Technical Note

ANIMAL DISEASE MONITRING AND SURVEILLANCE SYSTEM PROPOSED FOR SUDAN (ADMSSS)

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مقدمة:-

تواجه الثروة الحيوانية في السودان عدة تحديات مما أدي إلى تدني كفاءتها والاستفادة القصوى منها كرافد من روافد الاقتصاد القومي. يمكن أن يعزي تدني كفاءة الثروة الحيوانية جزئيا لتفشي أمراض الحيوان في معظم أنحاء القطر. إن مكافحة وإستئصال أمراض الحيوان في السودان تعتبران ذوي أهمية قصوى خاصة أن العالم إتجه لتغيير كثير من اللوائح والقوانين التي تحكم تجارة الحيوانات الحية والمنتجات الحيوانية الأخرى [1] .

يعتبر التطعيم الشامل للحيوانات ضد الأمراض من الطرق التقليدية الممارسة في معظم الأقطار الأفريقية . فقد تم تنفيذ مشروع مكافحة مرض الطاعون البقري [JP-15] ومشروع مكافحة مرض الالتهاب الرئوي البلوري [JP-28] ولكن نجاح هذه المشاريع مشكوك فيه في مناطق كثيرة من المناطق التي شملها التطعيم [2] .

نتيجة لذلك اقترحت طرق أخرى لمكافحة أمراض الحيوان في السودان تعتمد على دراسات وبائية وبحوث حقلية وبرامج تقصي متتابع ومستمر ثم أخيرا اختيار برنامج للمكافحة في مناطق مختارة [3,4].

لقد أنشأت برامج كثيرة لرصد وتقصي أمراض الحيوان على سبيل المثال وفي العام ١٩٨٣ أنشأ البرنامج القومي لرصد صحة الحيوان في الولايات المتحدة الأمريكية وقد أنشأت فروع لهذا البرنامج في كل ولاية[5].

الهدف من كتابة هذه الورقة هو إنشاء برنامج لرصد وتقصي أمراض الحيوان في السودان . هذا البرنامج مؤسس على المرتكزات الوبائية لتصميم وتنفيذ برامج الرصد

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والتقصي [6,7] والاستفادة القصوى من المؤسسات والبيانات الموجودة في السودان والتي تعنى بمكافحة أمراض الحيوان.

INTRODUCTION:

Animal resources in the Sudan face particular challenges, as its efficiency and its economic contribution to the national economy is still below optimum. Inefficiency is largely related to the existence of animal diseases in most parts of the country. Control and eradication of these diseases are of special interest as the world has, in recent years, experienced important changes related to livestock and animal products trade[1].

Conventional methods of mass immunization campaigns had been the choice of most African countries. Multi-national projects were launched against rinderpest [JP –15] and contagious bovine pleuropnemonia [JP –28]. However, the eventual success of such projects was questionable for large parts of the control region [2]. Hence, alternative methods for combating animal diseases in the Sudan, based on epidemiological field research, surveillance and selective actions have been proposed[3,4].

Many disease monitoring/surveillance systems have been established. In the U.S.A., a national animal health monitoring system [NAHMS] was started in 1983. Branches of NAHMS were initiated in different states [5].

The aim of this project is to establish an animal disease monitoring and surveillance system in the Sudan. The system follows the epidemiological criteria for designing surveillance programs [6,7] and better utilization of the available infrastructures.

OBJECTIVES

1- To generate stastistically valid data on animal diseases for use in computing national and regional estimates on prevalence and incidence rates. Emphasis would be on economically important zoonotic diseases.

2- To describe the occurrence of diseases in terms of agent, host and environment.

3- To estimate the economic impact of diseases and the feasibility of control programs.
4- To simulate computer models for animal diseases,
5- To design prevention, control and eradication programs.
6- To monitor and assess the success or otherwise of control programs.

STRUCTURE AND STRATEGIES

ADMSSS is built on three previously established infrastructures operating within the Ministry of Animal Resources and the Ministry of Scientific Research and Technology:1- department of veterinary services. 2- veterinary diagnostic laboratories, and 3- department of meat inspection (slaughterhouses) (Figure 1).

