REGIONAL STRATEGY FOR THE CONTROL OF ANIMAL DISEASES

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Summary: This report is an attempt to analyse the animal health situation of the region, to identify the major existing problems and to propose an approach for future strategies in one of the areas of the world most exposed to disastrous animal diseases.

The objectives of a regional strategy for the control of animal diseases are to prevent, control and/or eradicate the principal epizootic diseases, the major zoonoses and the other animal diseases having a strong impact on the economy of the region. The ultimate objective is to extend the control area as far as possible so that the region’s borders will be those of its outermost countries. These objectives can evidently not be reached without close cooperation and coordination.

To establish a common control programme, each country should rank diseases in terms of the potential economic, social and public health significance to the country.

The main animal diseases present or potentially threatening the livestock industry of the region are foot and mouth disease (FMD), rinderpest (RP), sheep and goat pox (SGP), brucellosis, contagious bovine pleuropneumonia (CBPP), African horse sickness (AHS), peste des petits ruminants (PPR), lumpy skin disease (LSD), Newcastle disease (ND), Gumboro disease (GD), rabies, echinococcosis, anthrax and Rift Valley fever (RVF).

The epidemiological study of some of these prevalent diseases may indicate the right approach to follow in terms of a regional strategy and may help to establish animal diseases control programmes adapted to each country’s preoccupations. It may also identify regional and/or sub-regional structures able to handle the rising problems, manage common programmes and run technical and scientific activities.

The animal resources of the region consist of over 155.5 million livestock units. Controlling diseases in these large animal populations is vital for the economy of the region and the health of its human population.

It seems impossible at present to completely control an animal disease solely at a national level and because many countries of the area are dependent on each other’s animal disease status, there is a real need for animal health projects in the framework of a regional strategy to control animal diseases.

Being aware of these increasing needs, the Office international des épiizooties (OIE) has recommended regional coordination actions and stronger cooperation between neighbouring countries, and FAO initiated in the region the well-known MINEADEP, the PARC, the WAREC, the SECNA and the recently formed RADISCON.

To insure better conditions for the success of the strategy, the region may be divided from west to east into the following sub-regions: Maghreb Arab Union, Nile Valley, Arabian peninsula, Central Near East and Northern Near and Middle East.

1 Food and Agriculture Organisation of the United Nations
2 Middle and Near-East Regional Animal Production and Health Project
3 Pan African Rinderpest Campaign
4 West Asian Rinderpest Eradication Campaign
5 Screwworm Emergency Center for North Africa
6 Regional Animal Disease Control Network
In these five sub-regions, the highest priority would be accorded to FMD, RP, SGP, bovine brucellosis, brucellosis by Brucella melitensis and poultry diseases.

The regional approach for the control of animal diseases can be divided into two main actions:

a) The development of veterinary service capabilities, such as a defense system based on quarantine, rapid laboratory diagnosis, epidemiological surveillance and information systems, and contingency planning and preparedness, able to rapidly and effectively mobilise resources.

b) Control programmes including one or a group of diseases and affecting one or more sub-regions. Disease control programmes are the ultimate action against diseases in view of decreasing their prevalence and incidence or eradicating them. On a regional scale, the endemic and epizootic diseases could be included in more extended programmes covering one or more sub-regions.

Starting from epidemiological evidence, it is possible to elaborate several groups of projects covering all the countries of the region, each one with its particularities. Each project could be based on the following components: promulgation of adequate policies, epidemiological surveys, control programmes adapted to each country's conditions, enforcement of diagnostic laboratory capabilities and identification of reference laboratories for each disease, creation of a training programme, implementation of an epidemiological surveillance network, identification of buffer zones between sub-regions and epidemiological zones and establishment of a regional commission insuring the follow-up and evaluation of activities.

Referring to the data included in the different country reports, the region may be considered, in animal health matters, as one of the more sensitive areas in the world.

The regional approach in this report consists of fighting the diseases in groups of countries sharing the same epidemiological, geographical, economical, sociological and political conditions. The classification of the diseases in order of their incidence, prevalence and impact, may help to identify priority programmes.

1. INTRODUCTION

The OIE Regional Commission for the Middle East expressed the request during the 62nd General Session of OIE, held in Paris in May 1994, to include "regional strategy for the control of animal diseases" as the second Technical Item for its 3rd Conference.

This report is an attempt to analyse the animal health situation of the region, to identify the major problems in the matter and to propose an approach for future animal health strategies and programmes.

First of all, I want to thank the Member Countries which responded to the OIE's request for information and thus assisted me in preparing the work that I am submitting for your appreciation today. I would like to mention in particular Cyprus, Egypt, Iran, Kuwait, Oman, Qatar, Sudan, Tunisia and Turkey. This information and that collected in the annual animal health reports over the last five years and from other OIE publications, were of great help. Nevertheless, considering the limited space allowed for this kind of report, it was rather difficult to elaborate a model strategy for each disease and for each sub-region, so I limited this report to the following:

- The synthesis of the epidemiological data related to the major diseases of the region.
- A flash back on the animal diseases control projects currently operating in the area.
- General proposals concerning possible model strategies for strengthening and developing veterinary infrastructures and activities and also for prevention and control programmes.

The Near and Middle East Region (NEMER) is composed of countries of the Maghreb and other North African countries, Near East countries and Middle East countries.* It is one of the most exposed areas of the world to disastrous

* Note: The OIE Regional Commission for the Middle East is composed of the following countries: Afghanistan, Bahrain, Cyprus, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Turkey and the United Arab Emirates. In order to present a
animal diseases, due to its geographical location and the important volume of its livestock and livestock product exchanges. Epidemic diseases remain a scourge of the livestock industry, and zoonoses are of epidemic proportion in the area. These major diseases can cause incalculable losses to the region's animal production industry.

