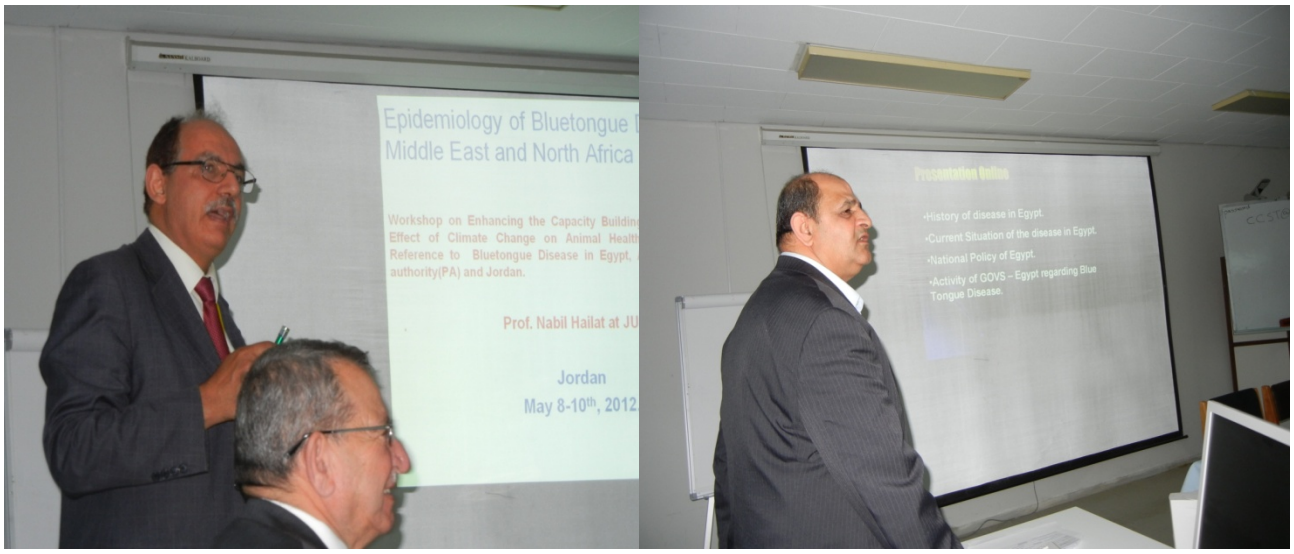
PROJECT code: 0007927

"A Proposal to Enhance the Capacity Building/Development on the Effect of Climate Change on Animal Health Issues With Special Reference to Bluetongue Disease in Egypt, Algeria, the Palestinian Authority (PA) and Jordan".



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Final Technical Report on the Proposal –PGTF-INT/11/K07,

PROG 2011/172.

A. **Title of the Project** **"A Proposal to Enhance the Capacity Building/Development on the Effect of Climate Change on Animal Health Issues with Special Reference to Bluetongue Disease in Egypt, Algeria, the Palestinian Authority (PA) and Jordan".**

B. **Implementing Institution:** Jordan University of Science and Technology, Faculty of Veterinary Medicine, Irbid-Jordan, 7-9 June, 2011, Prof. Nabil Hailat, DVM, Ph.D, Professor of Pathology and Animal Health.

I. Introduction, Justification and Situation Analysis:

Climate change and global warming has not been given sufficient attention in relation to animal health and diseases internationally. In addition, animal health issues are no longer confined within any single country's borders. There has been a real lack of appreciation among those involved in animal health for how the climate change may affect animal health, production and diseases. Furthermore, there is little contribution of the animal health curricula at scientific institutions in the Arabic countries to the capacity building and knowledge dissemination related to animal diseases and global warming.

The pattern (and impact) of BT epidemics has altered in Europe. The main strands of evidence were linking the invasion of BT to climate change. These include a northward shift in the range of the traditional African-Asian vector, Culicoides imicola, and, beyond this vector's range, the involvement of indigenous European Culicoides vector species. There was a subsequent spread

of BT into cooler and wetter areas of Europe which was facilitated by these new vectors that carried infection far beyond the range of the traditional vector. Understanding the relative role of biotic and environmental processes in such disease invasions is essential for development of early warning systems for vector-borne diseases. It is also considered how such knowledge is best integrated into risk assessment and early warning systems for bluetongue and other orbiviruses.

