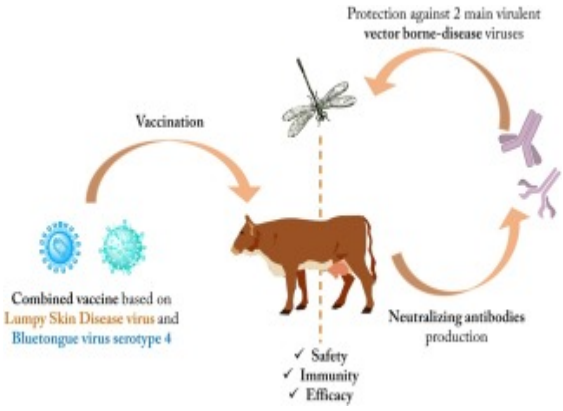
Regional Representation for the Middle East

Inter-Regional workshop on Vector Borne Diseases: surveillance & early warning.



Organized jointly by AOAD in collaboration with the OIE regional representation for the Middle East and the technical assistance provided by EuFMD.

8-9 November 2021

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Background:

Vector borne diseases (VBD) are considered as most serious diseases because of the various vectors, which are a living organism having the ability to transmit the disease at a large scale in shorter time and among different living beings (animals, birds, and humans). Treatment of VBD is difficult and prevention necessitates essentially a clear understanding of the vector activity and measures for its elimination.

The most important vector from all vectors is Mosquito, which is found all over the world. Among others, two major groups of mosquitos in relation with diseases transmission are: Culex (West Nile Fever), Aedes (Rift Valley Fever).

A WORKSHOP on VBD is organized jointly by AOAD, and the OIE regional representation for the Middle East and the technical assistance provided by EuFMD.

Rationale of the meeting:

Within the framework of the AOAD regional training program for the year 2021 and within the activities of the regional program for transboundary animal diseases, the national training course was implemented in the field of Inter-Regional workshop on Vector Borne Diseases, surveillance and early warning.

- Environmental sub-regions that share similar characteristics in terms of Vector Born diseases (BVD) risk factors have been identified, thus developing coordinated and customized preventive approaches to disease and risk management, in line with international standards and guidelines.
- The need for livestock exporting and importing countries to comply with the OIE standards for trade in livestock and products (regarding VBD) with special attention to the application of diagnostic tests, quarantine and the use of vaccines.
- Encouraging countries to translate the updated World Organization for Animal Health animal health codes into their national legislation and regulations and to promote their application, and to exchange information with trading partners.
- Implementation of a training and technical assistance programs for countries by international and regional organizations to support countries in risk areas in the Middle East for rapid diagnosis of diseases and conduct of predictive epidemiological studies for contingency planning: FAO, EU FMD, OIE & AOAD.
- Work on conducting studies evaluating the social and economic effects of the occurrence of insect-borne diseases (VBD)).
- Enhancing the concept of “ONE HEALTH” in programs to combat insect-borne diseases common to humans and animals.

- Supporting the implementation of scientific research on the epidemiology of Insect Transmitted Diseases (VBD) in the Arab region and linking it to the presence of disease-carrying insects, environmental factors and clarifying the role of wildlife animals in Arab countries in the field of monitoring and controlling animal epidemics

Participants:

65 participants from 21 Arab and African countries attended the training course including:**, Algeria, Bahrain, Chad, Commores, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, , Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, and Yemen**

Objectives:

The WORKSHOP is to highlight on the role of selected vectors in transmitting diseases to Humans and Animals, and the related pathogen activity.

It will also, discuss the pathogenicity of most important VBD circulating in the region, and their impact on the economy, trade, and the livelihood of the population, taking in consideration measures of prevention described in the OIE animal health Code and Manual.

4 diseases are selected as representative of many others prevailing in the region: Bluetongue, Rift Valley Fever, , Bovine ephemeral Fever, and Lumpy Skin Disease.

Challenges and Expected outcomes:

Countries should consider conducting the surveillance activities for Vector Borne Diseases, which are often project based, in a sustainable manner over longer time periods.

Government should commit to continuously use risk analysis studies, early warning systems and climate forecasting programs, for contingency planning even for a disease that occurs only sporadically. In addition, willingness at local level to carry out such activities should also be strengthened.

Human and financial resources to carry out surveillance, capacity building of surveillance Teams, should be enforced.