The region has a great wealth of livestock, estimated at 155.5 million livestock units in 1993, totalling 125.5 billion USD and contributing 30% of the total agricultural gross domestic product, in addition to nearly 14 billion USD of livestock products to its economy (5) (Table 1).

Table 1: Economic Importance of the Livestock and Human Resources by Sub-Region

<table>
<thead>
<tr>
<th>Sub-region</th>
<th>Livestock units</th>
<th>Livestock value</th>
<th>Human population</th>
<th>Veterinarians</th>
<th>Auxiliaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maghreb</td>
<td>25 607</td>
<td>20 510</td>
<td>64</td>
<td>3 216</td>
<td>4 202</td>
</tr>
<tr>
<td>Nile Valley</td>
<td>54 933</td>
<td>44 920</td>
<td>86</td>
<td>31 066</td>
<td>18 865</td>
</tr>
<tr>
<td>Arabian Peninsula</td>
<td>7 672</td>
<td>6 120</td>
<td>33</td>
<td>914</td>
<td>1 231</td>
</tr>
<tr>
<td>Central Near East</td>
<td>12 926</td>
<td>10 350</td>
<td>36</td>
<td>6 661</td>
<td>5 092</td>
</tr>
<tr>
<td>Northern Middle East</td>
<td>54 503</td>
<td>43 581</td>
<td>133</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>TOTAL</td>
<td>155 661</td>
<td>125 488</td>
<td>352</td>
<td>46 426</td>
<td>32 239</td>
</tr>
</tbody>
</table>

** Data concerning Iran not available.

In addition, demand for animal products is greater than the available supply, due to the growth and increasing wealth of the region's population available, and livestock movement and transport within and into the region is greater than ever before.

NEMER have generally a sub-arid, arid or Saharan climate, characterised by dry weather and variable rainfall; nomadic and transhumance production systems still prevail in many countries of the region, ignoring national borders. In addition, political crises have forced people and stock of some countries of the region to move to other countries without having been submitted to quarantine measures.

The objectives of the Regional Strategy for the Control of Animal Diseases (RESCAD) are to prevent, control and/or eradicate the great epizootic diseases, the major zoonoses and the other animal diseases having a strong impact on the economy of NEMER countries. The ultimate objective is to extend, as far as possible, the border control area so that the region’s borders will be those of the outermost countries of the region. These objectives can evidently not be reached without close cooperation between the Veterinary Services of these countries and without the coordination of activities such as animal health programmes, border control, epidemiomonitoring and zoosanitary information.

A regional approach to the control of animal diseases and implementation of common programmes of prevention and control are not easy tasks. They require:

- common organs of reflection, planification, pilotage and assessment;
- strengthening of Veterinary Services;
- establishment and development of veterinary diagnostic laboratories;
- standardisation of the means of control and of diagnostic procedures and tests;
- identification of reference laboratories;
- establishment of a rapid and reliable communication system of collection, treatment, diffusion and exchange of information.

complete picture of animal health in the region, this report covers a geographical area larger than that of the OIE Middle East Commission Member Countries.
This regional strategy approach may differ, depending on opinions and on national contingencies. Consequently, the objective of this report is more to pinpoint the importance of this type of approach and to justify it using epidemiological and economical arguments than to elaborate models for the region and its sub-regions.
2. IDENTIFICATION OF HIGH RISK DISEASES

The appearance, in a country or a region, of an epizootic disease, a major zoonotic disease or a potentially disastrous animal disease constitutes a major threat to livestock production and trade and to public health; even the suspicion of such a disease must be considered as a high risk.

Usually, infectious diseases are the diseases in cause, but major losses can occur from zoonotic diseases, tick-borne diseases and non infectious and production diseases. The infection may result from the introduction of an exotic disease or from a change in the epidemiology of an enzootic disease, such as an antigenic shift or the emergence of an exalted virulence.

Now more than ever before, because of the ever-increasing international movement of people and goods, these major epizootic diseases can spread rapidly and unexpectedly and can devastate a part of or the entire economy of a country or a region. That is why each country should rank diseases in terms of their potential economic, social and public health significance. Factors that should also be taken into consideration include geographical distribution and proximity of these diseases and their potential for regional and international spread.

The main animal diseases presently or potentially threatening the livestock industry of the NEMER are foot and mouth disease (FMD), rinderpest (RP), sheep and goat pox (SGP), brucellosis, contagious bovine pleuropneumonia (CBPP), African horse sickness (AHS), peste des petits ruminants (PPR), lumpy skin disease (LSD), Newcastle disease (ND), Gumboro disease, rabies, echinococcosis, anthrax, Rift Valley fever (RVF), recently introduced, and New World Screwworm (NWS), just eradicated (Appendices I and II).

The Veterinary Services of NEMER are highly preoccupied by FMD and RP among the epizootic diseases, and by rabies and brucellosis among the zoonotic diseases.

3. NATURE AND DEFINITION OF THE MOST IMPORTANT DISEASES

The epidemiological study of some of the prevalent diseases in the countries of the region may indicate the right approach in terms of RESCAD and can surely help to conceive animal disease control programmes adapted to each country’s preoccupations. It may also help to recommend regional and/or sub-regional structures able to handle the rising problems, manage the common programmes and run the technical and scientific activities.

3.1. Foot and mouth disease

FMD is an acute, highly communicable disease caused by a virus which has seven immunologically and serologically distinct types within which 61 subtypes have been designated by CF test. The movement of infected animals can rapidly spread the disease over long distances.

FMD occurs in most of the countries in the world and more often in the NEMER, caused by the different types of virus known. Recent outbreaks have been reported in Tunisia in 1989 and in Algeria in 1990, and in the last five years 21 countries of the region have reported the disease (15). Disease control in most of these countries is by vaccination, even if recommended control programmes suggest either stamping out, systematic vaccination or a combination of both methods.