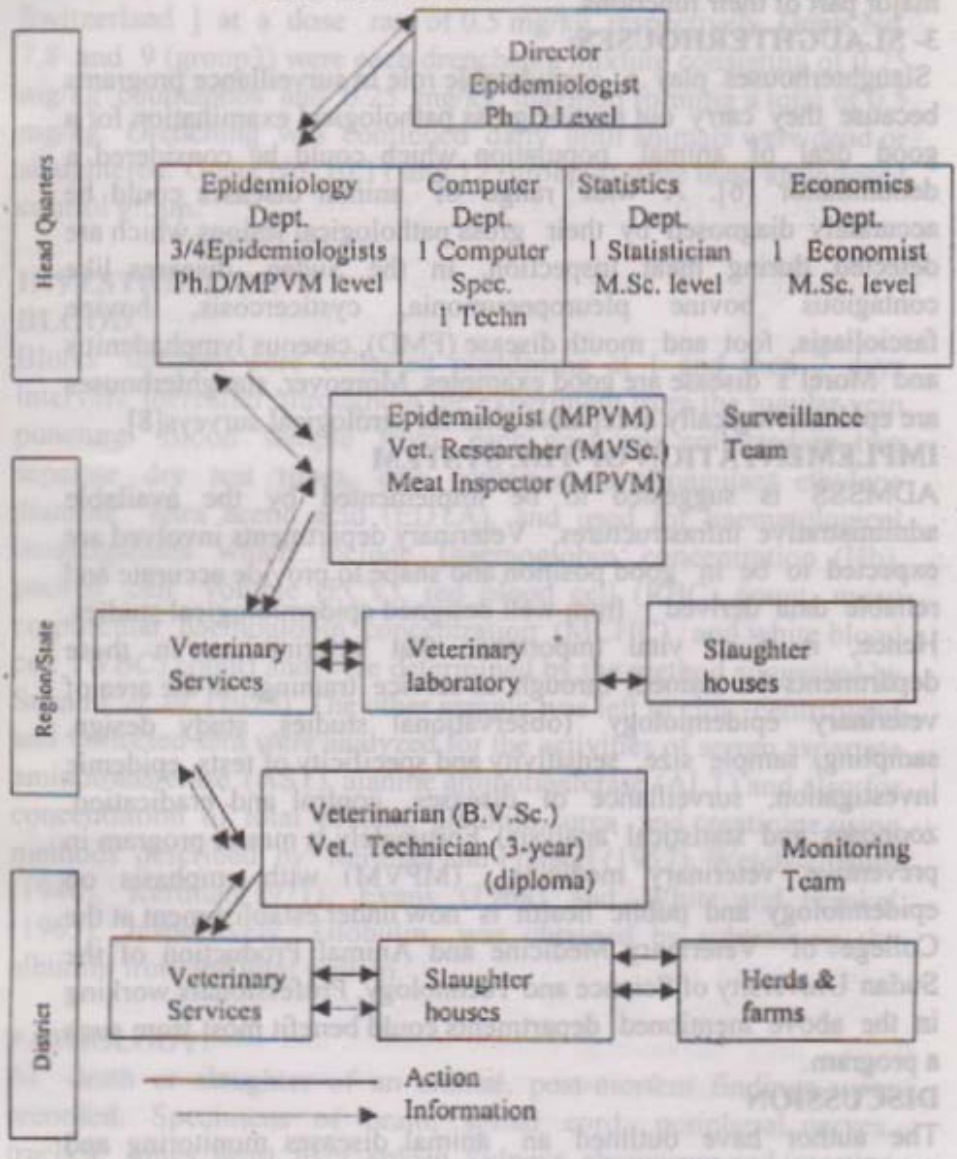
1- VETERINARY SERVICES:

Veterinary services departments are considered the backbone of ADMSSS because they are geographically distributed all around the country and hence facilitate the production of comprehensive epidemiological maps. Veterinarians working in field of veterinary services are expected to carry out detailed recording and reporting which are essential for monitoring and surveillance programs. Also, they are key personnel in implementation of control and eradication plans.

2- VETERINARY DIAGNOSTIC LABORATORIES:

Veterinary labortories play an important role in the surveillance system. This is because they carry out a wide range of functions such as identification and characterization of disease causing agents, serological surveys and vaccine production. Although veterinary laboratories cannot produce a definitive estimate of prevalence or incidence, they can provide a 'broad view' which may guide the surveillance system. To serve this function, laboratories are expected to adopt a well organized recording and reporting system. Therefore,

FIGURE 1: SCHEMATIC DIAGRAM OF ADMSSS



laboratories should consider surveillance of animal diseases as a major part of their functions.