As stated previously, BTV recently has spread throughout extensive portions of Europe including northern areas of the continent; much remains to be learned regarding the northern Eurasian BTV ecosystems in terms of both species of insect vector as well as virus strains and serotypes that occur within them.

In the Middle East, BTV infection previously (20 years ago) has been documented in Iran, Jordan, Oman, Saudi Arabia, Syria, Turkey and Yemen, the species and serotypes of BTV that occur within the Middle East are poorly defined and there have been few recent published studies from the region. In addition, last year, the disease was reported in many countries of the world causing high morbidity and mortalities, including Morocco, Algeria, Tunisia, Israel and the Palestinian Authority. We, in Jordan, have observed clinical cases of BTV in sheep, goats and cattle where we were able to investigate the gross and histopathological picture and identify some of the virus serotypes which are very essential for surveillance and control strategy. During our discussion with our counterparts in the government we found a real lack of knowledge and information about the diseases associated with the climate changes and poor strategies of controlling such diseases.

Thus, we organized a three day- consultation research workshop where scientists, academicians, veterinarians and agriculture engineers from the participating countries (Algeria, Egypt, PA and Jordan) attended and presented their views in these issues. In addition, undergraduate and graduate students participated in the workshop.

II. Strategy:

Three years ago, for the first time, we accurately described and diagnosed the Bluetongue disease in sheep, goats and cattle using histopathology, ELISA technology and molecular biology. These techniques were newly introduced to our laboratories and to Jordan. Later on, scientific research and surveillance was conducted to assess the size of the problem in sheep, goats and dairy cattle. The veterinarians in the Ministry of Agriculture were not aware of the disease and lack the training and the capacity of diagnosing the disease using accurate laboratory tests created a vicious dialogue and denying patterns of thinking and approach.

Through several formal and informal meetings we brought to the attention of our veterinary colleagues in the Ministry of Agriculture the importance and the occurrence of BT disease in Jordan. Furthermore, through our visitations to sheep and goats, and dairy farms, and through our post mortem examination at the Animal Health Centre in our faculty we brought the issue of BT disease to the farmers. Recommendations of the above-mentioned studies were sent to the Ministry of Agriculture to consider seriously BT disease as a trade-limiting factor with the objective of decreasing the occurrence of the disease in Jordan.

The Prime Minister of Jordan and the Minister of agriculture asked me (Prof. Nabil Hailat) to chair a national committee to conduct a national research study to assess the size and the occurrence of the BT disease. We were asked to propose a strategy plan of its prevention and control.

The target beneficiaries are veterinarians, animal scientists, ecologists and environmentalists in the Ministries of Agriculture, health, environment, academicians from the veterinary and agriculture faculties, undergraduate and graduate students, as well as many sheep, goats and cattle farmers. Technicians and research personnel improved their diagnostic skills in the diagnosis of this disease. Very recently, the disease has been reported officially through the OIE office in Algeria, Morocco, Tunisia, Iran, Greece, the Palestinian Authority and Israel.

Goal: Demonstrate, through expert discussion and presentation, that histopathology, ELISA technology and Molecular biology are effective techniques for improving laboratory diagnosis and benefiting animal health and public health sectors in the Middle East and North African (MENA) region.

Our Objectives were:

1- To enable sharing of expertise on animal disease diagnosis associated with climate change (BT disease) among the countries of Jordan, Egypt, Palestinian Authority and Algeria.
2- To facilitate transfer of knowledge and new diagnostic techniques related to animal diseases associated with climate change with special emphasis on BT disease.
3- To exchange information on the climate status (rainfall, temperature, humidity .etc), prevalence and status of BT disease in the region.
4- To increase the human resource capacity in the laboratories for animal diseases diagnosis transmitted by vectors with reference to BT disease.
5- To increase the awareness of how to use the best control measures for insects transmitted BTV.
6- To increase the awareness of farmers, animal scientists about the epidemiology and the transmission of BT disease.
7- To enhance the communication between and amongst scientists and veterinarians in the ministries of agriculture's in the participating countries.
8- To produce a proceeding pertaining the status of BT disease in the region.