3.2. Rinderpest

RP is an acute, highly contagious viral disease; there is only one serotype of RPV. The disease is enzootic in Asia and Africa, including many countries of the NEMER region. Major outbreaks occurred in Egypt in 1982 (3) and Turkey in 1991 (11); in the last five years 21 countries of the region have reported the disease (15). Disease control in most of these countries is by vaccination, even if recommended control programmes suggest either stamping out, systematic vaccination or a combination of both methods.

3.3. Peste des petits ruminants

PPR is an acute and subacute viral disease of goats and sheep, first described in 1942 in Côte d'Ivoire (17). It presently occurs in most African countries and the Middle East. Eight NEMER countries have reported PPR during the last five years (15).
Methods that have been successfully applied to RP eradication would be appropriate for PPR (see page 183).

3.4. Sheep and goat pox

SGP is a highly contagious viral disease of sheep and goats reported in various parts of Asia and Africa; it is enzootic in many countries of the region and is reported to OIE by most of them. Cyprus remains the only country free of SGP in the region.

Restrictions on the movement of animals and animal products is essential in preventing the introduction of SGP. In an endemic situation, massive vaccination followed by control of animal movement from infected areas represents an effective strategy for the control and eradication of the disease.

3.5. Lumpy skin disease

LSD in its classical form is an acute viral disease of cattle; considered as a new disease, it has invaded most of Africa. Five countries of the region have reported it during the last five years (15).

Secondary bacterial infections may occur and important production losses can result. Two types of vaccine have been used successfully to immunise cattle in endemic situations.

3.6. Newcastle disease

Velogenic Viscerotropic Newcastle Disease (VVND) is the most virulent strain of ND. Morbidity rates approach 100% and mortality rates may exceed 95%. VVND is considered to be almost worldwide in distribution. Once introduced into poultry, the virus spreads from farm to farm. The only countries of the region that have not reported ND in the last five years are Libya and Qatar (15).

Control and eradication necessitate an intensive programme consisting mainly of strict quarantine, destruction of all infected and exposed birds, cleaning, disinfection and vaccination.

3.7. Rabies

Canine rabies is present in more than 80 countries in the world and in most of the NEMER countries. Nearly five million persons in the world are treated annually for post-exposition (many of them from NEMER countries), the majority of whom are children, and more than 30,000 persons are declared dead after having been bitten by a rabid dog. More than 90% of human rabies cases are of canine origin (6); this clearly indicates that the human rabies problem is essentially related to the control of canine rabies.

Rabies in humans and dogs is presently almost entirely limited to developing countries where dog population control is light or inexistant. Such is the case of the countries of the NEMER region in which dogs are the main vectors and reservoirs. Five countries of the region have reported no rabies cases during the last five years (15).

The control method is vaccination with an efficient vaccine of the dog population along with, if possible, parenteral and oral vaccination with the objective of reaching more than 80% of the target population. It is recommended for neighbouring countries without any natural borders to establish common or regional programmes to avoid resurgence phenomena. These programmes should be based on three types of action: public sanitary education, reduction of the stray dog population and mass vaccination of dogs. In addition, an adequate epidemiological surveillance system, including regional notification of the disease, should be established.

3.8. African horse sickness

AHS is a highly fatal viscerotropic insect-borne viral disease of horses and mules and generally a subclinical disease in other equidae. The disease is endemic in tropical central Africa; it occasionally reaches northern African countries along the Nile Valley or the west coast of Africa. Notable outbreaks have been reported outside Africa; one of the most important occurred in 1959-63 in the Near and Middle East (3). The last outbreak was reported in Morocco in 1989. In the last five years this disease has been reported by only two African NEMER countries (15).

Preventive and control measures include quarantine, equidae movement control, vector control, detection and slaughter of infected animals and vaccination of all susceptible animals with the relevant monovalent AHS vaccine.
3.9. Rift Valley fever

Sheep are very susceptible to RVF, with high mortality rates in young lambs (60-100%) and abortion in pregnant ewes ranging from 60% to 100%. Cattle and goats are often infected by RVF virus. After a 12 year absence, RVF was recognised in Egypt in 1993 (7). One should also keep in mind the large RVF outbreak which occurred in Mauritania in 1987. In the last five years, RVF has been declared by only three countries of the region (15).

Recommendations for prevention of RVF include routine vaccination of domestic animals, vector control around quarantine areas, surveillance of RVF virus activity and veterinary personnel and public education regarding RVF.

3.10. Bluetongue

Bluetongue (BT) is an infectious non contagious viral disease of ruminants. The causative virus is an orbivirus with 23 or more known serotypes (3). In sheep, morbidity ranges from 80% to 100% and mortality varies from 0% to 50%.

The geographical distribution of BT is extensive and virological and serological testing have suggested that BTV exists in Africa, parts of Asia and the Middle East. The BT virus originated on the African continent; the first recorded outbreak of BT outside Africa was on the island of Cyprus in 1943 (17). Since then, BT has been reported in Israel, Syria and Turkey (17). During the last five years, six NEMER countries have reported the disease (15).

The primary means of controlling BT disease in sheep has been vaccination with attenuated virus vaccines (serotypes incorporated in the vaccine must be the same as those causing the infection). Other means include health management and vector control measures.

3.11. Screwworm myiasis

New World Screwworm (NWS) infestation is caused by the larvae of the obligate parasite *Cochliomyia hominivorax*. Screwworm infestations have been reported since 1858 (18); confined to the American continent, it recently invaded North Africa and posed a threat for the whole continent and the Middle East.

Control of the pest can be achieved by reducing the number of man-made wounds and treatment of wounds with insecticides.

Eradication can be achieved using the sterile fly technique, public information campaigns and intensive epidemiological surveillance.