Entomological studies and research on the activity of various vectors and the means of preventing their impact, should be promoted.

Countries should have a good legislative framework for quarantine stations. Implementation of the relevant OIE standards represents the ideal solution if applied wisely.

Proceedings of the meeting:

1- **Welcome Addresses**

FAO: Friederike Mayen

Healthy animals contribute to the elimination of hunger, to healthy people and to sustainable food production. In cooperation with its highly esteemed partner AOAD and OIE, FAO contributes to improve animal health to make livestock production more productive and sustainable.

Due to global warming, and intensified travel movements, vector- related patterns have changed and the risk of transmission of vector borne diseases has significantly increased, as recent examples in the MENA Region of LSD and Rift Valley fever outbreaks show.

Losses in animal production caused by vector borne diseases are estimated in billions of US dollars annually. According to OIE, vector borne diseases account for more than 17% of all infectious diseases in humans, causing more than 700 000 deaths annually.
In consequence, the zoonotic potential of Vector-borne diseases requires a concerted joint action of all partners in a One Health approach, linking animals, humans and the environment.

OIE: Ghazi Yehia (OIE Regional Representative for the Middle East):

The increasing volume of international and inter-regional trade within the Middle East, and the global trends, combined with changes in animal husbandry, urbanization, modern transportation and globalization, have resulted in a global emergence or re-emergence of epidemic vector-borne diseases affecting both humans and animals over the past 30 years.

The burden of vector borne diseases is highest in tropical and subtropical areas, and they disproportionately affect the poorest populations. Since 2014, have afflicted populations, claimed lives, and overwhelmed health systems in many countries.

Distribution of vector-borne diseases is determined by a complex set of demographics, environmental and social factors. Global travel and trade, unplanned urbanization, and environment.

The OIE, in continuous collaboration with its partners, FAO, AOAD and EUFMD, set standards and guidelines for the surveillance of these diseases and save no efforts to assist countries in the implementation of control measures.

EuFMD: Fabrizio Rosso

Dr Rosso highlighted on three points.

1. **The relevance of the topic**. The climate change together with animal movement patterns show new areas of risk for disease introduction and spread with special reference to VBD, which we would need to monitor and to forecast in order to improve our capacity to respond.
2. **The COVID-19 current situation**. The pandemic has accelerated the green and digital transition and has demonstrated the real implications of a globalized world and highlighting the value of training and networks, beside the availability of prevention and risk response tools.

3- The **collaboration among countries and among regional institutions**. Countries in the region have different opportunities to meet and collaborate which is quite essential for the benefit of the region. The covid pandemic has also limited in some cases and in some areas the capacities and resources to properly implement regular surveillance and properly react to TADs incursion.

International organizations should collaborate to develop mechanisms and system that can assist in better understanding the risk of VBS, the impact on economy, trade, and the livelihood, promote and support risk information sharing and control measures.

AOAD: Dr Ahmad Smawi, Deputy Director General of AOAD

According to the role of the Arab Organization for Agricultural Development (AOAD) in combating diseases, the AOAD works to support the efforts of Arab countries in implementing national control strategies for animal diseases, especially transboundary diseases by raising the efficiency of veterinary authorities in the field of TADs surveillance monitoring, early detection and response for emergency and risk management to prevent cross-border movement to access safe trade for live animals and their products.

1- **Vector borne diseases (VBDs) situation in the region**: **Dr Tamador Hussein (AOAD)**

Dr Tamador noted that vector borne diseases are considered the most serious diseases because of the various vectors, having the ability to transmit the disease at a large scale in shorter time and among different living beings (animals, birds, and humans). Treatment of VBDs is difficult and prevention necessitates essentially a clear understanding of the vector activity and measures for its elimination.

She also noted that the periodic mass gathering of pilgrims in religious events, the increased conflict and political instability in the region that led to large population movement, the uncontrolled movement of animals between countries irrespective of borders, the Climate changes (global warming) and the ecologic disruptions are factors, among others, affecting the expansion of the Vector borne diseases.