III. Steps in the Implementation of the Project:

To implement our project, we contacted our counterparts in Algeria, Egypt, The Palestinian Authorities and our colleagues in Jordan. We contacted scientists from both academia and governmental people in the ministries of Agriculture through our counterpart officers in each country, by emails, telephones and faxes. We sent to them the main themes of the consultation meeting-training workshop and we asked them to prepare their talks accordingly and the nominations of the participants should be according to specialization. We also included the private sector in Jordan where the chairman of the Jordan Veterinary Syndicate was invited and presented his views in during the activities of the workshop.

We asked the Royal Jordanian, Egypt airline and Algerian airlines to make the proper reservations for the participants and we made also the accommodation reservations for all the participants. We provided the participants with transportation from the airport to the hotel and to the university and vis-virsa. Food, soft drinks, juices and water, were provided along the duration of the workshop. Teaching materials were burned on CDs with some photos taken during the activities of the workshop were also provided to the participants.

Over the course of three days which we conducted from 8-10, of May 2012, we reviewed the current issues related to climate changes, changes in temperature, humidity and winds, and its relation with animal diseases. Transfer of knowledge and information in regards to animal diseases which are linked to changes in temperature and humidity and vector born diseases were discussed in details. Emphasis was given to Bluetongue disease, Rift Valley disease and other viral diseases that are transmitted via biological vectors. That was through presentation

of lectures, seminars and round table discussions. In addition, we reviewed the international regulations on animal movements and trade, regional documents and regulations, and country reports pertaining to such diseases. Several papers were presented from Egypt, the Palestinian Authority and from Algeria. Reports and papers on international trades, some of them electronic were exchanged among the participants. Exchange of addresses and emails and raising the issue of writing up joint proposals on such issues was discussed also.

The training-consultation workshop conducted on three days with five sessions and aclosing session for recommendation and discussion (attached). Nineteen papers were presented. Chairman and Co-chairman were assigned for each session considering the participating countries and the themes addressed in that session (see the workshop program Attached Number 1). The first page contained the logos of the participating institutions. Each country was asked to present the current issues and the challenges facing animal health with reference to climate change and animal diseases and how that may affect international trade and food security.

The workshop started on Tuesday May 8th, 2012 with an opening ceremony. The opening ceremony started with the speech of Prof. Nabil Hailat, the organizer at JUST where he welcomed the delegations and the participants and presented the main objectives and the strategy behind funding this proposal and the expected outcomes. This was followed by the paper of the Director of the Consultation Center at Jordan University of Science and Technology, where he presented all the support for implementation of the project on the behave of the university. It was followed by the speech of the chairman of the Jordan Veterinary Syndicate- private sector and then by the Dean of the Faculty of Veterinary Medicine at the University. Both appraised the workshop and emphasized the importance of organizing such a workshop. They all have expressed the importance of organizing capacity building consultation and training workshops.

Following these papers some remarks were presented by the delegations where they thanked the organizing institution and expressed their gratitude for Jordan as a leading country and initiating these activities. They also expressed their interest in sustainability of such activities with Jordan as it gives an opportunity for mutual and multinational cooperation and changes of ideas. Part of the opening ceremony is shown in Figures 1 and 2 below.

Figure 1 a&b.a. shows part of the opening ceremony; From right to left-the director of the consultation center, former Minister of Agriculture-Jordan, The Dean of the Faculty of Veterinary Medicine, The Vet. Syndicate Chairman. Figure b. The Egypt Director of veterinary services (left), The Director of the Jordan Veterinary services (middle) and the director of the animal health sector at the Ministry of agriculture (right).

At the beginning of the workshop, Prof .N. Hailat presented a scoping session explaining the idea behind the project and the expected outcome from this meeting. The objectives, the justification and the activities need to be conducted were introduced. Then two papers were

presented by Dr. Hailat showing data regarding the emergence of blue tongue in the Middle East and North Africa. He also discussed the occurrence of the diseases with reference to changes in temperature, rainfall and humidity and how that was related to the emergence of BT in Europe in 2008 and 2009. The pathology and the pathogenesis of the diseases and how it is transmitted was also presented in another paper. The different approaches used for the diseases diagnosis focusing on the pathological and pathognomonic lesions to bring the attention of the trainees were also presented. Scenarios for which samples needed for the diagnoses were addressed. (see the attached two presentations).

Dr. Hailat also showed a video explaining the clinical signs, the pathogenesis and the pathological lesions associated with BT. This video was prepared by APHIS-United State Department of Agriculture. During the discussion on the information in the video questions regarding the different viral strains were discussed and the possible vaccines used in the animal industries in different parts of the world.