3.12. Tick-borne diseases

Tick-borne diseases (TBD) are a serious constraint to livestock development in many countries. The principal existing TBD in NEMER are babesiosis, thelerosiis and anaplasmosis.

The importation into the region of highly productive and highly susceptible cattle underlined the high pathogenicity of the TBD agents.

Control programmes against ticks and TBD in the region should rely on:

- economically appropriate methods with acaricides in farming systems raising locally adapted breeds.
- integrated control methods using tick control and live vaccine immunisation against tick borne diseases in farming systems raising up-graded dairy or beef cattle.
- diagnostic facilities and surveillance systems.
- epidemiology study of TBD under different management systems.
3.13. **Contagious bovine pleuropneumonia**

CBPP is a subacute to chronic disease of cattle, endemic in most of Africa and occurring periodically in Europe. Eight NEMER countries have reported the disease during the last five years.

To prevent its introduction, it is important to maintain sufficient regulatory restrictions and to test serologically susceptible animals when imported. Removing susceptible animals from contact with CBPP-infected animals constitutes, with on-farm quarantine, the only method of control. However, in outbreak situations the method is to quarantine, test and slaughter.

Vaccination with modified live vaccine is routinely carried out in enzootic areas; immunity lasts at least one year. The CBPP vaccination could be combined with rinderpest vaccination.

3.14. **Brucellosis**

In the NEMER, animal brucellosis affects both cattle and small ruminants; it represents a significant constraint to the improvement of animal production and is considered a major risk to human health. The intensification of animal trade and the importation of high producing breeds, particularly susceptible to the disease and concentrated in big industrial farms, has notably increased the disease incidence in most countries of the region.

The disease has been reported in all NEMER countries, except in Cyprus where it was eradicated in cattle in 1932 and in small ruminants in 1984 (13). Nonetheless Cyprus reported a foci in 1993 (15). Qatar and Bahrein have not reported bovine brucellosis cases during the last five years (15).

Brucellosis caused by *Brucella melitensis*, even though it is less widespread globally than brucellosis caused by *B. abortus*, is progressing rapidly in NEMER countries. Available data point to the increasing incidence of *B. melitensis*, biovar three in cattle, which indicates serious changes in the epidemiology of brucellosis in the region and constitutes a greater danger for the human population of the area, in so far as cow's milk is more frequently consumed (13). This situation was underlined by the participants at the joint meeting of FAO, OIE and WHO held in Amman in February 1993. A document entitled "FAO/OIE/WHO Guidelines for a regional brucellosis control programme for the Middle-East" was adopted at this meeting. The programme will be implemented in Egypt, Jordan, Lebanon, Sudan, Syria and Turkey.

In extensive livestock management, brucellosis is often unrecognised and remains unreported. Its evolution as a chronic or subacute disease does not accord it a high priority even for veterinary clinicians.

In terms of prevention and control it is recommended that epidemiological studies be carried out and prevaccination serological surveys be conducted to determine the prevalence and incidence of the infection before starting a disease control campaign. The use of REV vaccine, conjunctively administered in reduced doses, for small ruminants, is recommended in mass vaccination as it protects pregnant ewes. The best live vaccine presently available for cattle is S19.

3.15. **Bovine tuberculosis**

Bovine tuberculosis has been reported in most countries of the region; 15 of them have reported it in the last five years (15). It seems that in NEMER countries the incidence of human tuberculosis is decreasing due to the increasing consumption of pasteurised and sterilised milk.

Some countries of the area are carrying out bovine tuberculosis control campaigns, thus decreasing the incidence of the bovine disease and contributing to the decrease, in incidence, of the human disease.

3.16. **Echinococcosis**

Echinococcosis constitutes a serious economic and public health problem. It has been reported by most of NEMER countries both in man and animals; however, the exact data on the prevalence of human hydatidosis in most NEMER countries are not available and data available are based on cases related to surgical operations. Four countries of the region have not declared the disease during last five years. The prevalence of the disease in several NEMER countries is particularly high among dogs.

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7 World Health Organisation
The problems encountered in the countries of the region are similar; these problems are mainly related to the
important population of stray dogs, the lack of epidemiological information, the weakness of public health
education programmes and the difficulties in improving the sanitary habits of the population.

Prevention and control measures are based on elimination or limitation of the stray dog population, improvement
of health education programmes, public education and environmental hygiene involving community
participation, legal enforcement of hygienic animal slaughter, improved meat supply to market, disposal of dead
animals, garbage collection and appropriate surveillance systems.

3.17. Non infectious and production diseases

Non infectious and production diseases of livestock account for substantial food losses in NEMER. These
diseases are generally chronic and subclinic and result from reproductive inefficiency and disorders, neonatal
pathology, nutritional deficiency, internal parasites, toxicosis and multifactorial diseases. Although they are of
great economic importance, these diseases have been neglected in terms of laboratory technology, reporting and
surveillance. They rarely occur in outbreak form and thus do not have the psychological effects that epizootic
disease outbreaks have on decision makers.

Non infectious and production diseases are not controlled by quarantine or vaccination but by improvement in
animal management and in delivery of Veterinary Services, extension services, field-oriented diagnostic
capabilities and input supplies.

