
<td>Guy FREELAND</td>
<td>Department for International Development UK</td>
</tr>
<tr>
<td>Michael D. KOCK</td>
<td>Wildlife Health Centre School of Veterinary Medicine - University of California-USA</td>
</tr>
<tr>
<td>Jeff MARINER</td>
<td>RDP Livestock Services, The Netherlands</td>
</tr>
<tr>
<td>Mohinder OBEROI</td>
<td>Professor Punjab Agricultural University India</td>
</tr>
<tr>
<td>Babasola OLUGASA</td>
<td>Department of Veterinary Public Health and Preventive Medicine - University of Ibadian Nigeria</td>
</tr>
<tr>
<td>Roger PASKIN</td>
<td>Farm Assured Namibian Meat Company Namibia</td>
</tr>
<tr>
<td>Brian PERRY</td>
<td>ILRI (International Livestock Research Institute) Kenya</td>
</tr>
<tr>
<td>Mark M. RWEYEMAMU</td>
<td>International Veterinary Consultant - Tanzania and AVIS College UK</td>
</tr>
<tr>
<td>Keith SUMPTION</td>
<td>EUFMD Secretary – FAO, Italy</td>
</tr>
<tr>
<td>Gavin THOMSON</td>
<td>Main Epidemiologist AU / IBAR-PACE - Kenya</td>
</tr>
<tr>
<td>John WOODFORD</td>
<td>PACE</td>
</tr>
<tr>
<td>EMPRES group:</td>
<td>FAO, Infectious Disease Group EMPRES FAO - Italy</td>
</tr>
<tr>
<td>Juan Lubroth, Head</td>
<td></td>
</tr>
<tr>
<td>Peter Roeder, GREP Secretary</td>
<td></td>
</tr>
<tr>
<td>William Amanfu, Animal Health Officer, bacteriologist/ Public Health</td>
<td></td>
</tr>
<tr>
<td>Vincent Martin, Animal Health Officer, infectious disease emergencies</td>
<td></td>
</tr>
<tr>
<td>Gholam Kiani, RADISCON Support Officer</td>
<td></td>
</tr>
<tr>
<td>David Nyakahuma, Animal Health Officer (early reaction)</td>
<td></td>
</tr>
<tr>
<td>Valérie Vion, short-term Animal Health Officer - information specialist and Moderator of the FAO/EMPRES mailing list</td>
<td></td>
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</tbody>
</table>
Acknowledgments

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Introduction (context of the e-discussion on FMD)

The EMPRES discussion forum was set up in July 1997 after the creation of the EMPRES priority programme by the Director General of FAO (1994) to foster exchange of information between professionals (individuals, research institutions, international organizations) involved in the management of animal health. As of today, the discussion list gathers more than 400 subscribers of various origins and scientific background who are regularly updated on EMPRES activities and recent developments on transboundary animal diseases (TADs)\(^1\) surveillance and control programmes.

From the 16th January to the 31st March 2003, a debate related to the control of foot-and-mouth disease (FMD) was initiated by several subscribers who raised critical issues regarding the current situation and prospects for FMD control in the world. The discussion started after a message on the deterioration of FMD situation in Zimbabwe was posted on our server and widely distributed to the whole list. This completely spontaneous exchange of ideas lasted 2 and half months during which 16 people expressed freely their opinions and their implications on FMD control strategies. These opinions, sometimes provocative or contradictory reflect the complexity of controlling a disease such as FMD and the difficulty to define a sound strategy commonly understood and accepted by all stakeholders.

Due to the interest expressed for this topic, we decided to summarize the discussion, highlight major issues and ask you to add your voice to the debate and raise other issues that might have been left out. We thank those who participated and for further active participation.

Background information on FMD situation in Zimbabwe. A preamble

After two years of absence, FMD (serotype SAT2) broke out in Zimbabwe in August 2001 in the Province of Matabeleland North. Following this episode, other outbreaks were detected in Matabeleland South and Masvingo provinces. Control measures included the establishment of quarantine zones, massive vaccination (approximately 220 000 cattle vaccinated in the outbreak zone) and strengthening of surveillance activities.

In April 2002, new outbreaks were detected in these provinces and control measures were intensified (control of animal movements, clinical surveillance, etc). In August 2002, two new outbreaks were detected again in the provinces of Manicaland and Masvingo, in a place contiguous to the game park located in Masvingo province (also confirmed as serotype SAT 2).

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\(^1\) Transboundary animal diseases are defined as: those that are of significant economic, trade and/or food security importance for a considerable number of countries; which can easily spread to other countries and reach epidemic proportions; and where control/management, including exclusion, requires cooperation between several countries. They are generally included in the OIE List A diseases.
Wildlife was suspected as the origin for the infection transmission to livestock. Other outbreaks were detected in October 2002 in the diptank areas of Masvo and Davata. Currently, Zimbabwe is trying to contain the spread of the disease using massive vaccination of the bovine population. However, the problem of FMD has become a regional crisis and the disease has crossed the border of Mozambique where FMD has rapidly spread through most of the southern part of the country in a relatively short period of time, between November 2002 and March 2003. The FMD virus involved has been demonstrated by the Onderstepoort Veterinary Institute (OVI) to be closely related to the virus in the ongoing Zimbabwe FMD outbreaks. Furthermore, what appeared as a food crisis in Zimbabwe has turned into a major humanitarian emergency due to a deteriorating economy, immense policy constraints, depleted capacity in the health sector and challenge to humanitarian principles. Finally, the current situation in Zimbabwe threatens to spill over to the rest of the region. Neighbouring countries may be impacted in terms of food security, economic performance, and international markets for animal and agriculture goods, international relations as well as by influx of Zimbabwe economic migrants.

1. Creation of Disease Free Zones for the control of FMD (concept of zoning, regionalisation and compartmentalisation)

“The concept of compartmentalisation is no longer an option for dealing with FMD.”
M.M. Rweyemamu

The above-mentioned statement from Mark Rweyemamu triggered an exchange of divergent opinions on the relevance of compartmentalisation and zoning in the fight against FMD. Although there was a common agreement to say that the creation of disease free zones was deemed necessary to achieve FMD control, the use of compartmentalisation rather than zoning and vice-versa gave rise to a controversial debate, partly because of an absence of common understanding on the meaning of these words.

“Compartmentalisation is vital for development of future strategies for dealing with FMD. What would make compartmentalisation apt for Newcastle disease and classical swine fever but not for FMD?” G. Thomson

Before entering the debate, you will find in the following section the definitions concerning the concept of zoning, regionalization and compartmentalisation.

1.1 Definitions

Definition suggested during the discussion

Gavin Thomson suggests a definition of compartmentalisation as opposed to zoning (or regionalisation).

"Compartmentalisation", as I understand it in the disease control context, could refer to any mechanism whereby groups of animals or geographic areas are treated differently from others. This, I would suggest, is the generic meaning. It has most commonly been applied to zoning, for example, disease-free zones. However, in recent years compartmentalization, certainly within the OIE, has acquired a more specific meaning.

...and provides us with his personal interpretation:

2 Bold text is that of the edition and not the authors.
Compartmentalization has been used to refer to a non-geographic segregation of production systems whereby the presence of an infection in one production system need not necessarily influence the disease/infection status of another production system even though the two systems may be located in the same geographic area. **So, in effect, it is non-geographically-based zoning.** This has been advanced as a way to deal with Newcastle Disease, for example, where the infection cannot be contained in zones because the virus can be spread by wild birds.” G. Thomson

**Official definitions provided by the OIE International Code**

**Zoning and regionalisation**

The concepts of “zoning” and regionalisation can be found in the International Animal Health Code -2002- in chapter 1.3.5.

Article 1.3.5.1. 'Zoning' is a procedure implemented by a country under the provisions of this Chapter with a view to defining geographical areas of different animal health status within its territory for the purpose of international trade, and in accordance with the recommendations stipulated in the relevant Chapters in the Code.

Article 1.3.5.2. The requirements necessary to preserve the special health status of a zone must be appropriate to the particular disease. The requirements will differ and size, location and delineation of a zone will depend on the epidemiology of the disease, environmental factors, and surveillance and control measures applicable. The extent of zones and their limits should be established by the Veterinary Administration on the basis of natural, artificial or legal boundaries and made public through official channels.

Thus defined, the zones constitute the relevant geographical units for the application of the recommendations in Part 2 of the Code.

Article 1.3.5.3. When an exporting country has defined a zone within its territory in respect of one or more of the diseases covered by the Code, it needs to implement the measures stipulated in the Code for setting up and maintaining such a zone.

An importing country should recognise the existence of this zone and accept the application of the appropriate measures recommended in the Code corresponding to the animal health status of the zone with regard to the importation, or transit through its territory, of commodities from the zone. [http://www.oie.int/eng/normes/mcode/A_00014.htm](http://www.oie.int/eng/normes/mcode/A_00014.htm)

The concept of zoning can also be used by a country in emergency situations to protect its trade in unaffected regions (report of the meeting of the OIE Foot-and-Mouth Disease and other Epizootics Commission, Paris, 2-3 July 2002)

“In discussion with the Code Commission it was agreed that no change in the FMD Chapter would be required to accommodate this approach. However, a new mechanism whereby approval can be obtained for such free zones without systematic presentation of the case to the International Committee needs to be developed. A proposal in this regard will be made to the International committee at the next General Session in May 2003.”

During the 71st General Session of the International Committee one of the technical item voted concerns regionalisation:”regionalisation as an instrument for preventing the propagation of
diseases, including camelids”. This technical item summarizes the evolution of regionalised approach to FMD control in the world, and also the impact of regionalisation to the international trade following the analysis of a questionnaire sent to 162 OIE member countries (only 56% of the countries indicate a boost of their external trade). See Annex 4 for more information.

Zoning is a procedure implemented by a country under the provisions of this Chapter with a view to defining geographical areas of different animal health status within its territory for the purpose of international trade, and in accordance with OIE’s recommendations.

Zoning and regionalisation are two synonymous words to define an area-wide (disease free) concept, with natural, artificial or legal boundaries.