Prof. Corrie Brown, Prof. of Pathology at the Department of Pathology, College of Veterinary Medicine at the University of Georgia Athens, Georgia State, USA presented a lecture on Rift Valley Fever, a vector born disease, in the horn of Africa, and the risk assessment approach to control the disease from traveling to the Gulf countries through legal and illegal trade. An interesting point was raised regarding illegal animal movement and trade which contribute significantly in the transmission of animal diseases. In addition, Dr. Brown shown how this diseases in transmitted by vector from animal to animal and to humans and what kind of regional and international cooperation is needed to control the spread of the diseases.

Prof. Brown in the framework of cooperation expressed her interest to join our faculty to spend one year Sabbatical conducted research on Bluetongue, Foot and Mouth Diseases and Pest Petit Ruminants (PPR). An application was put in place for funding from the Fulbright for the year 2013/2014. We extended for her an invitation letter for this purpose. Furthermore, we cooperated in a rabbit disease that is very dangerous for the rabbits and of international importance; namely Rabbit Hemorrhagic Disease (RHD).

In this consultation training workshop, multidisplinary approach was followed. Some presentation on water status and scarcity in Jordan and its relation to insects and disease

vectors were presented. The Director of the Environment Center at JUST presented different scenarios on how the changes in the temperature, rainfall and humidity may affect the living animals and plants in Jordan and the region (Figure 2a). In addition engineers from the Metreological centers of Jordan presented the patterns of temperature, humidity and rainfall in Jordan in the past 40 years (Figure 2b). Furthermore, participants from the Royal Society for the Protection of Nature contributed with the presentation of some early indicators of climate changes and called for research cooperation with university scientists.

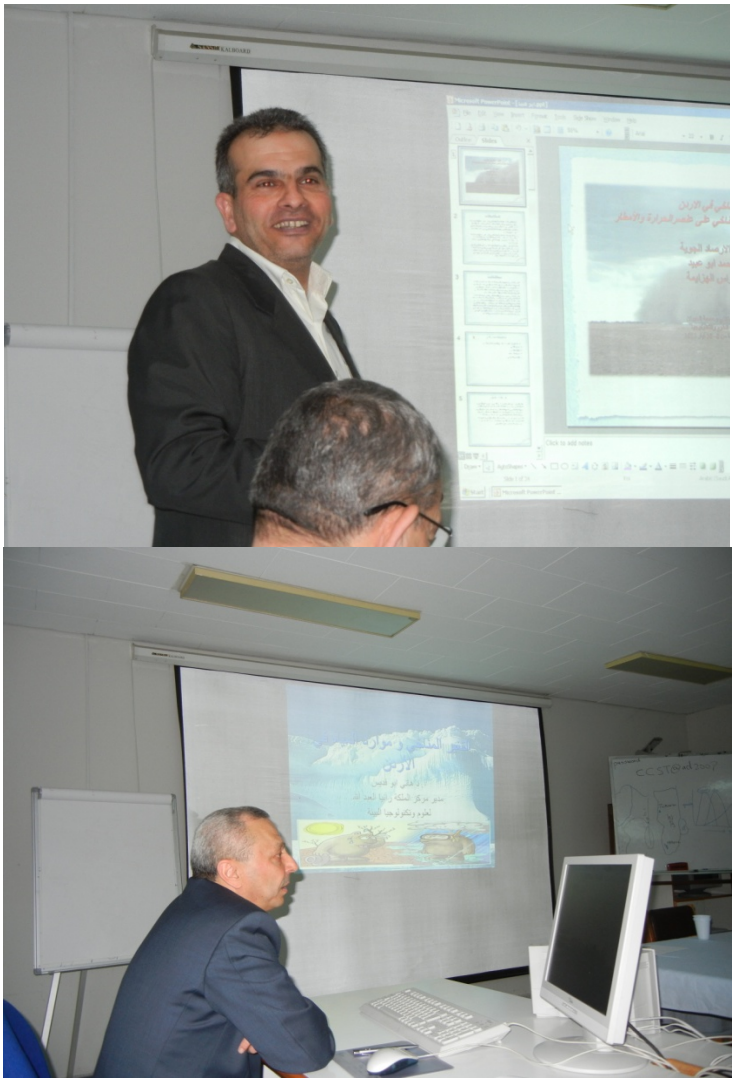
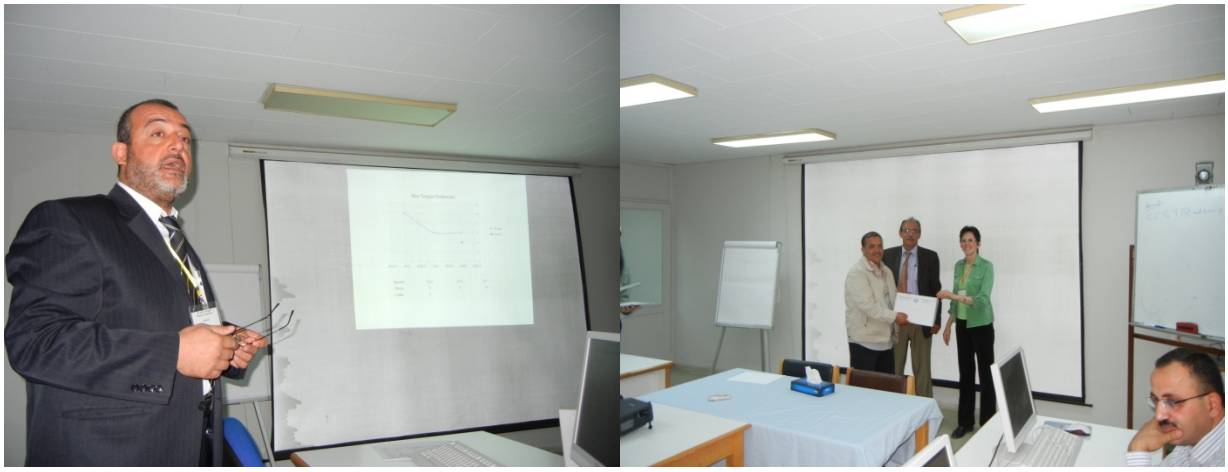