4. OTHER DISEASES

Many other diseases are highly prevalent in the region, including:

<table>
<thead>
<tr>
<th>Reported disease</th>
<th>Number of countries having reported the disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gumboro disease</td>
<td>19</td>
</tr>
<tr>
<td>Marek’s disease</td>
<td>18</td>
</tr>
<tr>
<td>Mycoplasmosis of poultry</td>
<td>16</td>
</tr>
<tr>
<td>Infectious bronchitis of poultry</td>
<td>15</td>
</tr>
<tr>
<td>Contagious caprine pleuropneumonia</td>
<td>14</td>
</tr>
<tr>
<td>Anthrax</td>
<td>13</td>
</tr>
<tr>
<td>Infectious laryngothracheitis of poultry</td>
<td>12</td>
</tr>
<tr>
<td>Infectious bovine rhinotracheitis</td>
<td>11</td>
</tr>
<tr>
<td>Varroatosis</td>
<td>10</td>
</tr>
<tr>
<td>Leishmaniosis</td>
<td>7</td>
</tr>
</tbody>
</table>

5. THE NECESSITY OF PREVENTION AND CONTROL OF THESE DISEASES

The NEMER distribution of livestock includes over 311 million sheep and goats, 60 million cattle and buffaloes, 12
million equidae, 12 million camels and 811 million chickens (15) (Appendix III). Controlling diseases in these large
animal populations is vital for the economy of the region and the health of its human population. Even if some NEMER
countries have eradicated or controlled a few of the most devastating diseases, many indigenous diseases still affect
livestock and highly transmissible foreign diseases and pests threaten the animal production industry.

As time goes on, the prevalence and incidence of the main animal diseases are increasing and so is the need for a
regional approach to animal disease problems. The animal production industry is suffering from epizootic viral diseases
such as FMD or rinderpest and the human population’s health is highly affected by major zoonoses such as brucellosis
and rabies. In the NEMER countries, the production of food, the working capacity of draught animals and the welfare
of man are greatly affected by the impact of these diseases on the productivity of domestic animals.

Except in the case of an island country, it seems impossible at the present time to entirely control an animal disease
solely on a national scale and there is a real need for a regional strategy for the control of animal diseases as many
countries of the area are dependent on each other’s animal disease status.
Need for animal health projects in the region is increasing for the reasons mentioned before; these projects should be part of a global strategy for the control and eradication of the most important infectious diseases, tick-borne diseases or non-infectious and production diseases.

These needs have been felt by OIE, which recommends regional coordinated actions and stronger cooperation between neighbouring countries.

6. OPERATING MODELS OF REGIONAL ACTIONS FOR THE CONTROL OF ANIMAL DISEASES

FAO was probably among the first international organisations that considered the necessity of a regional approach to the animal diseases control. It initiated in the NEMER the well-known MINEADEP, the PARC, the WAREC, the SECNA and the recently formed RADISCON.

6.1. MINEADEP

The Middle and Near East Regional Animal Production and Health Project had very ambitious objectives difficult to reach for many reasons. These reasons include the broadness of the area of the project, regrouping countries extending from the Atlantic Ocean to the foot of Himalayan mountains, the very different social, economical and political situations and the geographical, climatical and environmental differences between the countries concerned. A large percentage of the finances was used to train personnel in animal production techniques and few animal health programmes were involved.

6.2. WAREC

The West Asian Rinderpest Eradication Campaign is part of a global strategy for the eradication of rinderpest. One of its objectives is to establish links and coordinate actions with other rinderpest campaigns, namely PARC and SAREC (South Asian Rinderpest Eradication Campaign). The WAREC project, established by the UNDP, started in 1989. It presently covers the following NEMER countries: Egypt, Lebanon, Jordan, Syria, Yemen, Oman, Qatar, Bahrein, Kuwait, United Arab Emirates and Iraq, Iran and Turkey. The project plan is based on regional cooperation, mass vaccination or a specific area strategy to control RP, assessment of immune status using ELISA techniques, disease surveillance after vaccination and strengthening of animal quarantine services.

A regional coordination unit was established in Baghdad in 1989 and then transferred to Amman in 1991. A regional laboratory was established in Baghdad, sub-regional ELISA testing centres and sera banks were established in the participating countries and a vaccine bank was set up. The project ended in 1993 after three rounds of vaccination of more than 90% of the bovine target population. As a result of mass vaccination and epidemiological control carried out by member countries, only two countries in the WAREC area reported the occurrence of the disease during 1993 and since July 1993 no cases of RP have been reported. The next phase of WAREC will attempt to eradicate the disease.

6.3. PARC

The Panafriican Rinderpest Campaign concerns 35 sub-Saharan countries, including three NEMER countries (Egypt, Sudan and Somalia). The first meeting to discuss the PARC was convened in 1981 by FAO, jointly with OAU/IBAR and OIE, and the first vaccination campaign was organised by the OIE with the support of the European Economic Community (EEC). Five years later, a financial agreement was signed between EEC - the principal donor - and OAU, and the PARC campaign started in 1987.

The objectives of the project were to control and ultimately eradicate RP from Africa through mass vaccination, serosurveillance and control of animal movement, to restructure livestock services, to improve RP diagnosis, to strengthen disease reporting and to improve vaccine production and quality control.

PARC was managed through OAU/IBAR. The project has been fairly successful. Ten years ago, 19 countries were infected with RP, while only three reported the disease in 1993. Vaccinations have been stopped gradually in West Africa but the disease persists in the East. The future strategy of PARC is to establish a sanitary cordon to prevent the westward spread of the disease, to carry on vaccinating in some depth beyond the

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8 United Nation Development Programme
9 Organisation for African Unity/Interafrican Bureau for Animal Resources
sanitary cordon and then reduce and stop vaccination when the risk of the disease spreading is reduced to near zero.

6.4. TAHRP

The Trinational Animal Health Research Project involves Egypt, Israel and the United States of America. The objective of this cooperative project is to develop the information and technology needed for the control of three animal diseases in addition to strengthening infrastructure, standardisation of diagnostic methods, coordination of control measures and economic evaluation of animal diseases and of their control. Emphasis in the project is placed on epidemiology, development of improved diagnostic and preventive measures, transfer of technology from scientific institutions to field personnel, and diagnostic laboratories.