Compartmentalisation

So far, the concept of compartmentalisation was used in the OIE code for specific diseases such as the classical swine fever or Newcastle disease. Last year, the Code Commission requested the DG of OIE to form an Ad hoc group to examine the current chapters on Newcastle disease and highly pathogenic avian influenza and to recommend appropriate changes (see Annex 6). The group also examined the concept of compartmentalisation and decided that it could be applied to avian influenza. It believed that the poultry industry lent itself well to compartmentalisation for avian influenza, with the greater likelihood of spread of the disease being within an enterprise than between farms geographically close. Compartmentalisation of the wild waterfowl populations was also considered a suitable approach to addressing the disease risks presented. The Ad hoc Group acknowledged that the proposed revisions placed obligations on the poultry industry to set up and have verified systems to show compartmentalisation, and may require a closer working relationship between government and industry.

The concept was then defined precisely during the 71st General Session of the International Committee (May 2003) – see definition below.

• **Compartment**
  Means an autonomous epidemiological entity defined on the basis of either geography (zone) or management (enterprise) for the purpose of international trade.

• **Enterprise**
  Means one or more establishments with an integrated system of animal management forming an autonomous epidemiological entity.

• **Free compartment.** Means a compartment in which the absence of the animal pathogen causing the disease under consideration has been demonstrated by all the requirements specified in the Code for free status being met.

1.2 **Comments and discussion**

Some examples of zoning for the control of TADs
Most of the participants agree that zoning is the best option to deal with FMD through the establishment of FMD-free zones and their subsequent enlargement. Many of them refer to the Global Rinderpest Eradication Programme (GREP) as a successful model of zoning or regionalization, but point out that these zones are based on epidemiological grounds or geographical specificities rather than artificial or legal boundaries.

**In East Africa**

“Several individuals and projects involved in rinderpest eradication on the ground did evolve and articulate eradication strategies that identified specific communities or ecosystems. This approach eventually became a major part of the mainstream strategy. Resources could then be focused and interventions tailored to the specific social needs and epidemiologic factors of each compartment. It is important to note that many of these compartments spanned borders. With the adoption of these approaches in East Africa, progress in RP eradication resumed in the mid-1990’s.” *J. Mariner*

**In India**

“Creation of disease free zones and progressive control appears to be the only way to deal with FMD even in large developing countries like India. For eradication of Rinderpest from India, zones were created and persistent vaccinations were done ultimately achieving freedom. Unfortunately the quality of FMD vaccines is not that good. [...] nevertheless steps taken in the right direction can help in reducing the incidence. Creation of disease free zones separated by geographical barriers, legislative support and involving farmers by demonstrating the cost benefit ratio of vaccination in getting greater outputs appears to me the way out.” *M. Oberoi*

**Compartmentalisation, a questionable option?**

Compartmentalisation for the control of FMD in developing countries does not necessarily appear to be the most valuable option as pointed out by Mark Rweyemamu in his correspondence below.

“A successful and sustainable programme for FMD control has to be on an area-wide basis and **inclusive of all farming communities within the area**.³*

“The parallel with Newcastle disease and classical swine fever might not apply so readily to ruminant farming in developing countries. Large-scale poultry and pig farming have become industrial enterprises involving the housing and management of poultry and pigs in environmentally segregated units. With grazing animals, we are still quite a way from such a level of segregation.” *M.M. Rweyemamu.*

In other words, it might be better “to coordinate activities between natural, epidemiologically defined compartments (that often span borders) rather than seeking to isolate ourselves in artificial compartments based on national orders and often illusive cordons.” *J. Mariner*

Indeed, compartmentalisation implies a highly controlled environment including a strict control of animal and human movements. In developing countries, this could represent an unrealistic exercise with excessive cost implications.

However, this approach was not totally discarded and raised some interest. As mentioned by Keith Sumption, EUFMD commission secretary, the compartmentalisation approach could trigger investment in disease control in endemic areas.

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³ Bold text is that of the edition and not the authors.
“If compartmentalisation offers incentives which stimulate investment in bio-security and disease/infection freedom at the herd level, and can be shown and managed in a way as not to increase risk, then it should not be discounted, and could kick-start investment in disease control in some endemic areas.” K. Sumption

- The Global Rinderpest Eradication Program (GREP) can give an example for using zoning or regionalisation.
- It's important to note that a ‘zone’ can span borders.
- Compartmentalisation: a case by case solution for FMD?

2. The role of FMD control in the subsistence of small-scale farmers.

The control of major infectious disease does not always affect the livelihood of small-scale farmers and is sometimes questionable as a way of alleviating poverty in traditional areas of developing countries. The threat represented by FMD is often represented by the loss of trade opportunities for rich countries which have access to international trade. The disease doesn't necessarily feature in the agenda of developing countries which have to face a wide variety of endemic animal diseases which affect the livestock industry as a whole.

2.1 Equivocal opinion on FMD control – pros and cons

If zoning, and not compartmentalisation, is used to deal with FMD, it means that all farming communities are concerned ("richer commercials units, communal farms or campesinos, Bedouins herds or other small-scale/poor farming systems" M.M. Rweyemamu).

However, sometimes, it may be difficult for small farmers to join an FMD eradication program. "In practice the smaller and traditional farmers often tend to co-operate through coercion rather than any sense of major benefit, and seek to evade the controls whenever the perceived penalty/risk/inconvenience of observing the rules exceeds that of breaking them. And the harsher the restrictions and the longer they are imposed, so the greater becomes the need to evade them for the sake of survival." G. Freeland

“Although a very unpleasant disease, FMD is not a major killer and most animals make a complete recovery in a relatively short period of time. So, whilst having their herds/flocks infected with FMD undoubtedly brings varying degrees of distress and inconvenience to most owners of ruminant animals (and pigs), it is probably only in the fields of milk production and draught power that it really damages productive purpose and threatens livelihoods. Furthermore, different species have different degrees of susceptibility and infectivity, so causing the disease to display quite different epidemiological and impact characteristics among them. It is not surprising therefore, that, different owners, operating in different production systems, and even at different times of the year, show quite different levels of interest in the disease and its control. With such factors in the

4 Underlined text is that of the editors and not the authors.
background the successful and sustained elimination of F-M-D using currently available
technologies and strategies could only be achieved at a very high price: a price which is
in excess of the benefits in the majority of cases”. G.Freeland

“In the traditional and small holder environment, the value of livestock in a livelihoods
context is often more related to their overall use than to a single output. Meat is
frequently a secondary product.
In this context, FMD is often a lower priority in relation to other more pressing disease
issues that involve significant mortality. Although the cost-benefit of FMD control may be
positive in traditional communities, other disease control activities often command a much
higher return on investment. Most farmers make rational choices related to their own
situation. They will invest their limited time, efforts and money where they get the best
return”. J. Mariner

The following article from Peter Roeder, EMPRES “worldwide action on FMD” extracted from “the
Times” gives a different view on this issue:

“In my world, FMD is an important disease in its own right, causing much suffering to
animals and human families alike.

The Cambodian subsistence farming family loses half its rice crop when the buffaloes are
hit during paddyfield preparation, and the fattening pigs and calves die or require
expensive treatment. The progressive Bangladeshi dairy farmer with ten cows loses
overnight most of the milk production and daily income from it. When affected for the
second time in less than a year, the Ethiopian Boran pastoralist family's main source of
food, their cows, again stop producing milk, some abort and suffer infections leading to
chronic infertility, young calves die from heart damage as do lambs and kids, and even
older animals die as they are too lame to walk to seek grazing and water. When the
disease strikes just after lambing time, the northern Iraqi shepherd loses 400 of his 500
lambs from heart damage, together with much of the milk for consumption and sale.
These real examples do not cover the full spectrum of impact, but they do illustrate the
immediate, direct effects of FMD.

The welfare issues are also very real. Few who have actually seen FMD outbreaks in
pigs and cattle through to the recovery phase would be likely to trivialise its effects by
likening it to the common cold in humans. Let it be clearly understood that FMD cannot
be lightly dismissed as a trivial disease, neither for the intensive European farmer nor for
the subsistence farmer in developing countries where the disease is endemic. Wherever
livestock is farmed FMD constitutes a threat to people's livelihoods. The fight against
epidemic diseases of humans and animals is far from over; indeed, for livestock diseases
it has barely started in most of the world.

A concerted fight against FMD and other epidemic diseases is needed, to start at their
source where the reservoirs of infection persist.”

It is reasonable to assume that FMD has different impacts on the livestock and on the small
farmers’ economy in accordance to age of the animals, the type of production (milk, meat or use
for draught power), and the overall health status of the animals.

“The extent to which a broad-based programme for FMD control would succeed is largely
dependent on how it responds to the priorities of the non-commercial systems in each
region.” J. Mariner
2.2 Towards a sustainable control of FMD?

Sustainability is a critical issue for consideration before embarking on a control programme for FMD. As a matter of fact, “any such programme for the poorer farming communities should also address other aspects of animal health that may be of more immediate benefit to their needs than FMD per se.” Furthermore, “FMD control and associated animal health improvement programmes would contribute to the poor progressively accessing formal markets (local and regional, mainly) and thereby contribute to poverty reduction.” M.M. Rweyemamu

For small farmers:

- FMD is not a killer disease
- BUT for small holders still using draught power (notably in Asia), it represents a major threat
- Smaller and traditional farmers often do not have access to “big” markets (lucrative) and even do not breed cattle for trade purposes
- FMD control may have an investment price in excess of the benefits they receive
- Will the FMD-free status be a source of enrichment or an impoverishment for them?

3. FMD control/eradication: economic and political issues. Improvement for all?

3.1 Political wish for positive national return?

“Effective national or zonal FMD control or eradication that successfully meets the OIE requirements and allows export of meat products to higher priced markets in FMD free countries is likely to yield positive national returns on the investments made in FMD control.” B. Perry

“In certain sub-Saharan African countries the goal of gaining access to "lucrative" beef markets such as that of the European Union is a highly political issue.” J. Woodford

For those of us in developing countries facing challenges of FMD and pressures from the political leaders and the treasuries that our livestock industries must participate in international trade and thus are either embarking or on the drawing board for cost effective FMD control strategies, this debate is very good and informative.” M. Bahari

“The governments in South America installed big FMD control programs in the 1950's in order to control and eradicate FMD. This should allow their meat export trade to enter international markets.” H. Bahneman
3.2 Economic benefit

3.2.1 Skeptical

“Indeed, it may well prove to be difficult to convince both policy makers and politicians that the socio-economic costs of putting in place the rigorous FMD-free zonation system and its attendant vaccination and movement control protocols to a standard acceptable to the European Union, would probably not outweigh the small gains that could be made from the higher price of the beef that may reach such markets.” J. Woodford

“Elimination of the disease may also have some small but wider benefit by raising the internal market price for meat and livestock. This may bring some benefit to small-scale and subsistence farmers but their gain would be small and probably more than offset by the socio-economic costs - and occasional extreme hardships - burdened upon them by combinations of vaccination, quarantine, and movement controls, and other measures necessarily imposed to achieve and maintain freedom from FMD.” G. Freeland

3.2.2 Convinced

For the small farmers

“Any ‘traditional’ or ‘communal’ farmer lying within a FMD-free zone is able to market his livestock for export at a premium price (compared to local markets). The economic benefit is transmitted directly to them. This has certainly been the case in Namibia, where our traditional livestock owners are enjoying greater economic wellbeing than at any time in our past. Off take percentages from some of our communal farming areas often exceed 14% per annum. That's not bad when commercial farmers often struggle to make 20%.” R. Paskin

For meat industries and governments

The Namibian example:

“Our meat industry is currently bringing in US$ 100 million per annum; double what it was a few decades ago. Not only have communal farmers benefited, but new industries have been created, new jobs have been created, and the government harvests a lot of tax out of it. Considering that veterinary services cost a mere US$ 5 million per annum, and not all of that goes to maintaining FMD freedom, I think the benefits far outweigh the costs.”

