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الجمهورية اللبنانية
مكتب وزير الدولة لشؤون التنمية الإدارية
مركز مشاريع ودراسات القطاع العام

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Advisory Committee,
Beirut 11-14 June 1971)

MEETING

OF THE EXPERT GROUP ON

VACCINE PRODUCTION, STORAGE AND DISTRIBUTION

IN THE NEAR EAST

B E I R U T - L E B A N O N

1 - 2 APRIL, 1971

PROCEEDINGS AND RECOMMENDATIONS

C O N T E N T S

A G E N D A

1. Election of Chairman

2. Adoption of Agenda

3. Desirability and possibilities for producing laboratories in the region to increase production of certain vaccines* in case of national or regional emergency and to undertake production of new ones.

4. Desirability for so far non producing countries in the region to initiate vaccine production and possible establishment of a machinery to overcome foreign exchange difficulties experienced by certain vaccine importing countries.

5. Improvement of vaccine production, testing, storage and distribution of vaccines as far as their despatch in producing laboratories and their handling in the field are concerned.

6. Establishment of banks for certain reference strains of pathogens and vaccinal strains for normal and emergency use.

7. Any other business.

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* The vaccines to receive priority in the meeting will include those produced against Rinderpest, Foot and Mouth Disease, Newcastle Disease, African Horse Sickness, Contagious Bovine Pleuropneumonia, Blue Tongue and Sheep and Goat Pox.

LIST OF PARTICIPANTS

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IRAN	Dr. H. Ramyar	Head of Virus Department, Razi Institute.
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IRAQ	Dr. Najeeb Y. Al-Rawi	Director-General of Veterinary Services, Baghdad.
	Dr. Sadoon Dulaimi	Technical Adviser.
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JORDAN	Dr. H. Huseibeh	Co-Manager, JOR/15 Project
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LEBANON	Dr. J. Haraoui	Director-General of Agricultural Research Institute, Beirut
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	Dr. E. Rizkallah	Director of Veterinary Services
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LIST OF PARTICIPANTS
(continued)

Country	Name	Title
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	Dr. R.S. Roberts	Project Manager, TUR/42 Project.
U.A.R.	Dr. M.S. El Sabban	Director-General of Veterinary Research and Co-Manager, UAR/67 Project.
	Dr. Y. Ozawa	Project Manager, UAR/67 Project.

OBSERVERS

SYRIA	Dr. M. Baghdadi	Director, Veterinary Research Laboratories, Damascus
UNDP SECRETARIAT	Sir Robert Jackson	Consultant
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SUMMARY OF PROCEEDINGS

INTRODUCTION

The second meeting of the Near East Animal Health Institutes' Advisory Committee which took place in Rome at FAO Headquarters from 4 - 6 November 1970 recommended (recommendation No.5c) that UNDP/FAO appoint a regional technical committee to review the problems involved in vaccine production, storage and distribution in the Near East, and advise on the necessary action to be taken to maintain sufficient stocks of vaccine to meet normal and emergency requirements and vaccine seed material needed for reference purposes. The recommendations of the meeting of this technical committee were to be considered at the third meeting of the NEAHI Advisory Committee scheduled in June 1971.

The meeting was subsequently arranged in Beirut on 1 - 2 April, and it was decided that the Directors of vaccine producing institutes and the NEAHI project managers should participate.

Dr. J. Haraoui, the Director General of the Agricultural Research Institute, Lebanon, welcomed the participants on behalf of the Minister of Agriculture and pointed out in his opening address the importance for the region to become self-sufficient in vaccine production for an efficient control of animal diseases and the prevention of their dissemination from one country to the other.

The meeting then proceeded to the election of the Chairman. Dr. A.W. Stableforth, UNDP Consultant, was proposed by Dr. Rizk, Director of the Fanar Laboratory, Lebanon and his nomination supported by Dr. H. Ramyar, Head of Virus Department, Razi Institute, Iran. Dr. Stableforth was then unanimously elected as the Chairman of this technical meeting.

The draft agenda was subsequently approved by the meeting but it was soon recognized that it would be more practical to discuss the problems of vaccine production, storage and distribution under each separate vaccine heading. It was therefore agreed that the following vaccines intended to control diseases of major economic significance to the region would be discussed one after the other:

I. Virus Diseases : Foot-and-Mouth Disease, Rinderpest, Newcastle Disease, Infectious Bronchitis, African Horsesickness, Blue Tongue, Sheep Pox, Goat Pox, and Rabies.

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II. Bacterial Diseases : Contagious Bovine Pleuropneumonia, Contagious Caprine Pleuropneumonia, Anthrax, Anaerobic Diseases and Fowl Cholera.

Amongst the above conditions, virus diseases are far more important for the region as a whole than bacterial ones with the exception of Contagious Caprine Pleuropneumonia and as such they received major consideration from the meeting.

The problems connected with the storage and distribution of vaccines in general were then taken up and a certain number of recommendations made in this connection. These discussions included the conditions of storage of vaccinal or challenge strains of pathogens in the countries of the region.