2- Epidemiological situation and OIE initiatives on Vector-borne diseases in North Africa (R. Bouguedour-A. Ripani OIE SRR Tunis)

The Mediterranean basin is a strategic political and economic corridor with a unique ecosystem. The Mediterranean basin is a region vulnerable about climate change and latest data showed that the basin is warming faster than the whole planet. The annual average temperature has already risen by 1.4°C compared to pre-industrial temperatures, compared to an average of 1.1 ° C worldwide. The potential impact of climate change on vector distribution and vector-borne diseases incidence is significant. Therefore, the Med-Region is a suitable area for incursion and/or diffusion of vector-borne diseases such as Bluetongue, Epizootic hemorrhagic disease virus, West Nile Fever and Rift Valley Fever. In particular, the appearance of clinical outbreaks of Rift Valley Fever in Libya in January 2020 and the evidence of detection – over the past years - of serological evidence of antibodies against RVFV in ruminants, demonstrate the presence of RVF virus circulation in North Africa and, therefore, the needs of implementing appropriate surveillance in the sub-region. To this end, the OIE Sub-Regional Representation organised in December 2020 a sub-regional workshop which conclusions highlighted the importance of implementing:

a- Field and laboratory investigations to better understand the prevalence and distribution of vector-borne diseases in the sub region.

b- Regular surveillance and early warning for vector-borne diseases including standardized entomological studies.

c- Mediterranean approach about surveillance with potential extension to Sub-Saharan countries.

d- Predictive models.

Based on these conclusions, the OIE SRR Tunis, is driving the dialogue with the OIE Collaborating Centre in Italy and NASA (*National Aeronautics and Space Administration*) as well as Veterinary services in North Africa to move forward in the implementation of tools for improving epidemic intelligence on VBD in North Africa through specific projects such as "*Defining Ecoregions in the North African area through multivariate clustering approaches: a step toward a targeted vector-borne disease surveillance*" and *Designing and implementation of entomological and virological surveillance for RVF in North Africa*".

3- OIE terrestrial code standards on Vector borne diseases. Charmaine Chng (OIE)

This presentation introduced the OIE standards, notably the organisation of the Terrestrial Animal Health Code, interaction between Volume I and Volume II of the Code and how Members may use the Code to

guide efforts in the control of vector-borne diseases and facilitation of safe trade. Standards pertaining to vector-borne diseases were covered, along with a case example of bluetongue virus. The presentation also covered ongoing work to revise existing chapters on vector-borne diseases.

4- **Use of Forecasting models in the prediction of VBD pathogen activity. (C. Pittiglio, F. Kivaria, K. Morteo, C. Bebay and J. Gilbert)**

Rift Valley fever (RVF) is a zoonotic vector-borne disease that has severe impacts on livelihoods, national and international markets, and human health. RVF is currently limited to Africa and parts of the Near East with the potential to expand globally.

Outbreaks are closely associated with climate anomalies (e.g., periods of heavy rains and prolonged flooding), which increase habitat suitability for vector populations, influencing the risk of disease emergence, transmission and spread.

Early warning systems represent an essential tool to enable national authorities to implement measures preventing outbreaks. In this context, FAO has developed a web-based RVF Early Warning Decision Support Tool (RVF DST), which integrates near real-time RVF risk maps with geospatial data, RVF historical and current disease events from EMPRES Global Animal Disease Information System (EMPRES-i) and expert knowledge on eco-epidemiology.

The RVF forecasting model builds on the model developed by Anyamba and collaborators and calibrated by FAO. This tool has been crucial in successfully forecasting hotspots for RVF vector amplification in Eastern Africa, as it provides recommendations and early warning messages for countries at risk of RVF outbreaks. The tool is used to build capacity for early warning and forecasting at country level, and demonstrates how near real-time modelling, risk forecasting, and digital innovation can enhance preparedness and anticipatory actions.

As shown by our preliminary analysis in North Africa for RVF, the RVF DST can be calibrated and scaled up to other regions as well as to other diseases.

5- **An Overview on vector borne diseases surveillance: Giancarlo Ferrari (EUFMD)**

"In his presentation, Dr Ferrari highlighted on the major aspects of a surveillance system based on its specific objectives and the components/tools utilized to achieve such specific objectives. The main purpose of the presentation was to show how the overall sensitivity (the capacity of the surveillance system to detect the disease of concern if it is present) can be increased using a risk-based approach. It is essential that in order to be able to use a risk-based approach some knowledge about the disease of concern and the most important associated risk factors must be present. Moreover, if a surveillance system is structured in different and independent components, the sensitivity of each component can be aggregated to further increase the sensitivity of the surveillance system as a whole".