Each year, Namibia exports 15000 mt of beef to South Africa as against 10000 mt to the EU. The returns realised are N$ 200 millions (US $ 26 millions-06/2003) from the South African market versus N$ 500 millions (US $ 65 millions 06/2003) to the EU. The market, to which we export less, brings in the most! The EU SPS standards (especially for FMD) are much higher than South Africa’s - but it is obvious where the money lies. This is exactly why more and more Namibian producers are trying to gain status as “EU exporters.” R. Paskin

5 Underlined text is that of the editors and not the authors
6 1 N$=0.13 US$ (June 2003)
Disagreement with the concept of "small gains":

“According to an FAO report dating back to December 1998, Tanzania has a definite export potential:

"Tanzanian sheep and goat farmers may soon be able to take advantage of a new market in the Gulf States. Assisted by an FAO Technical Cooperation Project, the East African country has taken the first steps towards establishing a meat export industry, drawing on the country's 14 million strong sheep and goat herd... A new, purpose-built market and information system is part of that export strategy. A trade-promotion mission of government and private-enterprise representatives that visited the United Arab Emirates was another part. The mission returned convinced, through discussion, observation and objective measurement, that Tanzania's smallstock and carcass meat were equal to the best they'd seen on offer."

But what price can Tanzania expect from its current markets? Again, from FAO information (the FAOStat database), we see that the prices realised for Tanzania's products in 2001 were as follows:

**Beef/veal:** US$ 2.00 /kg  
**Mutton/lamb:** US$2.80 /kg

And this during a period when beef was selling to the EU at about USD 3.00/kg and lamb for USD 3.50/kg! The price differentials as far as FMD-free meat is concerned are enormous.” R. Paskin

4. Private versus public goods in the control of FMD

The concept of private versus public goods for the control of diseases does not only apply to FMD but to most of OIE list A diseases. Veterinary products can be usefully classified as private or public goods depending on who receives the benefit.

- **Public good products have value to society as a whole, consequently society needs to share the costs.**

- **Private good products have value principally to the individual and the individual beneficiary should bare the costs.**

All products do not necessarily fit neatly into these two categories. Economic theory applied to the delivery of veterinary-related commodities and services recognises "externalities" and "moral hazards" which suggest that there is a need for the public service to deliver some commodities and services. For example, zoonotic disease such as rabies or anthrax and their control, even though there is a strong private good component from vaccination, may be so imperative (because of high incidence, poor human health care, etc.) that the public veterinary service can take full financial responsibility for control. Similarly public service dominance in FMD control can be justified, even though vaccination has a private good character in some circumstances (dairy cattle, traction animals), because export of animal products from some countries may represent a significant importance to country-wide employment and the economy. In any event, products with mixed public and private good characteristics provide ample debate for delivery and financing within each country depending on the circumstances. There are numerous examples where veterinary products are delivered successfully by either the public or private sector.
4.1 The necessary commitment of the private sector

“Transboundary animal and veterinary public health diseases constitute a major constraint to healthy livestock production and safe utilization of animal products worldwide. The control of FMD, like with other transboundary animal diseases (TADs), should be widely recognized as a public good7, since the occurrence of the disease has an immediate impact on trade and food security. However the establishment of partnerships with the private sector, technically and financially to be supportive of veterinary services and their laboratories for TADs control and eradication, are imperative.” J. Lubroth

“While I regard FMD surveillance and control as a government function, the supporting role of private sector is of great importance in these days of shrinking budgets. Developing countries are going to lose out badly if they don’t get their industry stakeholders to rally around their veterinary services in the fight to maintain a clean bill of herd health. Zimbabwe is losing millions in foreign exchange now that FMD has taken hold in their meat industry.” R. Paskin

“The battle against livestock epidemics isn’t going to be won by governments alone - not even in developed countries. There needs to be optimal private sector involvement, but that will only happen when the dollar sign at the end of the tunnel takes on some clarity.” R. Paskin

Private sector refers to those who especially may have some net financial benefit operating in the disease free zone, i.e. the commercial farmers and associated agro-industries. However, in most developing countries they represent only a minimal proportion of the livestock owners (all of whom operate in private sector).

“FMD control is not merely a veterinary clinical activity; it is an issue that has to be linked to livelihoods, access to markets and liberalized trade. FMD control cannot be carried out only by the State. The State is but one of several stakeholders. The farming and trading communities are also important partners.” M.M. Rweyemamu

“It appears that although the major beneficiary of these exports is the commercial livestock sector,[yet] it is the public sector that bears most of the costs. It seems reasonable to suggest that in the interests of sustainability, a much more active engagement with the different elements of the private sector be sought in order to redress the imbalances that appear to be present in the funding of FMD control activities.” B. Perry

“In order to involve stakeholders, their needs and priorities must be adequately incorporated into the objectives of the programme. For export oriented commercial farmers, FMD is a priority.” J. Mariner

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7 Bold and underlined text is that of the edition and not the authors.
4.2 The contribution of private sector in FMD control: which perspectives?

Public and private sector’s relationships at international level

“It is very encouraging to see that the OIE-coordinated SE [South East] Asia FMD control programme has firstly started to invite the private sector to the annual planning meetings, normally the exclusive domain of the FMD technical experts, and secondly has also engaged a Task Force to evaluate how the private sector could be better integrated into FMD control in the region (the initial report of the Task Force can be seen on http://www.seafmd-rcu.oie.int). We wonder if this might be a possible option for southern Africa, and who might take the lead? SADC possibly?” B. Perry

“I am very much aware, and was involved for a few years, with the ‘the Comisión Sur Americana para la Lucha Contra la Fiebre Aftosa’ in South America. At their annual (and extra-ordinary) meetings, a delegate from the country sits next to a representative of the private industry/commercial interest/farmer. The relationship has been this way for a decade, knowing well that the government does not own the animals - the farmers and ranchers do. Those involved in transport, packaging, distribution also have a stake. The two partners may not see eye-to-eye, and voice their concerns. Both are involved in the strategy for better control and facilitate operational aspects. This relationship could be emulated in other parts of the world as you indicate - with the necessary adjustments to fit regional particulars”. J. Lubroth

At national level

“The essence is that the private sector must be organised and have a voice. Governments don’t respond to market signals, they respond to citizens’ pressures.” R. Paskin

“Employing government-private sector partnerships to fight FMD (and other livestock epidemics) sounds great in theory, but implementing it in practice is the bit that actually counts, and is usually the most difficult. A few suggestions that might help:

(1) **Government and private sector must get together.** As a private sector initiative, we spend a fair chunk of our budget every year on workshops for animal health inspectors (the guys who regularly visit farms, inspect livestock and talk to farmers) where we draw on the expertise of speakers from both private and public sectors. We also spend a sizeable sum on getting the government veterinarians together, sponsoring a barbecue for them and giving them a presentation on animal health as it affects marketing.

(2) **Talking isn’t enough.** You have to work together. Our FMD-awareness pamphlet was the result of round-table discussions, swapping drafts by email, choosing photos together and sitting together with the advertising agency that was producing the pamphlet. When our CVO went to Brussels to negotiate on SPS measures with the EU, I went with him, and we took one of our leading farmers along for good measure. Our new national FMD plan is the result of collaboration between various stakeholders. You simply have to work on joint projects, but not at a distance - ‘together’ is the watchword.

(3) **Help sponsor government functions / activities.** We didn’t just design an electronic traceback system together with government veterinarians - we paid for all the

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8 Underlined; EMPRES Ed.
software development. That gives private industry a vital stake in what government is doing.

(4) **Organise sustainable financing.** The Farm Assured Namibian Meat initiative came from the farming community, who recognised that in the long term, production and marketing of livestock and livestock products would depend on more than the efforts of a single role player (the government). FAN Meat is financed by farmer contributions via a levy or check off system which was put in place through the private sector. A dollar or two per head of livestock slaughtered or exported soon appreciates to a sizeable sum. However, FAN Meat is also an example of a government-private sector joint venture through which both parties benefit from each others' activities.

(5) **Make improved welfare the goal.** Yes, let's talk about money. Eradicating livestock diseases sounds like a noble goal, but no farmer on this planet is going to part with his cash unless he sees direct financial benefit around the corner. The goal must have something to do with market access, market penetration and market maintenance. Better profitability means increased welfare. Farmers and businessmen understand that. If there's no bottom line, there's no co-operation.

(6) **Ensure that there is a forum for all role-players to get together.** The Namibian model is an example, but there are others in Zimbabwe, Australia and New Zealand to learn from. Those of us involved in the 'first' Ghana ASF [African Swine Fever] outbreak a few years ago [2000] will well remember that the eradication campaign worked best in the areas where farmers' unions were most active. But it goes further than farmers' unions; livestock traders/auctioneers, abattoirs and meat processors must have a means of meeting regularly for the management of their own industry - and the government (Veterinary Services) must be vitally involved.

(7) **Don't obscure responsibilities.** Epidemiological surveillance, meat inspections, certifying animal health and negotiating SPS issues with other animal health importing authorities is Veterinary Services business. Giving moral, technical and financial support (where necessary) is private sector business.” *R. Paskin*

### 5. The role of Wildlife

#### 5.1 **“Compartmentalisation”**

Most subscribers agreed with the importance of segregation of wildlife and domestic cattle in a South African context, and even agree on the fact it is neither compartmentalisation nor zoning but just common sense.