The financial procedure to be developed for facilitating the intraregional trade of vaccines between countries in the region was then the object of further discussions and it was recommended that this matter be further referred to the third meeting of the NEAHI Advisory Committee together with additional data from the countries concerned concerning financial implications.

In view of the considerable deterioration of the rinderpest situation in the Near East region during the last two years, the meeting agreed that a concerted regional rinderpest eradication campaign would be highly desirable. The FAO virologist specialized in rinderpest and presently assigned to the Lebanese project LEB/15 was requested to prepare a draft outline of such a campaign for consideration by the second meeting of the FAO Commission on Animal Production and Health in the Near East and the third meeting of the NEAHI Advisory Committee to be held in Nicosia and Beirut respectively in June 1971.

Appendix I, attached to the present report, includes all the data supplied by the directors of vaccine producing laboratories in the region as to the nature, type and approximate quantity of vaccine produced and sometimes exported to other countries in the region. Amongst the data listed, the sale price per dose of each type of vaccine was included by some of these laboratories represented at this meeting.

I. VIRUS DISEASES

(1) Foot-and-Mouth Disease

The meeting appreciated that too often the veterinary departments of the region imported FMD vaccines and use them

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to control outbreaks before an adequate typing was carried out. This may result in wastage of material and money as the cross-protection existing between vaccines of different types is virtually negligible and that between subtypes is often limited. This is why it was recommended that the vaccine producing institutes in the region issued vaccine for local use or export to other countries after adequate typing has been carried out.

However, it was appreciated that, amongst the three regional FMD vaccine producing institutes, i.e. the Razi Institute, Teheran, Iran; the Ankara Institute, Turkey, and the Abbassia Laboratory, Cairo, UAR, none of them was yet in a position to accept for diagnosis and typing suspected samples originating from other countries. This is due to the lack so far of the necessary isolation facilities to prevent a possible escape of virus from these institutes.

The Head of the Virus Department, Razi Institute, stated that his Institute would be in a position towards the end of 1971, to accept samples for typing from other countries in the region, and to produce, if necessary, vaccines of exotic types, as the necessary isolation facilities presently under construction are expected to be completed by that time.

The possible justification of the extension of FMD vaccination to sheep and goats was then discussed by the meeting. Although it was admitted that the disease may be severe in these species of animals, sometimes causing significant losses in lambs and kids, it was considered impracticable to recommend the systematic application of FMD vaccination to sheep and goats. The only exception which could be envisaged would be the vaccination of such animal species in limited areas where valuable cattle are kept.

Generally speaking, FMD was regarded in the region as a very serious disease not so much because of the mortalities caused, but mainly because of loss of milk and meat production and its interference with agricultural practices ad draught cattle when infected become unavailable to carry out the necessary cultivation work. The problem is made even more acute in the region because of nomadism or transhumance across borders, particularly in the absence of efficient quarantines. The importance of prophylactic measures other than vaccination and the establishment or strengthening of quarantines were on this occasion duly emphasized.

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It was also recommended that pending the availability of typing services in the region, suspected samples should systematically be sent by the countries concerned to the World Reference Laboratory, Pirbright, U.K. Even after typing facilities have become available in the region, it will still be desirable to send duplicate samples to the Pirbright Institute for confirmation and provision of an accurate picture of the disease on a world wide basis. The meeting regretted that the number of suspected samples sent to Pirbright for identification was still very small and recommended that in order to have an accurate picture of the incidence of the various types and subtypes in the region and be in a position to control outbreaks with adequate types of vaccines, more samples should be sent to the World Reference Centre.

(2) Rinderpest

In view of the deterioration of the position of this disease in the region, rinderpest vaccine production, storage, distribution and utilization in the field has assume considerable importance during the last two years.

At present three institutes produce rinderpest vaccine in the region, namely the Abbassia Institute, Cairo, UAR; the Razi Institute, Iran, and the Ankara Institute, Turkey.

The meeting recalled that international requirements for the production and testing of rinderpest cell culture vaccine (live) were published in the 22nd report of the W.H.O. Expert Committee on Biological Standardization in 1970. Consequently, the antigenic titre of the final product issued to the field by the institutes should at least be equivalent or higher than that of the minimum international requirements and any batch, of which the titre is lower, should be systematically discarded.

It was also appreciated by the meeting that no rinderpest reference laboratories have so far been designated by the International Organizations concerned and consequently no international standards for rinderpest vaccines or antisera have yet been established. Nevertheless the international requirements of production established by the above W.H.O. Expert Committee are considered for the time being sufficient to ensure the safety and potency of rinderpest vaccine to be produced by all laboratories in the world.