6- **Country presentations:**

Representatives from 6 selected countries, (**Algeria, Egypt, Chad, Morocco, Sudan and United Arab Emirates),** addressed the situation of the respective 4 vector borne diseases in their countries, the measures for control and surveillance, and identifying challenges met. (Annex)

7- **Risk mapping and risk-based surveillance of VBD: (Sh. Baiomy-EUFMD).**

The presenter illustrated that as part of the EuFMD risk reduction program, which aims to reduce the risk of FAST diseases in the European neighborhood, including North Africa, the Middle East, and southeast

Europe, EuFMD promotes the development of skills for risk analysis to identify risk locations and hot spots. In 2017, EuFMD and CIRAD formed a partnership aiming to advance the development of FMD surveillance and control strategies in the European neighborhood.
CIRAD has developed a framework to analyze and map the risks of the introduction and spread of FAST diseases. The framework is based on the collective expertise of national, regional, and international experts. It aims to assist national veterinary services set up less expensive and more effective risk-based surveillance and control protocols.
This integrated approach is ideal for countries with data scarcity. Expert opinion from a diverse group is crucial for identifying (spatial) risk factors and compiling data on transboundary and national animal movements. Then, experts assess the significance of each factor and their combination as a risk for the introduction and spread of a TAD.
Experts identify high-risk zones; prioritize surveillance, and control activities in these zones using the risk maps developed. This process is iterative because when new, data that is more precise becomes available; the risk maps are updated, hence improving the surveillance/control strategies. Thus, the goal is not to create a single map but to train and involve local experts to continuously execute this framework, for example, once a year or as necessary.
Animal movements (through trade and transhumance) are a significant risk factor for the transmission of animal diseases and must be considered in qualitative risk analysis in animal health. Animal mobility data is sensitive and frequently scarce, as most movements are unregistered. Understanding animal mobility networks makes it possible to predict the introduction and spread of the majority of vector-borne and directly transmitted animal diseases. It is recommended that animal mobility be considered as a significant risk factor for the introduction and spread of animal diseases.

8- Entomological surveillance. Maria Goffredo (IZSAM) :

The presenter showed an overview of the roles that insects can play in different scenarios of arboviruses, including Bluetongue, Bovine Ephemeral Fever, Rift Valley Fever and Lumpy Skin Disease. The knowledge of the transmission routes, specifically for Culicoides- and mosquito borne diseases, may lead the strategies for surveillance and control actions.
The possible approaches to the entomological surveillance were highlighted, with the different aims that can be achieved through entomological investigations, both on vector populations and circulating arboviruses. The experiences of **the Istituto Zooprofilatico Sperimentale dell 'Abruzzo e del Molise (IZSAM)** were reported, related to the surveillance plans currently in place in Italy for Culicoides (within Bluetongue surveillance) and mosquitoes (within West Nile and Usutu surveillance). Finally, the training activities on entomological surveillance, which were recently delivered entirely on-line, were also described.

9- Project proposals on Vector-borne diseases (ecoregions and entomological and virological surveillance). Annamaria Conte (IZSAM)

The presenter showed the background, the rational and the outline of a project activity that will be carried out in North Africa. The activity driven by the OIE office in Tunis will be carried out by the Istituto Zooprofilatico Sperimentale dell 'Abruzzo e del Molise in collaboration with the National Aeronautics and Space Administration (NASA).
Firstly, Ecoregions will be identified in the participating Countries (Mauritania, Morocco, Algeria, Tunisia, Libya, and Egypt, identifying similar environmental and climatic characteristics on the territory, regardless of the presence of a specific vector, can constitute a fundamental starting point for the improvement of surveillance systems and for the development of alert systems in the event of the introduction of new infections transmitted by vectors. The 'ecoregions' are defined as homogeneous areas in terms of their geophysical, biological and climatic characteristics and in which the environmental conditions are similar.

The second project activity regards the implementation of a harmonized surveillance system for RVF in North Africa that will be developed through different phases: designing and implementation of entomological and virological surveillance; field activities (a number of selected sites will be sampled along the study period); laboratory activities (species identification/viral detection); realization of a database for collecting all the information and of an interactive Dashboard and the Web GIS.