As an example, the “game fencing programme of Southern Africa for segregating wildlife from livestock is taken as an useful and well established practice.” *M.M. Rweyemamu*

#### 5.2 **Wildlife and FMD**

##### 5.2.1 **The role of African buffalo (*Syncerus caffer*) and other species**

“It is now well understood that the three South African Territories (SAT) serotypes of FMD virus are maintained by wild African buffalo, which can remain as symptomless carriers, possibly for life. It has also been established that most, if not all populations of wild buffalo probably carry one or more SAT strains of FMD virus, more or less continuously.” *J. Woodford*
Fencing is not a one time investment it is very costly and, to be effective, requires daily, or more frequent, inspection of its integrity. In South Africa, there is continued serological evidence of persistent cycling of a SAT 2 virus in the West Central impala (*Aepyceros melampus*) sub-population of the Kruger National Park. Sero-prevalence in different random samples varied from 24% - 61%. The virus has not been isolated, but appears mild and apathogenic in impala, with few clinical signs. The Kruger National Park is in the endemically infected buffalo zone. In Zimbabwe, there is serological evidence of FMD virus [type unspecified] cycling in greater kudu (*Tragelaphus strepsiceros*) in the save River Conservancy in the eastern lowveld. A 30% sero-prevalence was found on random sampling. This conservancy is also located in an endemically infected buffalo zone. (OIE working group on wildlife diseases 2003)

"It is interesting to note that once in the recent history of livestock disease in Africa, FMD did almost disappear. The temporary disappearance of FMD infection from cattle in southern and eastern Africa from the late 1890's until it reappeared in the early 1930's was thought to have occurred as a result of the devastating effects of the Rinderpest pandemic which wiped out huge numbers of domestic and wild bovids from northern Abyssinia, where the disease was thought to have been introduced, to the southern Cape of South Africa." J. Woodford

"The issue of African buffalo and FMD is a controversial one."
"Not regarding the carrier status of buffalo with FMD and its political nature, what is not clear is how and when transmission occurs. But this issue requires "out of the box" thinking, there are (have been) buffalo herds that are probably FMD free or approaching this status in southern Africa under particular sets of circumstances." M. Kock

"Finally, the African buffalo is a much maligned creature with regards FMD; I would suggest that many of the historical outbreaks attributed to this beast have been caused by carrier cattle. A more enlightened approach, such as Zimbabwe has adopted, is necessary." M. Kock

5.2.2 African buffalo: To eradicate or use as a ‘commodity’?

Nobody really wants to eliminate the wildlife population but the difficulty of eradicating FMD from domestic cattle in the presence of wildlife can appear as an impossible challenge.

"where large populations of African buffalo (*Syncerus caffer*) exist, the use of the word eradication may be inappropriate." Indeed "without eradication of the African buffalo, the eradication of FMD caused by the three SAT strains of FMD might be a more or less impossible goal." J. Woodford

"This would be akin to the unnecessary slaughter of thousands of head of game in the name of tsetse control or the total disregard for ecosystems and corridors in the name of disease control (i.e. fencing) initiated by colonial authorities in southern Africa. This is not being protectionist, when we address the issue of rural livelihoods, livestock health and human wellbeing we should be looking at disease control in terms of the whole ecosystem and the impacts on the health of these systems; they are all linked. The African buffalo, under certain conditions (large areas of semi-arid Africa), is worth far more than a cow even when an FMD carrier but it has been well proven that FMD buffalo herds can be developed and represent a very valuable commodity, even more so to poor rural folk who may be able to develop partnerships in Community Based Conservation initiatives. Small scale farmers and poor rural communities live under a constant struggle, are unlikely to be global producers nor have access to "protected" markets, rarely benefit form veterinary inputs (historically, many of these have been modeled, inappropriately, on a colonial basis), therefore, any improvements in their livelihoods must come form sustainable use of a wide variety of "commodities" such as wildlife, veldt products, crafts, livestock etc…” M. Kock
6. Who benefits - who pays?

Financial collaboration is essential for the developing countries and not only for fighting animal diseases.

This financial collaboration can occur at different levels: That means the rich private stakeholders [can help the poorest one, and also can have a] "much more active engagement" "in order to redress the imbalances that appear to be present in the funding of FMD control activities" [between them and the public sector.] B. Perry

It means also that some neighbouring countries can help each other, and also that the more developed nations assist the developing one’s. The guiding principle of this financial collaboration can be "that those who benefit most should pay the lion’s share of such a programme".

M.M. Rweyemamu

Other collaboration of developed countries comes through the assistance of the United Nations Organisations or the Non Governmental Organisations.

6.1 Cooperation between developing countries

A recent example of South-South cooperation between South Africa and Zimbabwe, where FMD is representing a threat for the whole region:

""South Africa’s Agriculture Ministry said that it would wait for a formal request for assistance from Zimbabwe for vaccines before deciding what to do "Zimbabwe is part of NEPAD [New Partnership for Africa's Development] and SADC [the Southern African Development Community] so we will look at it once we receive a formal request," ministry spokesman David Tshabalala told IRIN."" B. Perry

Some months later (April 2003), collaboration begins:

"South Africa is going to make vaccination worth 12 million ZAR (1 564 120 USD) available to Zimbabwe. The Minister of Agriculture and Land Affairs, Ms Thoko Didiza, said that this was part of the regional strategy to prevent the spreading of the disease from Zimbabwe. The Agricultural Research Council will deliver the first batch of 39 000 dosages in the near future.” MeatNews.com, 15 Apr 2003"

This interesting development illustrates the practical side of another recommendation made at the 6th EMPRES expert consultation meeting - 2/4 October 2002:

"As interest in regional FMD control initiatives increases, the same principle that the main beneficiaries of FMD control might increasingly pick up the costs could also apply. Those countries most likely to gain from the export opportunities and other benefits of FMD control might be expected to consider more seriously investing in the control in neighbouring countries from which the importation of the disease is a high risk.”
A country focus, traditional in many regions of the developing world in particular, is increasingly too narrow for the sustainable funding of FMD control. There is clearly an urgent need for integration of national programmes into a regional strategy. But whose responsibility is this, and can the international and regional organisations actively pursuing FMD control update their approach to better harness the potential contributions from, or involvement of, private sector and regional actors? “B. Perry

6.2 Collaboration of United Nations Organisations or Non-Governmental Organisations

Taken from the same example of FMD in Zimbabwe:

“Zimbabwe will receive a consignment of 340 000 [doses of] vaccine from the Food and Agriculture Organisation (FAO) as part of efforts to control the spread of foot-and-mouth disease (FMD), which has dealt a severe blow to the country’s livestock industry. Recently the government’s veterinary department pleaded for help to buy vaccines, as the country did not have enough foreign currency to do so. However, while the Netherlands delivery will provide some relief from the crisis, the FAO has warned that it will only cover 10 percent of the up to 3.4 million doses needed to vaccinate all the animals at risk of contracting the disease”. UN Integrated Regional Information Networks (IRIN)

6.3 Collaboration between developed and developing countries

“We consider that this argument (of who benefits, who pays) could also be extrapolated further to an international scale. It could be argued that countries of the developed world that are free from FMD would be the main global beneficiaries of improved control in the countries where FMD persists by reducing the risk of FMD importation that they currently face. Rather than building higher walls to protect their domestic production and high-value export markets to other FMD-free countries, it might be worth investigating whether it is more cost-effective in the long term to support efforts to reduce the risk at source.” B. Perry

And also,” for the more developed nations to assist the developing nations in this fight must be regarded as enlightened self-interest, not benevolence”. P. Roeder (The Times April 2001)

And for a conclusion of this international scale collaboration:
“Clearly this opens up all sorts of other issues, in the areas of both technical and political feasibility. Nevertheless, we believe that they will be issues that we will have to tackle more effectively if we are to meet the diverse goals of successful FMD control and successful reduction in the disparities between the developed and developing worlds.” B. Perry

7. Some solutions for FMD control

As observed in the previous sections, FMD control is a complex issue and depends on various parameters: type of production systems, epidemiological and diagnostic capability level of implication of all stakeholders (commercial farmers, small farmers, trading communities, government/veterinary systems…), the availability of funds for control policy, political will, the interaction between livestock and wildlife and the ultimate goal.

The last outbreak of FMD in Europe (2001) showed a radical way to deal with FMD with the slaughter of thousands of animals. However, in light of this last disaster, other solutions are now being considered.
7.1 For small farmers

“So, as an alternative, control may simply seek to reduce the impact of the disease upon production systems and livelihoods, without needing to seek to eliminate the disease for trade purposes. In such an approach vaccination - strategic and tactical - plays the major role, with the more punitive control measures reduced to an essential minimum. Currently, such an approach will find greater favour with the majority, but it does little to foster the commercial development of the livestock sector. Unfortunately, we do not yet have vaccines of sufficient quality, robustness, or breadth and duration of protection, to make protection by individual choice a feasible option and must still rely upon a combination of compulsion, peer pressure, and community interest to secure enough coverage to make vaccination an effective means of control. Such systems of control must essentially be operated as public goods.

In summary therefore, I am sceptical about the levels and commonality of interest in the disease, and the nature and scale of benefit to be derived by the majority of livestock owners in most developing countries from the rigorous control/elimination of FMD for trade purposes, and doubt whether, for many, it is worthwhile even considering such programs at this time. Strategies to reduce the impact of the disease upon production systems and livelihoods may be more pertinent.” G. Freeland

7.2 Vaccine quality and disease control

“For the future, the real need is to develop much better vaccines which could enable farmers to make their own choice as to when and how much it wish to protect their own stock. This would place the initiative and responsibility very much into the hands of the private sector, and is the area into which the developed livestock economies should be concentrating their research efforts - in their own interests as much as in those of the developing countries.” G. Freeland

In his contribution, G. Freeland highlights the need for better vaccines and proposes a greater involvement of the private sector (initiative, responsibility, and investment, and eludes to the theme ‘public goods versus private goods’).

The contribution below underlines also the necessity of having good vaccines as well as the importance of research in vaccine development and the capacity of production of laboratories.