6.5. SECNA

The Screwworm Emergency Center for North Africa was created in 1990 in order to stop, control and eradicate the NWS (18). While primarily aimed at controlling NWS in Libya, the project also involves neighbouring countries. The project is based on epidemiological surveys, strengthening of veterinary capabilities, such as control teams, quarantine stations and diagnostic laboratories, epidemiomonitoring, border control, training, public education and information. With the coordinated synergistic action of FAO, IFAD, UNDP, IAEA, several donors and the Veterinary Services of Libya and of surrounding countries, the SECNA eradicated NWS from the region in two years. This regional animal disease control action is considered as a model of collective regional emergency action against animal diseases and pests.

6.6. RADISCON

This project initiated by FAO and IFAD in 1993 was initially conceived as a response to the NWS threat; its goal was to establish an early alert system against a possible reinfestation of North Africa by NWS. It presently regroups 29 countries of the area, characterised by important trade exchanges, extensive animal production systems and frequent animal migratory movement over international borders: Algeria, Bahrain, Chad, Djibouti, Egypt, Eritrea, Ethiopia, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Mali, Mauritania, Morocco, Niger, Oman, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, Turkey, United Arab Emirates and Yemen.

The immediate objectives of RADISCON are the establishment of an animal disease surveillance and control network in the participating countries and the training of veterinary personnel in epidemiomonitoring, information and reporting. The intermediate objectives are to establish animal health protection units and to upgrade veterinary diagnostic capabilities.

7. SUGGESTED MODELS OF REGIONAL ACTIONS FOR THE CONTROL OF ANIMAL DISEASES

Dividing NEMER in sub-regional areas becomes a necessity due to many factors including political, social and economic compatibility, geographical and climatic conditions, nomadic movement and animal transport and trade.

In addition to the factors mentioned before, the subdivision of NEMER should take into count the following:

- The nature of the disease and its capacity to spread.
- The priority given to the disease by many neighbouring countries.
- The presence and nature of national disease control programmes.

Taking into account these factors, NEMER can be divided from west to east into the following sub-regions:

a) **Maghreb Arab Union** countries, including Algeria, Libya, Mauritania, Morocco and Tunisia.

These five countries form an economical group and have signed a common veterinary agreement. At least three of them constitute an epidemiological entity facing the same threats and fighting against the same diseases. Mauritania and Libya may be considered as the gates of this sub-region toward southern sub-Saharan Africa and

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10 International Fund for Agricultural Development
11 International Atomic Energy Agency
eastern North Africa and the Near East, and their outer borders could play the role of buffer zones for the sub-region. In this area the dominant pathology concerns FMD, SGP, brucellosis, rabies and poultry diseases.
b) **Nile Valley** countries, including Egypt and Sudan; this group may also include Somalia and eventually other countries on the African horn.

These countries represent a huge part of NEMER and occupy a key position between Central Africa, North Africa and the Near East. They can constitute a means of introduction of many diseases from these areas. This area is primarily affected by RP, RVF, FMD, LSD, CBPP, brucellosis and ND.

c) **Arabian Peninsula** countries, including Bahrein, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates and Yemen.

These countries are characterised by social, political, economical, geographical and meteorological similarities. Furthermore, most of them are large importers of animals and animal products from different parts of the world and thus face the same risks. They developed intensive poultry and dairy industry very sensitive to a great variety of animal diseases.

According to OIE reports, the priority diseases in this sub-region are FMD, RP, brucellosis, PPR and poultry diseases.

d) **Central Near East** countries, extending from the Mediterranean shore to the Euphrates river and including Cyprus, Gaza and Jericho Territories, Iraq, Jordan, Lebanon and Syria.

These countries are situated in the central part of NEMER and are exposed to contamination risks from the other surrounding countries. The livestock production systems in this sub-region include transhumance and migratory movements across borders which facilitates the spread of diseases and the presence of economically important diseases within the livestock population. Priorities in the region are FMD, PPR, RP, brucellosis and poultry diseases.

e) **Northern Near and Middle East** countries, including Afghanistan, Iran and Turkey.

These three countries regroup a large human population (nearly 38% of the NEMER population) and considerable livestock production and consequent movement for national and international trade. The first concerns in animal diseases are RP, FMD, SGP, brucellosis and LSD.

Over the five sub-regions, the first priority is given to FMD, followed by brucellosis by *Brucella melitensis*, SGP, bovine brucellosis, RP and poultry diseases with an emphasis on ND and Gumboro disease.

The regional approach to controlling animal diseases can be divided into two main components:

- Activities which could be developed in all the countries of the region, such as surveillance, diagnostic structures, education, training, and information, in order to improve each national veterinary structure and its activities.

- Control programmes including one or a group of diseases, affecting one or more sub-regions. In these control programmes, highly infectious diseases can be distinguished from vector transmissible diseases, tick-borne diseases, non-infectious and production diseases and zoonotic diseases.

### 8. DEVELOPMENT AND IMPROVEMENT OF VETERINARY STRUCTURES AND ACTIVITIES

Regional strategy does not imply supranational structures and authority; it is, on the contrary, based essentially on the strengthening of present national veterinary authorities and structures (Table 2). Addressing major animal diseases problems on a regional basis is a more strategically sound approach than on an individual country basis. In addition, the regional approach has a better chance of attracting the interest of international organisations which could become participants or donors.