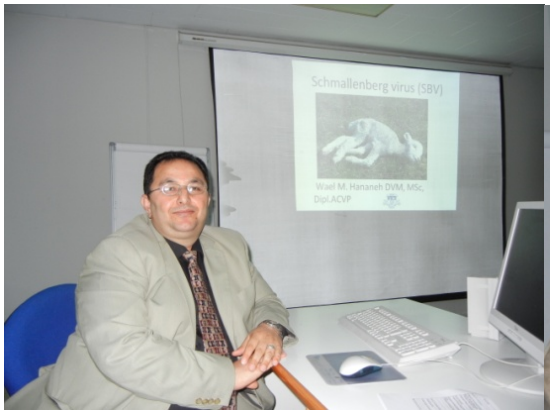
Figure 2 a&b. a. An engineer from the Jordan Metreological Center and b. the Director of Queen Rania Center for Science and Environmental Technology-JUST.

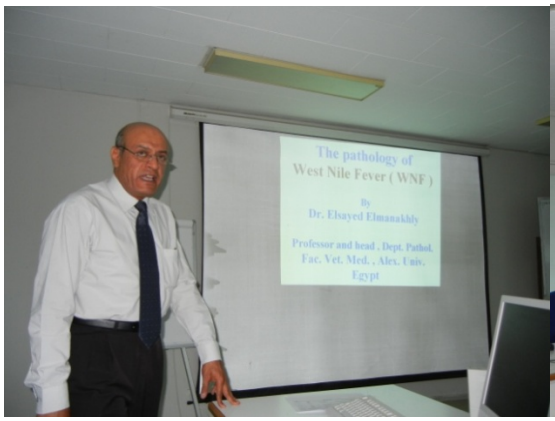
In addition, several lectures from the Palestinian authority and Algeria were presented. The director of the epidemiology unit presented the emergency of the BT diseases in the Palestinain authority (figure 3a). He also indicated to the possible viral serotype-BT-8 which affected the sheep, goat and cattle industry in the West Bank. Another presentation was presented by an Algeria university professor where he reported the occurrence of the BT in Algeria and the neighboring countries (figure 3b).