“For about twenty years I worked with FMD and FMD vaccines in different parts of the world, mainly in South America at the Pan-American FMD Center in Rio. The governments in South America installed big FMD control programs in the 1950’s in order to control and eradicate FMD. This should allow their meat export trade to enter international markets. However for decades their vaccination program was poorly executed and maintained FMD in the cattle population. How? With poor and improperly inactivated vaccines. When Argentina and other countries changed around 1990 to a better vaccine, developed at the Panamerican FMD Center, FMD was eliminated from Argentina within four years. The country maintained the vaccination for another five years (no disease outbreaks) and then was several years disease-free without vaccination. Unfortunately the disease was reintroduced from a neighboring country in 2001. By that time almost all vaccine producing labs had been dismantled.” H. Bahnemann

“A proper vaccination program with the right vaccine can control and eradicate the disease (without killing millions of animals). But it needs the cooperation of all, private sector and government, and a well functioning veterinary service. This is perhaps the biggest problem in most developing countries.” H. Bahnemann
And to conclude: “As Mr. Freeland says, for most developing countries strategic control using a good vaccine, is likely to be the most realistic option, rather than aiming for lucrative beef export markets for the foreseeable future.” J. Woodford

8. Summary of the discussion and conclusion

Outbreaks of infectious diseases have caused increasingly heavy losses in both developed and developing countries. With increasing globalisation, the persistence of transboundary animal diseases anywhere in the world poses a serious risk to the world animal agriculture, food security and jeopardises international trade. There is ample evidence from various studies that the risk of spread of TADs will increase unless a concerted international action is put into place for effective prevention and progressive control. This conclusion is predominantly based on predictions of an unprecedented growth of the livestock sector and consumption of livestock products, particularly in TAD-endemic developing countries. However, this livestock revolution offers also a significant opportunity for livestock farmers in the poorer regions to partake in economic activity and provides a way for them to escape the poverty trap. However, for this to occur there is a need for an increase in the quantity and quality of animal products for trade at a local level and for a significant improvement in the globalisation of trade in animals and animal products. At both local and international levels, the presence of animal diseases will have a significant negative impact on opportunities for trade.

The e-discussion on FMD highlights the threats and opportunities related to the control of FMD in the world and its potential impact on farmers, especially in developing countries. Below, you will find a summary of the main issues raised during the discussion:

In summary:

- The necessity of creation enlargement and maintenance of FMD Disease Free Zone is highly desirable.

- Involvement of private sector, how can it be achieved?
  1. Those who benefit should pay …
  2. Useful improvement of the communication between private and public sector (Veterinary services for example) from the farmers to the meat processors.
     →Possibility to work together
     →Understanding of goals, priorities, organizations of each other
  3. Private sector usually participates when there is a benefit.

Private and public sector must work in synergy, but epidemiological surveillance, meat inspections, certifying animal health must remain public services while technical and financial support can come from the private sector.

- Impact of FMD control on the poorest people:
  1. Depends of the region
     →Asian country: FMD can be a major problem since the disease can have significant seasonal effects on the draught capacity of cattle and buffalo.
     →Africa: in market-oriented countries of southern Africa, due to the good control of FMD, the disease rarely occurs at present in the smallholder sector or when it does, the impact on indigenous livestock is very limited. For other countries where the disease is endemic, the impact of FMD control on small-scale farmers’ livelihood can be difficult to assess (the current case in Zimbabwe shows what
could happen when there is a complete breakdown of the veterinarian systems that were once in place).

2. However, in order to be successful, a control policy would have to be beneficial for them

- Importance of FMD vaccines and the improvement of currently available tests for better FMD control and to identify alternative solutions to stamping out through research:

1. Vaccines:
   - Safe to use, have a long shelf life and be thermostable
   - Would allow discrimination between vaccinated and infected animals (marker vaccines)
   - Would provide high levels of maternal immunity
   - Provide immediate protection after administration
   - Provide long duration of immunity
   - Provide wide spectrum against FMD Serotypes/Subtypes
   - Combined with other vaccines/bacterians for better rationalization of veterinary services
   - Cheap to manufacture and to administer

2. Tests:
   - Liquid Phase Blocking Elisa (LPBE) and Solid Phase Competition Elisa (SPCE: Not validated yet against all serotypes and not in OIE manual yet) still are tests of choice for serological surveillance of non vaccinated animals
   - Nonstructural Protein(s) (NSP) antibody test can be used together with the LPBE or SCPE in areas where vaccination has been used and virus activity is suspected.
   - Penside tests for Antigen detection and serotype identification.
   - Penside tests for Antibody detection and serotype identification.
   - Penside tests for NSP.

3. Others:
   - Animal identification schemes:
     - Permanent
     - Inexpensive
     - Easy to apply
     - Compliance with animal welfare standards.

In conclusion, the exchange of opinions expressed in the recent EMPRES subscriber list demonstrates vast diverging views on disease control issues. Although the focus surrounded foot-and-mouth disease primarily, much of the dialogue should also be transferred to other conditions – ranging from contagious bovine/caprine pleuropneumonia (or any other infectious disease), antibiotic or hormone residues, public health concerns, trade and compliance, genetically modified organisms, and international cooperation in the spirit of transparency.

Information is power. Power is centred on self interest in disregard to subordinates. Yet, power should be channelled for a more humanistic purposes that in turn benefit the self interest in a concept of “let it benefit all (win-win)” option rather than the misfortunes of my competitor benefits me. The honesty of transparency benefits regional approaches to overcome crippling problems to poverty alleviation, self reliance, sought necessary investments and confidence, collaboration,
and safeguarding ones successes. In the realm of animal diseases, a neighbour’s difficulty or condition of status should be of concern and attention to ones own livelihood or investment.

The occurrence of foot-and-mouth disease in Zimbabwe is preoccupying for the entire southern African region. The veterinary services of Zimbabwe have been crystal in their difficulty to control the current situation - that has recently extended its ravages to Mozambique and Botswana, and threatens other neighbouring countries. The interest of South Africa to assist Zimbabwe is to be commended. FAO has provided several thousand doses of vaccine for Zimbabwe, knowing perfectly well that the temporary effort of vaccination is only a small but important aspect to concerted disease control. The causative virus in the area has been typed as a SAT2 virus which has shown an uncanny behaviour that should worry neighbours, trading partners, private investors (agriculture and livestock) alike. It would be of no surprise if the SAT2 virus or viruses become more than a regional problem. The Aphthovirus genus is well known by virologists for antigenic variation, host tropism differences, wildlife-livestock interactions, and for their negative ramifications for animal and animal product trade. Foot-and-mouth disease viruses classified as serotype A show the greatest antigenic variation, whereas Asia1, C and type O appear to be more stable. For reasons that perplex the international scientific community, type C has not been active worldwide (diagnosed) for almost a decade. This underlines, EMPRES’ premise that several viruses cause a condition known as foot-and-mouth disease, each with a different epidemiology rather than categorically assuming that all FMD viruses would behave the same way.

It is essential from EMPRES’ perspective that private industry - those who have most to gain from proper disease control – be a strong partner and investor in the international effort to control these diseases. The national effort and international coordination can assist with legislation reforms, strategic use of resources and planning.

FAO is currently, as it has in the past, reviewing a number of promising proposals, to assist countries with FMD and other transboundary animal disease control. Overall, these proposals are best accomplished in a regional context and should be based on intimate knowledge of information networks, which include animal movement trends, products trade, and the participation of villagers, community animal health workers, veterinary colleagues in (public and private practice or non-governmental organisations), epidemiology units, field surveillance teams, abattoir labourers, and university research projects.

There is also a strong trend for countries to want to create “disease free zones” as well as the desire to have “export zones”, without full understanding of the inputs and difficulties to prove and maintain each of those states. The benefits of having such a zone are understandable in the context of trade promotion and aspirations that it will contribute towards poverty alleviation, but will depend on heavy investment in infrastructure, changes in legislation, and superior veterinary services systems than what are common today.

As we hunt for the origin of infection – the ultimate breakthrough to less disease downstream – we will still have to rely on emergency measures to contain outbreaks and protect other susceptible species, people’s livelihoods, and the environment. Offering a helping hand to a neighbour is often the best way to protect one’s own interest and the concerted effort to identify primary endemic zones for these devastating diseases a responsibility of the international community with the able assistance of national and regional structures.

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9 Viruses belonging to the genus Aphthovirus (Family – Picornaviridae) are RNA viruses. Seven serotypes are currently monitored /diagnosed; these include type A, O, C, Asia1, Southern African Territories (SAT) 1, SAT2, and SAT3. RNA viruses are typified by a high mutation rate. Those viruses that are successful in overcoming host defences change over time. Quick reporting of vesicular disease occurrence, sample submission, agent characterisation, and comparisons to known circulating viruses over time, their efficacy to available vaccines, and epidemiological investigations are essential to concerted national mitigation and international cooperation.
Annex 1: Impact of FMD control on people’s livelihood

The rural poor and rural women depend heavily on livestock and there is strong indication that the expected overall growth of the livestock sub-sector can improve their income and enhance their economic alternatives. Livestock contribute to the livelihoods of 70% of the world’s rural poor. With a burgeoning demand for animal protein in low- and middle-income countries there is the opportunity for the poor to benefit from the 'Livestock Revolution' that is going on around them. At the same time, urban poor will benefit from reduced prices as the offer of livestock commodities expands.

Recent studies by the International Livestock Research Institute (ILRI) have examined delivery of transboundary animal disease control by evaluating the impacts of FMD control in some of the developing regions of the world, from an economic perspective. These studies have had several objectives, and these have differed in emphasis with different stakeholders. They have been designed to evaluate the potential returns to investment in different FMD control and eradication scenarios through the use of benefit-cost analysis. But beyond that, they have also attempted to evaluate the distribution of the costs and benefits among different stakeholders so as to provide some guidance as to where the investment into different control options might be most justifiably sourced.

Two such studies have recently been carried out in South East Asia: Thailand and The Philippines. In the Thai study, different FMD control and eradication scenarios were compared with a baseline that assumed continued status quo control measures and FMD occurrence. In each scenario, exports of different qualities of pork products at different prices were also examined. The study conclusions were that should Thailand be able to eradicate FMD, the returns would make it an economically sound investment, even without exports. Exports, particularly to high-priced pork markets in Asia, would increase the returns significantly. The distribution of benefits was not calculated.