A major responsibility of national Veterinary Services is the maintenance of a defense system based on quarantine, rapid laboratory diagnosis, epidemiomonitoring and information systems, and contingency planning and preparedness, able to rapidly and effectively mobilise resources.
Table 2: Human Population Veterinarians and Auxiliaries by Country

<table>
<thead>
<tr>
<th>Country</th>
<th>Human population (millions)</th>
<th>Veterinarians</th>
<th>Auxiliaries (Thousands)</th>
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<tbody>
<tr>
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</tr>
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<td>2 016</td>
</tr>
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<td>1 718</td>
<td>374</td>
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<td>8</td>
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<td>200</td>
</tr>
<tr>
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<td>4</td>
<td>438</td>
<td>1 449</td>
</tr>
<tr>
<td>Egypt</td>
<td>53</td>
<td>27 300</td>
<td>15 950</td>
</tr>
<tr>
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<td>25</td>
<td>3 388</td>
<td>1 193</td>
</tr>
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<td>1 722</td>
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<td>2 320</td>
</tr>
<tr>
<td>Jordan</td>
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<td>149</td>
</tr>
<tr>
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<td>18</td>
<td>3 890</td>
<td>2 382</td>
</tr>
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<td>4 136</td>
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<td>174</td>
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<tr>
<td><strong>Total</strong></td>
<td>352</td>
<td><strong>46 426</strong></td>
<td><strong>32 239</strong></td>
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</table>

Quarantine stations are considered as the first line of defense against infectious animal diseases. Considering the importance of animal movement in the region, this line of defense must be given priority consideration and border checkpoints must be under constant veterinary control and vigilance. Even if animal diseases may enter a country in many ways, they may be more easily introduced by importation of animals and their products, biological products and other material. Many examples of imported diseases can be cited, such as NWS in Libya, RP in Turkey and Syria, bovine leucosis in Saudi Arabia, IBR in Tunisia and Algeria, brucellosis in United Arab Emirates and poultry diseases in most countries of the region.

Internal quarantine stations should also be established between natural or administrative areas in a country, in order to control animal movements and to limit the spread of infectious diseases and pests. Moreover, risk analysis and assessment before importation may greatly strengthen the first line of defense.

The strategy consists of enforcing quarantine structures and observing national and international measures which in turn necessitates the following:

- qualified veterinarians and auxiliaries.
- an adequate budget.
- political will, strong legislation and adapted policies.

Diagnostic laboratories are the second line of defense against infectious animal diseases. They are directly linked to the first line as well as to the third line of defense. Early diagnosis may prevent the spread of disease and may avoid costly control and eradication measures.

Unfortunately, in most countries of the region there are no sufficient means of securing a confirmed laboratory diagnosis of a suspected disease.

The strategy takes into consideration that as a basic requirement each country of the region should develop laboratory capability both in terms of facilities and trained staff for general pathology, bacteriology, virology, protozoology and parasitology diagnostic work. National laboratories should be in contact with each other in a network for the exchange
of their knowledge, techniques, biological products, specialists and experts; to this end, periodical meetings should be organised. It would be interesting if, in a synergical approach, each national laboratory specialised and concentrated on one animal disease and thus played the role of a regional reference laboratory for that disease. Close contact should also be established with regional and/or international reference laboratories, and, because the construction of high security laboratories for diagnosis, research and vaccine production are beyond the resources of most of countries of the region, it would be interesting to study the possibility of establishing in each sub-region at least one bio-security lab and one high security lab in a selected country for the benefit of all the NEMER.

Within the framework of the RESCAD, and in respect to the diagnostic laboratories, it is recommended to:

- train lab staff in routine techniques as well as on high sensitivity and specificity techniques.
- promote advanced techniques in immunology and molecular biology.
- organise an information laboratory network to complement and coordinate other actions.
- develop laboratory quality control teams.

The third line of defense consists of epidemiosurveillance and information systems and of disease control programmes. RESCAD should rely on the implementation of these systems and programmes.

**Epidemiosurveillance systems** on a national scale, as on a sub-regional or regional level, have become a necessity and should be developed to allow each country of the region to detect the presence of the disease, estimate its prevalence, monitor its progress and follow-up and assess the results of the measures taken.

Most of the countries of the region have already established passive epidemiosurveillance systems but unfortunately these are not sensitive enough. In fact, field Veterinary Services generally carry out surveillance activities on a limited number of diseases and react very slowly to the presence of newly introduced diseases. This mode of operation does not facilitate early detection and does not help to monitor livestock diseases, so the following is recommended:

- enhance passive surveillance by training field veterinary officers and private veterinarians in epidemiological investigation skills, and extend programmes to involve the public.
- emphasise active surveillance in order to complete passive surveillance activities. In this framework, field veterinary officers who presently occupy most of their duty time in routine administrative activities should be reoriented towards field visits to farms and flocks, random surveys of animal populations, collection of diagnostic material from sentinel herds, abattoirs, quarantines and foci of infection for laboratory analysis and animal health monitoring and finally reporting epidemiological data to the central office.

**Information**, in the form of a network, linking countries of the same sub-region and sub-regions between each other and linking a regional structure to other regional or international communication networks and documentation centres, should be developed in order to obtain reliable information from exporting or transit countries. The information obtained through this network would help to estimate risk and to make correct decisions, thus avoiding anarchic and risky importations, allowing early warning of outbreaks and helping to coordinate control measures.

Presently, most of the zoosanitary information collected goes through the OIE system and considerably helps NEMER countries. However, a closer network associating neighbouring countries, as it is the case for the EEC system or the American system, would assure a better and more rapid information exchange.

**Contingency planning and preparedness:** RESCAD should emphasise, on a national scale, the enforcement of disease control programmes for each of the most important diseases. National control programmes can be divided into two types:

- control programmes for endemic diseases such as bovine tuberculosis, rabies or brucellosis. These programmes are run on a long-term basis and their objectives are to eradicate the disease or to lower its incidence rate;
- control programmes for epizootic and rather generally exotic diseases, such as FMD, RP or AHS. These are usually emergency disease programmes. Veterinary Services should be trained to face this type of situation. Field veterinary officers should be provided with adequate equipment to allow them to undertake proper disease investigation and to send good diagnostic specimens to the laboratory.
9. SPECIAL DISEASE CONTROL PROGRAMME

Disease control programmes are the ultimate action against diseases in order to reduce their prevalence and to decrease their incidence or to eradicate them.