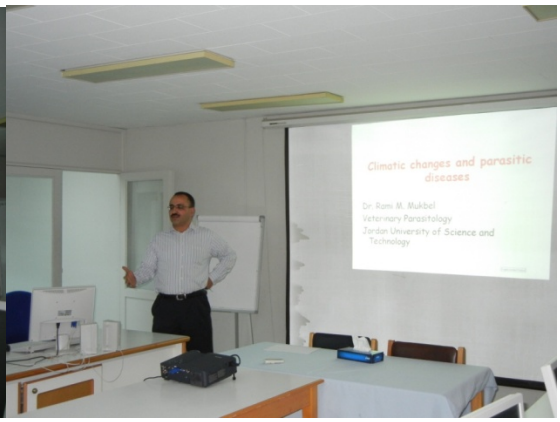


Figures 3 a&b. a left the director of the epidemiology department at the Ministry of Agriculture in the PA and the young professor (right) receiving his certificate is from Algeria.

Several more presentations were discussed. Some are shown below.



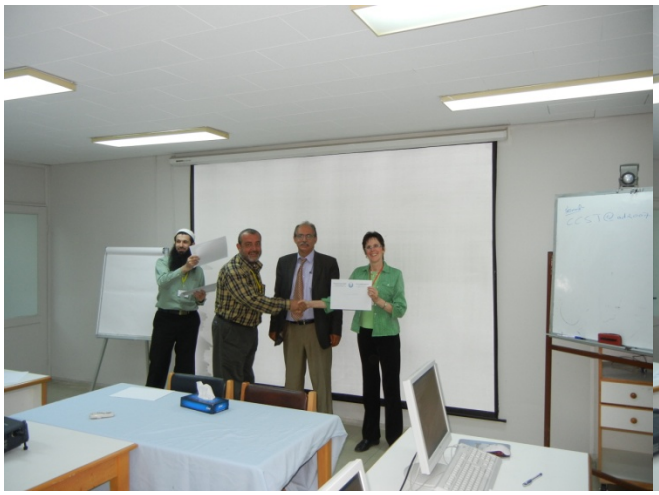
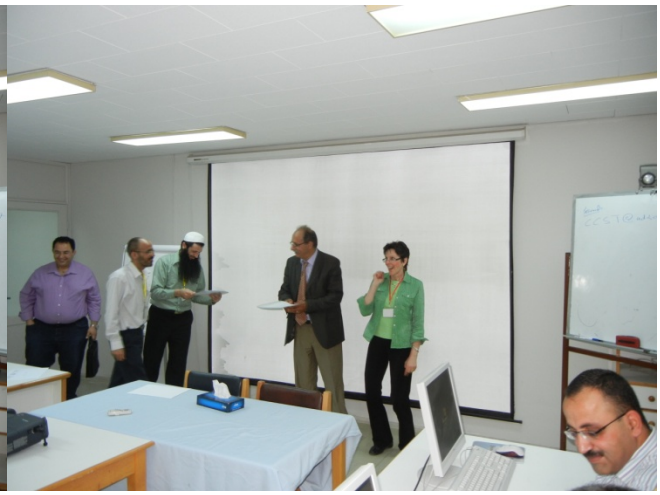




IV. **Certificates:**

The organizer, Prof. Nabil Hailat from the faculty of Veterinary Medicine at JUST and Prof. C. Brown from university of Georgiat handed in the certificates to the participants on Thursday following the completion of the consultation workshop. The certificates were in English and were signed by the organizer and the Director of the Consultation Center for Science and Technology, Prof. Serhan Hadad. They contained the title, date and duration of the workshop with the logo of Jordan and the university. A copy of the certificate is attached with the report.

Some pictures from the ceremony;

V. Recommendations:

1. To expand and enhance the cooperation strategies among the countries in the region in relation to animal health, climates change and international trade.
2. To form a regional body where they can update the countries and the academic institutions with the climate changes affecting animal health.
3. To include the concepts of climate changes, environment and international treaties regarding the environment and animal health in the curricula of the veterinary faculties in the region.
4. To emphasize the participation of animal health scientists in the national and regional committees of monitoring and adaptation mechanisms of climate changes policies.
5. To share the vaccination programs of animal diseases which are of international trade importance such as BT, Rift Valley Fever, African Horse Sickness and so on.
6. To write joint research and developmental proposals for improving animal health policies, climate change and trade.
7. To form personnel data base for those interested on climate change and animal health.