In The Philippines, a scenario in which FMD control continues at recent levels with continued presence of the disease was compared to scenarios in which a publicly-funded programme achieves eradication by 2005 (current policy objective), by 2007, and by 2010. Under varying assumptions regarding the development of export trade of livestock products following eradication, estimated benefit-cost ratios for the investment in eradication ranged from 1.6:(2010, no exports) to 12.0:(2005, exports of 5000 tons of low-value and high-value livestock products annually) indicating eradication to be an economically viable investment. As far as the distribution of benefits was concerned, the commercial pig sector was estimated to capture 84% of the benefits generated by the public investment in eradication, versus 4% by backyard smallholder pig producers.

The highly skewed distribution of the benefits from FMD eradication has two implications. First, the result suggests that policymakers may be justified in expecting the commercial sector to contribute to the eradication effort, whether directly or through taxation. Eradication will not be a one-off investment; it will require a continued investment to protect the country’s FMD-free status once it has been achieved. Sustained public funding of the necessary FMD surveillance and control may not be feasible, particularly given the commercial orientation of its benefits. Participation of the direct beneficiaries in the commercial sector would provide a more sustainable alternative. Second, the commercial orientation makes it difficult to reconcile the investment in FMD eradication with poverty reduction objectives. For this reason, it may be difficult to mobilise resources if access to funding is dependent on political or donor support.

More recently a broader study has been carried out in Zimbabwe (southern Africa), which served as a case study country for the benefit-cost and livelihoods analyses. The study results show that FMD control measures are likely to be of considerable benefit to the national economy of Zimbabwe. This is demonstrated in several ways. Firstly, in a comparison between the baseline
and a pessimistic FMD control scenario, it is shown that for every $1 that Zimbabwe disinvests from the FMD control programme, $5 further are lost by the country. This is a very stark result. It is important to note that in this pessimistic scenario in which FMD controls decline significantly, no trans-boundary effects were taken into account, and the losses calculated are uniquely those of Zimbabwe. However, the association of the outbreak of FMD in south-eastern Botswana in March 2002 after over 30 years of freedom with the outbreaks in western Zimbabwe suggest that the costs to the region as a whole of Zimbabwe’s disinvestments could be much greater. In addition, it is important to point out that the effect of declining FMD infrastructures on the control of other diseases is not taken into account in the benefit-cost analysis. The negative effects of disinvestments in FMD control are thus considerably underestimated.

Secondly, the results show that if Zimbabwe were to invest in fences and other veterinary service infrastructures required to create a much larger and much more secure export zone that is OIE-recognised as FMD-free, there would be returns of approximately $1.5 for every $1 invested. Similar to the dis-investment scenario, this does not incorporate benefits to the region as a whole through greater security for FMD control, nor does it include the other benefits from an enhanced national veterinary service.

At present the costs of FMD control are borne almost entirely by the public sector. Some of the benefits accruing from FMD control, and from the access to export markets come back to the public sector, particularly through the ability to manage other disease threats to the nation, and in foreign exchange remitted to the exchequer. However, a large portion of the benefits pass to the commercial beef sector that dominates the export market, and to the marketing industries that support it.

These results again suggest that policymakers may be justified in expecting the commercial sector to contribute more to FMD control in the future. Furthermore, the predominance of direct benefits to the commercial beef sector raises questions about the compatibility of such public sector investments with poverty reduction objectives. The poverty reduction implications were examined in detail and are discussed below.

A case study in Zimbabwe

The results of the Zimbabwe case study suggest that the direct impacts of FMD on the poor are currently very meagre. The disease itself has limited productivity impacts, even on traction\(^{10}\), and those impacts it has relate mostly to constraints induced by movement controls on animal marketing.

Similarly, the direct impacts of its control on the poor are limited. Large numbers of the very poor do not own livestock, many that do own livestock do not have cattle, and many that own cattle own insufficient numbers to engage in the commercial marketing of their animals. Even those that do engage in such marketing may be at a disadvantage on the price of their animals.

There are some positive impacts on the poor, both direct and indirect. The infrastructure of veterinary services in Zimbabwe had grown until recently, partly because of the stimulus provided by the beef trade, and the communal lands are served with Animal Production and Health Centres to address the broad animal health needs of the community. This in theory allows greater awareness of animal health issues and their resolution in the community, as well as an intelligence system for the detection of other major infectious diseases.

With regard to indirect benefits, there appear to be both positive and negative influences. On the positive side, the access to export markets has an overall positive effect on generating additional

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\(^{10}\) Due to the good FMD control in some countries of southern Africa, FMD rarely occurs at present in the smallholder sector, and when it does its impacts on the indigenous livestock are very limited. However, in regions in which FMD is endemic, such as parts of SE Asia, the disease can have significant seasonal effects on the traction capacities of cattle and buffalo.
national income, a small portion of which ends up being shared by lower-income segments of the population through wage earnings or increased returns to their commercial livestock enterprises. Counteracting, and possibly overwhelming, these positive effects are the more generalised impacts on the poor of higher domestic prices for livestock and meat products associated with export activity. Firstly, only a small portion of the poor keep cattle for commercial purposes and so benefit from higher sale prices. For the large numbers who do not keep cattle, higher prices act as an obstacle to using or acquiring cattle as an intermediate investment out of poverty. Secondly, even for the poorest populations, meat (mostly beef) is a critical component of their diet and accounts for a not insignificant portion of their expenditures. Higher meat prices therefore reduce the real incomes of all poor consumers, both rural and urban, and possibly contribute to exacerbating their nutritional vulnerability.
Annex 2: EMPRES involvement in the containment of transboundary animal diseases

Several training tools have been (or are being) developed by EMPRES (animal health manuals, multimedia training software, database management software) to assist member countries to better recognize major TADs at all levels for early warning and early reaction, so that diseases can be identified and eliminated at the earliest appearance in any area. More recently, a multimedia programme, available on CD and the FAO/EMPRES website, was produced to promote the concept of a Code of Good Emergency Management Practice (GEMP) in dealing with animal health emergencies. GEMP in animal health is the sum total of organised procedures, structures and resource management that leads to early detection of disease or infection in an animal population, prediction of the likely spread, prompt limitation, targeted control and elimination with subsequent re-establishment of verifiable freedom from infection in accordance with the OIE International Animal Health Code.

As stated below, this material is instrumental in raising awareness among public and private sector involved in animal disease below.

"I just thought you would like to hear that even the private sector is involved in EMPRES-style activities. I am certain that FAO, and specifically your staff, are aware of the FMD spreading within Zimbabwe and leaking out into Botswana; here in Namibia we are preparing our veterinary and farming communities to recognise and deal with FMD. We have been actively distributing the FAO Good Emergency Management Practices CD to all of our private practices and government field veterinarians; I have had thousands of full colour information pamphlets on FMD printed and distributed to our farmers. The importance of animal health to an export-oriented meat industry cannot be over-emphasized. In Namibia, 70% of peoples' livelihoods depend on it." R. Paskin

As observed in the above contribution, the private sector is an active player in the control of transboundary animal diseases and uses information produced by government or international organizations such as FAO to disseminate the right message on disease control across the country up to the final beneficiaries, i.e. livestock owners.

EMPRES is also actively involved in field activities through technical projects implemented directly with member countries. Due to the increasing complexity of controlling TADs, FAO and OIE are joining their efforts to optimize their resources and the way to address disease control options through the implementation of the “Global Framework for the Progressive Control of FMD and Other Transboundary Animal Diseases.” (GF-TADs). Indeed, OIE and FAO have examined the problem of transboundary animal diseases from the perspective of the complexity of the world food chain and human welfare, as well as the International Public Good goals of Equity, Conservation of Natural Resources and Public Health. Thus the GF-TADs that is being promoted by the twoOrganisations proposes the effective prevention and progressive control of FMD and Other major TADs as an essential contribution to strengthening the International Public Goods to the achievement of the Millennium Development Goals.

Goals of the Initiative
The GF-TADs, initiated by FAO and OIE, after extensive consultations with regional organisations, regional commissions and offices of FAO and OIE and partners from national agriculture systems following key goals have been identified:

- To safeguard the livestock industry of developed as well as developing countries from repeated shocks of infectious disease epidemics,
- To improve food security and incomes of developing countries,
• To promote safe trade in livestock and animal products at national, regional and international levels.
Annex 3: Wildlife disease implications for the OIE/FAO Global Framework for the Progressive Control of Foot-and-Mouth Disease and Other Transboundary Animal Diseases

(Report of the meeting in the OIE working group on wildlife diseases February 2003)

During the Wildlife Disease Working Group, Dr Dewan Sibartie, Deputy Head of the OIE Scientific and Technical Department remarked that animals, both wild and domestic, as well their parasites and diseases vectors, do not respect geo-political boundaries. Man-made barriers, fences or enclosures however confine most domestic animals. On the other hand, in the absence of any physical barriers, as in the case with many international boundaries, free-ranging wildlife and their pathogens may expand their range under suitable ecological conditions. It is predictable that if transboundary biological bridges exist as a result of contiguous wildlife populations, then in the absence of any transboundary control measures, pathogens and vectors will expand their ranges in relation to the spatial distribution of their hosts. The current and historic situation with regards to CSF and rabies in Europe are good examples, as are the potential animal disease risks with regard to transborder parks in Africa and other parts of the globe.

With regard to transborder parks, the conservation benefits of the expansion of wildlife-protected areas in a world where encroachment by burgeoning human populations is the norm, make this a positive initiative for the long-term goal of biodiversity conservation and ecotourism expansion. However, all countries participating in these initiatives should approach them with their eyes ‘wide open’, in light of the potential animal health implications of the transboundary movement of significant animal diseases or vectors. Proactive disease risk planning and disease management strategies should be considered by the relevant authorities of participating countries involved in these transboundary conservative initiatives.

The GF-TADs propose the establishment of a Global Warning and Response System for reporting major animal diseases, to be managed jointly by FAO/OIE/WHO to better warn members of trends, risks, imminent dangers. The framework also envisions the effective control of major animal diseases especially in developing countries with the aim of promoting international trade of animals and animal products. The latter will be coordinated by a joint FAO-OIE Secretariat under the supervision of a Steering Committee. Actions at regional levels will be coordinated by representatives of the regional structures of FAO and OIE. He invited the Working Group to consider the implications of wildlife diseases in the Global Plan.
1. INTRODUCTION

Regionalisation, or zoning when it occurs within a given country, is a method implemented by countries to create and maintain areas with a particular health status, in order to enable and promote international trade, in accordance with the recommendations of Chapter 1.3.5 of the OIE International Animal Health Code (the Code). The criteria for the establishment and maintenance of a particular animal health status must be laid down by the national Veterinary Authority and must be based on the specific epidemiology of each disease considered. These criteria may differ in each case with respect to the existence or non-existence of natural barriers, the quality and range of disease containment measures, including the use or non-use of vaccination, the control of animal movements to and from the zone in question, and, especially, the extent of surveillance carried out by the Veterinary Services in the area.