10- laboratory capacities for Vector-borne diseases in the Middle East. (G.Yehia, A.Elromeh)

After describing he main objectives of the OIE manual of diagnostic tests and vaccines, as the guide to provide internationally agreed diagnostic laboratory methods and requirements for the production and control of relevant vaccines and other biological products, the presenter showed worldwide distribution maps of the 4 vector borne diseases, RVF, BT, LSD and BEF, as reported to the OIE world information system (WAHIS) in 2020.
Dr Yehia also, summarized the laboratory validated methods for isolation and identification of the related pathogens and the serological tests used. He also, refer to the manual for the description of validated vaccines and strains recommended for prevention plans.
The presenter concluded by encouraging countries to comply with the OIE manual in their surveillance activities for VBD and other diseases at risk of re-emergence in the region, and request assistance from the accredited world reference laboratories and collaborating centers.

11- Towards regional prevention and control strategies: G. Yehia, A.Elromeh (OIE)

The OIE regional Representative for the Middle East read the draft of recommendations proposed to be adopted by the countries representatives as a roadmap for the way forward in the control of vector borne diseases. Some of these recommendations were selected from recommendations of other similar meetings held in previous years.

1- Countries should promote and practice good veterinary governance to effectively prevent and control VBD, in accordance with international standards.
2- Countries in the region should enhance information sharing on vector-borne diseases, to establish an effective surveillance system with qualified experts and high technical tools, especially in the field of insect vector biology and control.
3- Countries to ensure compliance with their obligations on transparent animal disease information by promptly reporting all outbreaks of VBD to the OIE.
4- A regional network of national epidemiologic teams on VBD as well as vectors, be developed including the international FAO/OIE collaborating centers/ reference laboratories and the results of these activities be shared to support early warning efforts of regional Members.
5- Countries in the region should urgently develop, evaluate, and update, their national contingency planning, to include risk maps and estimation of the animal population in risk areas. The use of the developed web-based Rift Valley fever (RVF) Early Warning System Support Tool (RVF DST) to support the early warning decision for controlling the disease.
6- Countries are encouraged to establish a cross-border disease monitoring system that considers the complexity of the risk factors for the introduction/persistence of vector-borne diseases.
7- **Define "Ecoregions"** through which a territory is classified into similar areas according to specific environmental and climatic factors in order to develop harmonized and customized preventive approaches for VBDs for appropriate and targeted surveillance and risk management, in line with international standards and guidelines. In this regard, the OIE Sub-Regional Representation for North Africa is guiding the elaboration of a specific project for the definition of Ecoregions for

North African countries and, this project, could be a model to be enlarged to other countries in Middle East.

8- Trading countries follow the standards of the OIE for trade of livestock and products with respect to VBD with particular attention to the application of diagnostic tests, quarantine and use of vaccines. Countries are encouraged to translate the updated OIE code chapters into their national legislation and regulations and reinforce their application, and to exchange information with trading partners,

9- Training and technical assistance be provided to countries by the international and regional organizations and development partners to support countries within the risk areas in the Middle East for rapid diagnostic of the diseases and to undertake predictive epidemiological studies for contingency planning.

10- International and regional organizations, FAO, OIE, AOAD, EUFMD, continue to support research, accelerated development for new diagnostic tests, safe and efficacious vaccines, and strategy for the control of VBD.

11- The impact of VBD occurrence and implementation of control programs should be regularly assessed on a socio-economic level through an appropriate communication strategy.

12- In line with the "One Health concept", strengthen and formalize inter-sectoral collaboration and data sharing, on national and regional levels, to ensure that the surveillance and control of VBD be followed by rapid response after detection of disease either in animals or humans.

13- Research on epidemiology of VBD, should be strengthened in the region with particular emphasis on entomological studies, pathogen dynamics, environmental factors, and the elucidation of the role of wildlife.

These recommendations should be presented at the AOAD executive council assembly, as well as to the FAO/OIE GF-TADs regional steering committees' meetings, for adoption and endorsement.

Acknowledgment

The OIE regional Representation for the Middle East extends its thanks and appreciation to the Arab Organization for Agricultural Development (AOAD) for all the efforts to hold this important meeting on the surveillance and early warning of vector borne diseases. These diseases are threatening the animal health as well as Public health, with great disturbances on trade in animals and animal products added to negative impact on the socio-economy of member countries, especially those covered by the AOAD program: "surveillance of Transboundary Animal Diseases".

Our thanks are also extended to the EUFMD for its continuous collaboration and technical assistance.