On a regional scale the endemic and epizootic diseases could be included in more extended programmes covering one or more sub-regions considering that the coexistence of traditional and modern husbandry systems complicates disease control and requires carefully planned prophylactic and management schemes.

Starting from the epidemiological evidences cited above, it is possible to elaborate several groups of projects covering all NEMER countries, each one with its particularities, and including the following diseases:

- epizootic viral diseases (FMD, RP, SGP, PPR)
- bovine brucellosis, bovine tuberculosis and small ruminants brucellosis
- vector transmissible diseases (AHS, RVF, BT, LSD)
- tick-borne diseases (anaplasmosis, babesiosis, theileriosis)
- poultry diseases
- neonatal diseases
- zoonotic diseases (rabies, echinococcosis)
- mycoplasmic diseases (CBPP, CCPP)
- non-infectious reproductive diseases
- telluric diseases (anthrax).

Each project should be based on the following components:

a) epidemiological surveys to establish a real idea of the situation.
b) elaboration of control programmes adapted to each country's conditions, taking into account epidemiological data.
c) enforcement of diagnostic laboratory equipment and identification of reference laboratories for each disease.
d) creation of a training programme, continuing education and workshops for all the programme actors.
e) implementation of an epidemiosurveillance network.
f) identification of buffer zones between sub-regions and epidemiological zones.
g) establishment of a regional commission insuring the follow-up and evaluation of activities.
h) promulgation of adequate policies, considering that legislation constitutes the basis of disease control without which Veterinary Services would be defenseless and ineffective.

The means of sanitary and medical prevention and control are numerous:

- vaccination (FMD, RP, RVF, AHS, CBPP, LSD, SGP, BT, ND, PPR, VHD, rabies, anthrax)
- stamping out (FMD, RP, ND, PPR)
- combination of stamping out and systematic vaccination (FMD, RP, PPR)
- restricting the movement of animals (RVF, FMD, AHS, SGP, PPR)
- controlling arthropod vectors (RVF, AHS, LSD, BT)
- surveillance
- public education (RVF, rabies, brucellosis, echinococcosis)
- health management (all diseases)
- destruction of all infected and exposed animals (ND, VHD)
- proper disposal of carcasses and contact fomites (all diseases)
- limitation of stray dog population (rabies, echinococcosis)
- on-farm quarantine (FMD, AHS, CBPP, ND, PPR, VHD, anthrax)
- test and slaughter (CBPP, bovine brucellosis, bovine tuberculosis)
- disinfection (FMD, CBPP, SGP, ND, VHD, anthrax).

10. CONCLUSION

Referring to the data included in the different country reports, the region may be considered, in animal health matters, as one of the more sensitive areas in the world.
If animal resources and wealth are important and play a key role in the countries' economies and if human and other means exist in the region, the lack of communication and coordination represents a heavy handicap for the control of animal diseases in the area.

In order to fight major diseases, several projects have been implemented; these have had some success but unfortunately not enough to reduce the animal disease incidence to a required level.

The approach briefly described in this report consists of fighting diseases in groups of countries which share the same conditions and constraints, thereby ensuring greater success to future animal health programmes. Five sub-regions have been identified on these bases.

Classifying diseases by priority with respect to their incidence, prevalence and impact may assist in the identification of priority programmes. The study of the means of prevention and control imposes the adoption of a general strategy based on:

- legislation development and enforcement
- strengthening of the veterinary structures
- education and training in its different aspects
- surveillance;
- bringing diagnostic laboratories up to a standard level
- specialisation and identification of reference laboratories
- follow-up and assessment.

REFERENCES


18. FAO (1992). The New World Screwworm Eradication Programme
# Priority Classification of Diseases by Country of the Region

## Appendix I

<table>
<thead>
<tr>
<th>Countries</th>
<th>MAGHREB</th>
<th>NILE VALLEY</th>
<th>ARABIAN PENINSULA</th>
<th>CENTRAL NEAR EAST</th>
<th>NORTHERN MIDDLE EAST</th>
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<tr>
<td></td>
<td>Ma</td>
<td>Mo</td>
<td>Tu</td>
<td>Al</td>
<td>Ly</td>
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<td></td>
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<td>3</td>
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<td>5</td>
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<td>-</td>
<td>-</td>
<td>-</td>
</tr>
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<td>-</td>
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<tr>
<td>Bluetongue</td>
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</tr>
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</tbody>
</table>

A = Afghanistan   C = Cyprus   In = Iran   L = Libanon   Mo = Morocco   SA = Saudi Arabia   Sy = Syria   UAE = United Arab Emirates
### Appendix II

**Priority Classification of Diseases of the Region**

<table>
<thead>
<tr>
<th>Type of disease</th>
<th>Disease</th>
<th>Priority Classification</th>
<th>Total</th>
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<tr>
<td></td>
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<td></td>
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</table>

It appears that the most important diseases of the region are by priority classification:

1. Foot and mouth disease
2. Ovine brucellosis
3. Sheep and goat pox
4. Newcastle disease
5. Bluetongue
6. Rinderpest
8. Peste des petits ruminants
9. Lumpy skin disease

and by category of diseases:

**Viral diseases**
1. Foot and mouth disease
2. Sheep and goat pox
3. Newcastle disease
4. Rinderpest
5. Rabies
6. Peste des petits ruminants
7. Lumpy skin disease
8. Gumboro

**Vector transmissible diseases**
1. Varroaosis
2. Rift Valley fever
3. Mycoplasmosis

**Bacterial & other diseases**
1. Ovine brucellosis
2. Bovine brucellosis
4. African horse sickness
5. Anthrax
6. Mycoplasmosis
7. Echinococcosis
## Animal Resources

<table>
<thead>
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