The Uruguay Round Final Act of the Multilateral Trade Negotiations of the General Agreement on Tariffs and Trade (GATT) in 1994, the implementation of the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) in 1995, and the existence of potential markets for animal products, all served to stimulate investment in the livestock sector in countries with surpluses, and thus expand markets.

In the late 1980s in South America, where the main restrictions to the export of animal products are due to foot and mouth disease (FMD), a number of countries established the Hemispheric Plan for the Eradication of FMD (PHEFA), based on the concept of disease ecosystems, defined by the interactions between the agent, host and environment existing in the most typical livestock production units in each region. The ecosystems served as a framework for the regionalisation of national programmes, and the concept made it possible to develop differentiated FMD control and eradication strategies.

This regionalised approach to FMD control was put into practice throughout the 1990s and early 2000. Disease occurrence in the sub-continent dropped from 955 outbreaks in 1990 to 55 in 2000; herd infection rates went down from $1.25 \times 10^5$ to $0.08 \times 10^2$ and morbidity from $6.89/10^5$ to $0.41/10^5$ over the same period.

This paper will present and discuss the impact of regionalisation as a tool for disease control and the promotion of international trade, the progress achieved, the difficulties encountered in the establishment and maintenance of zones and, in particular, its effects on trade in South American camelids.

2. REGIONALISATION IN THE WORLD: SURVEY FINDINGS

In order to assess the use of regionalisation in the world, and its impact on disease control and on trade, a questionnaire was drawn up regarding the criteria for the establishment of specific zones/regions and regulations pertaining thereto, the acceptance of special zones by the private sector, the diseases covered by regionalised control measures, and the criteria for evaluating the impact of regionalisation. The questionnaire was
sent to the 162 OIE Member Countries, and 115 replies were received. An Access XP database was created from the nine questions so that the replies could be cross-referenced in order to draw up a profile on the use of regionalisation as a disease-control instrument, particularly in camelds, and its impact on international trade.

Seventy-four per cent of the countries that replied (62% in Africa, 58% in Asia, 83% in Europe, 86% in North and Central America, 75% in Oceania and 100% in South America) use regionalisation as a means of preventing the spread of diseases, but only in 66% of the countries (48% in Africa, 54% in Asia, 89% in Europe, 43% in North and Central America, 100% in Oceania and 89% in South America) is there specific legislation covering zoning, its geographical limits and specific control measures for the diseases considered. This means that the zones in question cannot all be given international recognition, as the conditions under which the countries have established them do not meet the requirements of Article 1.3.5.2 of the Code. Only 36% of the countries that replied have a disease free zone that has earned international recognition.

Regarding the impact of zoning on trade and the level of private sector support to the process, the percentage of countries that gave positive replies fell to 56% worldwide (24% in Africa, 21% in Asia, 74% in Europe, 21% in North America, 50% in Oceania and 56% in South America). These figures suggest that the developed countries, with the greatest market opportunities, made more efficient use of regionalisation to promote their trade, and that the majority of countries that replied have not yet recognised the positive economic impact of zoning on trade, which in turn may account for the low level of support from the private sector.

In 74% of the countries that replied, the criteria for delineating the zones were based on the known geographical distribution of the disease, 42% used risk analysis in regionalisation, and 28% combined both types of criteria, indicating a more methodological approach. Sixty-two per cent of the countries that replied used natural boundaries and official transit checkpoints to monitor their zones.

Sixty-three per cent of the countries that replied reported that they have a strategy of different control methods for the diseases covered by regionalised programmes. The methodologies mentioned varied according to the disease, but on the whole were based on national criteria or independent regional approaches, with restrictions on movements of animals or animal products, specific surveillance, or the conditional use of vaccines. In South America, the nine countries that replied, out of a total of eleven, declared that they had a different strategy for the control and eradication of FMD.

With respect to the diseases covered, marked differences between countries and continents were observed. Some countries apply regionalisation to more than one disease. However, FMD was mentioned in 40% of the replies worldwide, and was the leading disease in Africa, Asia and South America. Brucellosis and classical swine fever (29% each) were covered by regionalised programmes in North America and Europe, and bovine tuberculosis (22%) and rabies (20%) were the other two most frequently mentioned diseases.

Tables I and 2 summarise the replies regarding the impact and efficacy of regionalisation in the various continents, as regards both control eradication and international trade.
Table 1 - Perception of the impact of regionalisation on disease control and trade, OIE Member Countries, 2002

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Africa</th>
<th>Asia</th>
<th>Europe</th>
<th>North America*</th>
<th>Oceania**</th>
<th>South America</th>
</tr>
</thead>
<tbody>
<tr>
<td>No reply</td>
<td>28%</td>
<td>43%</td>
<td>25%</td>
<td>20%</td>
<td>22%</td>
<td></td>
<td>43%</td>
</tr>
<tr>
<td>Positive impact on disease</td>
<td>58%</td>
<td>43%</td>
<td>75%</td>
<td>68%</td>
<td>66%</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>Positive impact on trade</td>
<td>14%</td>
<td>14%</td>
<td>-</td>
<td>12%</td>
<td>45%</td>
<td>-</td>
<td>14%</td>
</tr>
</tbody>
</table>

* Includes some countries of Central America and the Caribbean.
** Only three replies were received.

Some countries replied that they used more than one methodology to evaluate the impact of regionalisation on disease control. Worldwide, most countries use a single technique, which varies according to the disease (see Table 2).

Table 2 - Methods for evaluation of the efficacy of regionalisation, OIE Member Countries, 2002

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Africa</th>
<th>Asia</th>
<th>Europe</th>
<th>North America*</th>
<th>Oceania**</th>
<th>South America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seroepidemiology</td>
<td>20%</td>
<td>25%</td>
<td>-</td>
<td>50%</td>
<td>-</td>
<td>-</td>
<td>33%</td>
</tr>
<tr>
<td>Risk analysis</td>
<td>26%</td>
<td>25%</td>
<td>-</td>
<td>25%</td>
<td>50%</td>
<td>-</td>
<td>33%</td>
</tr>
<tr>
<td>More than one method***</td>
<td>54%</td>
<td>50%</td>
<td>100%</td>
<td>25%</td>
<td>50%</td>
<td>100%</td>
<td>1</td>
</tr>
</tbody>
</table>

* Includes some countries of Central America and the Caribbean.
** Only three replies were received.
*** Depending on the disease, a set of techniques may be used to evaluate the zone (seroepidemiology, risk analysis, vaccinal cover, etc.).

3. IS REGIONALISATION AN EFFECTIVE TOOL FOR DISEASE CONTROL?

On the basis of the replies received the establishment and maintenance of zones for disease control eradication is perceived as useful by 58% of the countries. However, the different figures suggest that some countries, particularly in North America, gain more from regionalisation in terms of trade (45%). In countries in South America that are traditional exporters of meat products, only 14% claimed that their exports has been boosted due to regionalisation, although 100% claimed they used zoning.

The PHEFA's main strategies in addition to a regionalised approach to FMD control/eradication include the support of the private sector in the establishment and maintenance of specific zones. The participation and interest shown by the private sector, encouraged by the prospect of new business opportunities, had made it possible to finance and maintain certain control activities in these zones (13). Sixty-five per cent of the countries that replied stated that they had the support of the private sector for their specific zones.

To illustrate the use of regionalisation as an instrument for disease control, we will take the example of South America.
4. REGIONALISATION IN SOUTH AMERICA

The signing of the SPS agreement in 1994 and the OIE’s adoption of the concept of regionalisation/zoning had a major impact on foreign trade for the South American countries of Argentina, Brazil and Uruguay, traditional exporters of meat products, which established regionalised FMD-eradication programmes, within the framework of the PHEFA. The Hemispheric Plan has regional sub-projects in the Plate River Basin, South Cone, the Andean Region, the Amazon River region and in non-Amazonic Brazil. The FMD-free region is covered by the Central American, North American and Caribbean sub-projects. In South America, where FMD is endemic, the subprojects were established on the basis of the specific economic and productive characteristics of the livestock farming systems in those places where the disease is present, which allowed the development of regionalised control strategies.

The Sub-regional Project for the Eradication of FMD in the Plate River Basin led to a drastic drop in outbreaks in the late 1990s, the eradication of FMD in Uruguay in 1996, in Argentina in 2000, and the recognition of Southern Brazil (States of Rio Grande do Sul, Santa Catarina and Parana) as FMD free with vaccination in 2000.

To achieve this, Uruguay adopted a programme with homogeneous criteria for the entire country whereas the national programmes of Argentina and Brazil used zoning to isolate animal production systems with the greatest impact on international trade and subject to specific protective regulations.

The year 2000 witnessed the re-emergence of FMD in the region, caused by virus type O, which affected all three countries. In 2001, another outbreak due to virus type A occurred in Argentina and spread to Uruguay and Rio Grande do Sul, Brazil.

During the virus type O outbreak, both Brazil and Uruguay decided to establish an emergency zone in the areas around the outbreaks and to resort to stamping-out without vaccination as an eradication technique. In 2001, during the virus type A outbreak, both countries decided to vaccinate. In Rio Grande do Sul, Brazil, the health authorities decided not to modify the existing zoning system, and the State was isolated, by strict monitoring of the movement of animals and animal products, from the Centre-West livestock region already recognised as FMD free, as well as from the Eastern region, which was in the process of gaining recognition as FMD free with vaccination.

This situation prevailed until the emergency actions and mass vaccination campaigns eliminated the risk for the rest of the country, as attested by successive seroepidemiological samplings.

The re-appearance of FMD due to virus types O and A in Argentina, starting in 2000 and lasting throughout 2001, prompted the authorities to revise the National Eradication Programme 2001-2005. The programme is based on the division of the livestock production area into the following regions: Mesopotamica, Cuyo, Northeast, Central, and Patagonia (North A and B and South).