3- SLAUGHTERHOUSES:

Slaughterhouses play a considerable role in surveillance programs because they carry out routine gross pathological examination for a good deal of animal population which could be considered a denominator [6]. A wide range of animal diseases could be accurately diagnosed by their gross pathological lesions which are detected during meat inspection. In the Sudan, diseases like contagious bovine pleuropneumonia, cysticercosis, bovine fascioliasis, foot and mouth disease (FMD), caseous lymphadenitis and Morel's disease are good examples. Moreover, slaughterhouses are epidemiologically acceptable sites for serological surveys[8].

IMPLEMENTATION OF THE SYSTEM

ADMSSS is suggested to be implemented by the available administrative infrastructures. Veterinary departments involved are expected to be in good position and shape to provide accurate and reliable data derived from well designed epidemiological studies. Hence, it is of vital importance that veterinarians in these departments be trained, through in-service training, in the area of veterinary epidemiology (observational studies, study design, sampling, sample size, sensitivity and specificity of tests, epidemic investigation, surveillance of diseases, control and eradication, zoonoses and statistical analysis). Fortunately, a master program in preventive veterinary medicine (MPVM) with emphasis on epidemiology and public health is now under establishment at the College of Veterinary Medicine and Animal Production of the Sudan University of Science and Technology. Professionals working in the above mentioned departments could benefit most from such a program.

DISCUSSION

The author have outlined an animal diseases monitoring and surveillance system that would provide accurate and valid data on diseases in Sudan. The advantages of this system is that it is relatively cheap and formal because it relies on existing

administrative infrastructures, and effective because the data will be collected from reliable sources using accurate epidemiological methods and will be analyzed using appropriate statistical techniques.

For a surveillance system to be effective the numerator (diseased animals) and the denominator (defined animal population at risk of the disease) should be appropriately characterized [6]. In the proposed monitoring and surveillance system cases of disease will be either clinically diagnosed by qualified veterinarians in the field or pathologically detected in slaughterhouses. Whenever possible, diagnosis will be confirmed by laboratory examination. Also, sera from serological surveys will be examined by professional in veterinary diagnostic laboratories. All these sources have been considered appropriate and reliable sources of data about the numerator and the denominator [8,9].

A surveillance system should provide information about agent-host-environment complex [6]. The proposed system would provide sufficient data about biological factors of diseases. Agent whether a virus, bacteria or parasite etc. will be identified and characterized using available facilities in diagnostic laboratories. Information concerning host e.g. type of animal, breed, age, sex, immunity and health condition will be identified and recorded by members of monitoring and/or surveillance team.

Environmental factors such as climate condition, vegetation, presence of vectors, type of management and professional activities will also be identified and recorded . Data concerning biological factors will be considered for confounding and interactions and then analyzed using appropriate statistical techniques [9].

There is a lack of information concerning economic impact of diseases and feasibility of control programs in the Sudan. However, a benefit-cost analysis study of control program for contagious bovine pleuropnemonia in Southern Sudan showed that control program centered on surveillance and selective action was economically preferable to mass vaccination or no action [4]. Therefore, it is necessary to carry out benefit-cost analysis studies in order to estimate the economic impact of diseases and determine the

feasibility of control programs before deciding which program to launch.

One of the recent advances in area of epidemiology is epidemiological models. Efforts to investigate and understand epidemiology of animal diseases and improve control and eradication programs through computer simulation have been carried out and reported [10] . However, sufficient biological information should be available prior to construction of the model. This information could be furnished only through monitoring and surveillance systems.

The choice of a control and /or eradication program depends upon many situations such as the economic and public health impact of the disease, epidemiology of disease, and cost of program. For example, epidemics of rinderpest is easy to control compared to endemic rinderpest which is difficult to eradicate [11]. Therefore, it is necessary to collect sufficient epidemicological data about animal diseases in order to decide which program (vaccination, movement restriction or test-and- slaughter) is efficient and feasible for combating the disease.

Serological surveys, detection of diseases in slaughterhouses, diagnosis of cases in the field or veterinary clinics, and notification are efficient tools for assessment of control programs. To monitor the efficiency of a vaccination campaign a test which detects either short or long term antibodies can be used [11]. Sensitivity and specificity of the test should be carefully evaluated to avoid reporting false results [9]. Moreover, cases of diseases detected in slaughterhouses should be confirmed by laboratory tests whenever possible.

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