Risk levels resulting from the movement of animals and animal products between regions are covered by specific legislation for each origin/destination. Of particular importance was the strengthening of the protective barrier for the South Patagonia region, where vaccination is not practiced, and which remained FMD free throughout the outbreak that extended to nearly the entire country. The Patagonia A region was subject to systematic mass vaccination, while the Patagonia B region, without vaccination, acted as a surveillance zone, with a network of transit checkpoints. Although Argentina was classified as an infected country, the last
outbreak having occurred in January 2002. because of zoning the South Patagonia region was internationally recognised as FMD-free without vaccination in May 2002.

In Colombia, the entire Atlantic Coast, which forms a region together with the Lake Maracaibo based in Venezuela, was subject to a control/eradication programme, and achieved international recognition as an FMD-free zone with vaccination in 2001.

More recently, the Bolivian National Programme submitted a request for recognition of an FMD-free zone with vaccination in the department of de Santa Cruz de la Sierra, near the border with the States of Mato Grosso and Mato Grosso do Sul Brazil already recognised as such. The proposal uses the favourable conditions that exist in this border region to establish and implement a protected zone located in a country where FMD is endemic.

Paraguay experienced a re-appearance of FMD in Corpus Christi, on the border with the State of Mato Grosso do Sul, Brazil, in September 2002. A national commission was created within the framework of the Plate River Basin Project in order to assess the situation and the risk for Brazil. The authorities decided to regionalise the departments of Chaco and San Pedro, and to establish a special surveillance programme jointly with Brazil. The Paraguayan authorities established a programme of special activities in the departments affected or threatened by the outbreak.

5. CAMELID BREEDING AND REGIONALISATION

The breeding of camelids (Camelus dromedarius and C. bactrianus) is a regionalised activity mainly for reasons of climate, and is concentrated in the arid and semi-arid regions of Africa, especially from the edges of the Sahara and the Sahel to the eastern edge of the continent. It is also practised from the Middle East and the Arabian Peninsula to the Eastern republics of the former Soviet Union, and in the People's Republic of China and Mongolia, both areas where camelids play an important economic role as providers of meat and milk, and as draught animals. The world camelid population in 2002 was 19,300,000 heads, of which 15,130,000 are in Africa. Somalia, Sudan and Mauritania have 55% of the world camelid population.

In eleven countries of Africa and Asia, the most common camelid pathologies are parasitic (gastro-intestinal helminthiasis, ectoparasitosis), bacterial (anthrax, brucellosis and tuberculosis) and viral (camelpox, contagious ecthyma, Rift Valley fever and rabies) according to a survey performed by Fassi-Fehri in 1987. The prevalence of these pathologies is intimately linked to the relationship between these species and the environment. The low concentration but high mobility of herds is an obstacle to regionalised control programmes. However, in some regions of Chad, Morocco and Sudan, with a high prevalence of internal parasites due to nematodes and cestodes, control programmes have been established. This is also the case with chemicoprophylaxis against trypanosomosis.

6. REGIONALISATION AND CAMELID DISEASE CONTROL IN SOUTH AMERICA

Camelid breeding in South America is concentrated in the plateaus and high mountains of the Central Andes, over 2,500 meters in altitude, located mainly in Argentina, Bolivia, Chile, Ecuador and Peru. The most common species are llamas (Lama glama), alpacas (Lama pacos), guanacos (Lama guanicoe) and vicunas (Vicugna vicugna). The camelid population has risen over recent years, and now numbers 6.2 million, of which 70% live in Peru.

In the case of Bolivia and Peru, geography, climatic conditions and species distribution create a de facto regionalisation in which the camelid species live in virtual isolation due to aridity
and traditional breeding methods. In these regions, other species, such as cattle, are infrequent; sheep are the species that most often co-exist with South American camelids. Thus, camelid pathologies are isolated in these ecosystems, and control is easy. Trade with FMD-free countries is possible through trade protocols with established control measures, and the use of risk analysis to identify areas and populations with the lowest risk. As in Africa and Asia, ecto- and endo-parasites are the principal camelid pathologies, and are covered by regionalised control programmes. In Peru, the Servicio Nacional de Sanidad Agraria - SENASA - carries out regionalised control of mange in camelids and sheep, using demonstrative units located mainly in the southern part of the country. The project began in 1999, and is scheduled to conclude in 2004. In populations treated for mange, the average prevalence dropped to 1.85%, compared with 19.02% in populations not covered by the programme. The same organisational structure will be used for a project to control enterotoxaemia (Clostridium. Spp.) and sarcosporidiosis (Sarcocystis spp.) both important pathologies for camelids in the region.

In Peru and Bolivia, centres were set up for the export of camelids to FMD-free countries based on export protocols. These protocols require in addition to a compulsory declaration that the countries are free from rinderpest, haemorrhagic disease of deer, contagious bovine pleuropneumonia and Rift Valley fever, that animals for export be tested for FMD (they must be non-vaccinated), tuberculosis, brucellosis, enzootic bovine leukosis, infectious bovine rhinotracheitis, infectious pustular vulvovaginitis, bovine viral diarrhoea, bluetongue, vesicular stomatitis and surra (Trypanosoma evansi). The protocol was developed on the basis of the regionalisation of these species in the Andean altiplano.

7. CONCLUSION

Zoning as a disease-control instrument, and its impact on the creation and strengthening of markets for livestock products, is generally perceived as positive by countries. However, in many countries, the system of regionalisation chosen is based on known boundaries of disease occurrence, without any specific support legislation. Few countries have developed and implemented methodologies to characterise more precisely the risks, zone boundaries and the cost-effectiveness of regionalisation for disease control and eradication. An analysis of the replies to the questionnaire suggests that there is a need to disseminate more broadly the concept of regionalisation, to encourage participation by the private sector in the maintenance of specific zones, and to adopt specific legislation. Specific legislation would lead to enhanced disease control, and conceivably to international recognition of these zones, with positive benefits for trade between countries with different animal health status.
Annexe 5: General definitions of the 2003 OIE Code

GENERAL DEFINITIONS

Articles 1.1.1.1.

For the purposes of this Code:

**Approved**
Means approved, accredited or registered by the Veterinary Administration for export purposes.

**Case**
Means an individual animal (affected by an infectious or parasitic disease) infected by a pathogenic agent listed by the OIE.

**Compartment**
Means an autonomous epidemiological entity defined on the basis of either geography (zone) or management (enterprise) for the purpose of international trade.

**Enterprise**
Means one or more establishments with an integrated system of animal management forming an autonomous epidemiological entity.

**Free compartment**
Means [an enterprise] a compartment in which the absence of the animal pathogen causing the disease under consideration has been demonstrated by all the requirements specified in the Code for free status being met.

...
Annex 6: Report of the meeting of the OIE Ad hoc Group on avian influenza

Paris, 30-31 October 2002

(...)
The Ad hoc Group decided on the following definitions for avian influenza and for ‘poultry’ (as per Article 2.1.14.1 of the draft designed chapter):

1. Avian influenza (AI) was defined as “an infection of poultry caused by either any influenza A virus which has an IVPI (intravenous pathogenicity index) in 6-week-old chickens greater than 1.2 or an influenza A virus of H5 or H7 subtype”.

2. “poultry” was defined as “all birds reared or kept in captivity for the production of meat or eggs for consumption, for the production of other commercial products, for restocking supplies of game, or for breeding these categories of birds”.

The Ad hoc Group then examined the concept of compartmentalisation and decided that it could be applied to avian influenza. The Ad hoc Group believed that the poultry industry lent itself well to compartmentalisation for avian influenza, with the greater likelihood of spread of the disease being within an enterprise than between farms geographically close. Compartmentalisation of the wild waterfowl populations was also considered a suitable approach to addressing the disease risks presented. The Ad hoc Group acknowledged that the proposed revisions placed obligations on industry to set up and have verified systems to show compartmentalisation, and may require a closer working relationship between government and industry.

The Ad hoc Group also reviewed information on the zoonotic risk posed by some avian influenza strains. They agreed that the changes proposed in the Code will improve the characterization of all avian influenza isolates, providing an appropriate early warning system for the transfer of the virus into the human population.

Based on the epidemiology of the disease and avian commodities usually traded, Ad hoc Group drafted a revised chapter for examination by the Code Commission (Appendix IV). The Ad hoc Group also suggested a change to the definition of free enterprise.

CHAPTER 2.1.14.

AVIAN INFLUENZA

Article 2.1.14.2.

AI free country or compartment

A country or compartment may be considered free from AI when it has been shown that AI infection has not been present for the past 12 months. If infected poultry are slaughtered, this period shall be 6 months after the slaughter of the last infected poultry.

The AI status should be determined by an ongoing surveillance and monitoring programme (carried out in conformity with the provisions of chapter 1.3.6.) based on virus isolation, virus detection or serology. (...)
Freedom of infection in an enterprise can be demonstrated with an ongoing surveillance programme designed to provide at least a 95% level of confidence of detecting a prevalence of 10%. Each establishment should be sampled to provide a 95% level of confidence of detecting a prevalence of AI of 20%.(…)

This item was not approved totally during the last General Session in May 2003, and will be discussed later.
Annex 7: Relevant publications and web sites used to summarize the discussion

- FAO Electronic Conference on Principles for Rational Delivery of Public and Private Veterinary Services

- Infectious Diseases in livestock. The Royal Society
  http://reports.royalsoc.ac.uk/idl_sum.pdf

- The impact and poverty reduction implications of foot and mouth disease control in Southern Africa, with special reference to Zimbabwe.
  http://www.cgiar.org/ilri

- OIE 71st General Session Working document 2003
  http://www.meatnews.com April 2003

- The Times Tuesday April 10 2001 “Worldwide action on foot-and-mouth” From Dr Peter Roeder

- Global Framework for the Progressive Control of FMD and other TADs GF-TADs - A FAO and OIE initiative (technical description of the GF-TADs programme. Draft)

  http://www.oie.int/eng/publicat/RT/a_RT21_3.htm

- Animal Diseases: Implications for international meat trade - FAO Committee on Commodity problems. Intergovernmental Group on meat and dairy products Nineteenth Session

Annex 8: Join the EMPRES discussion forum

To subscribe to the EMPRES-livestock moderated discussion group send an e-mail message to mailserv@mailserv.fao.org

Type in the body of the e-mail the following: subscribe EMPRES-Livestock-L

To unsubscribe to the EMPRES-livestock moderated discussion group send an e-mail message to mailserv@mailserv.fao.org

Type in the body of the e-mail the following: unsubscribe EMPRES-Livestock-L

More information on the EMPRES Web site:
http://www.fao.org/ag/AGA/AGAH/EMPRES/contact/discuss.htm