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The problem of vaccine dispensing not only in 200 doses but also 100 and 50 doses was then fully discussed. The meeting appreciated that in view of the fact that in many countries of the region, only small numbers of cattle were available for vaccination within the two hours following the reconstitution of the vaccine, it would be highly desirable that the vaccine be dispensed in the future not only in 200 doses but also in 100 and 50 dose containers. It was recognized that the dispensing in smaller containers would involve additional cost of production as at least 2 out of the three producing laboratories in the region prefer importing relatively expensive neutral glass containers. Also larger refrigeration capacity is required for keeping a larger number of smaller containers. However, these disadvantages are largely offset by the advantage consisting of using up the vaccine once reconstituted in a relatively short time, thus keeping its immunizing value as high as possible and consequently ensuring a greater efficiency of the vaccination.

The meeting took note of the fact that the use of saline instead of distilled water as reconstituting medium was strongly recommended by Dr. Plowright, the virologist who developed the rinderpest cell culture vaccine, on the occasion of the NEAHI regional training course on rinderpest in Cairo which he attended as a guest lecturer in December 1970. This recommendation was based on his extensive experimental work presently under publication, carried out in his Kenya laboratories and supported by statistical analysis of the results obtained.

Although the Razi Institute found some contradicting evidence of the respective values of saline and distilled water, the meeting agreed that the use of saline was to be recommended for reconstitution of rinderpest vaccine in the region before its use in the field.

As countries in the region which do not produce rinderpest vaccine may require to import it in large quantities at short notice for the prevention or control of the disease, the meeting recommended that a minimum stock of 2,000,000 doses of such vaccine be held at all times by each of the three producing institutes in the region. For obvious economic reasons, it was also recommended that this stock be systematically used up on a rotation system by the producing countries in their national vaccination campaigns before the expiry date of the vaccine if the latter were not required by other countries in the region. These stocks could then be replenished in useful time with a more recently produced vaccine.

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The yearly maximum requirements of the region in rinderpest vaccine can be presently estimated as follows : -

AFGHANISTAN	2/3,000,000	doses
CYPRUS	Nil	
IRAN	6,000,000	"
IRAQ	3,000,000	"
JORDAN	50/100,000	"
KUWAIT	10,000	"
LEBANON	250,000	"
SYRIA	650,000	"
TURKEY	15,000,000	"
U.A.E.	5,000,000	"
YEMEN, BAHREIN, S.ARABIA and other countries of the Arabian Peninsula	2/300,000	"

The meeting advised that in view of the reinvasion of virtually the whole region by the disease, the vaccination of cattle and buffaloes was to be carried out on a systematic basis for 3 consecutive years. However, it was recognized that national vaccination campaigns would be insufficient to obtain a complete eradication of the disease from the region as the reinvasion of the countries from bordering ones would remain unavoidable. This is why it was recommended that a regional campaign be implemented with the assistance of CUB through the appointment of a regional coordinator.

The FAO rinderpest virologist, specialized in rinderpest and presently assigned to LEB/15 project was therefore requested to prepare in consultation with the two CUB's epizootiologists a draft outline of a regional eradication campaign which could

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be considered by the second meeting of the FAO Regional Commission on Animal Production and Health scheduled in Cyprus in June 1971 and by the third meeting of the NEAHI Advisory Committee which is expected to take place the following days in Beirut.

It was further recognized that the confirmation of diagnosis of the infection was equally important as the latter should always be differentiated in laboratories from rinderpest-like diseases. It was also recommended that in support of the proposed vaccination campaign, serological surveys be carried out in order to appraise the level of immunity obtained in the animals following their vaccination.

For the purpose of carrying out the proposed surveys, it was agreed by the meeting that regional reference laboratories could not cope with the requirements on a routine basis and it was consequently recommended that facilities be made available by the governments concerned to existing national laboratories to enable them to carry out such surveys.

(3) Newcastle Disease

The directors of producing laboratories briefly described the techniques used in their respective countries to produce and test different types of Newcastle Disease vaccine. More detailed information is included in Appendix I of this report.

It was recommended by the meeting that for safety reasons live avianized vaccine prepared from different attenuated strains of Newcastle Disease virus should as far as possible be produced on SPF particularly PPLO free eggs. So far because such eggs could not be produced locally the laboratories producing Newcastle Disease vaccine in the region had to import them at a very high cost from Europe. Because of the prohibitive cost involved, some countries in the region like Lebanon have decided to establish SPF flocks so that local production is expected to become available in the near future. Others like UAR are envisaging to start this production. However, some laboratories such as Fanar and the Razi Institute are already producing their Newcastle Disease vaccine on imported SPF eggs whereas other laboratories in the region preferred, because of their high cost, to develop poultry farms of their own, attached to their laboratories with reasonable isolation facilities for the supply of eggs required for vaccine production.

The meeting however advised that for the protection of breeding and egg laying flocks, it is highly desirable that the vaccine be prepared from SPF eggs whereas for the protection

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of broilers the adoption of this practice which is still recommended may be differed until facilities for the local production of such eggs become available.

Because of the higher cost of production of vaccines prepared from SPF eggs the meeting recommended that the nature of the material (SPF eggs) used for this production be clearly spelled out on the labels of the containers. A brief review was then made by the meeting on the use of different live attenuated strains of Newcastle virus in the respective countries. It was noted that apart from the classical vaccinal strains such as B1, F, K, Roakin, La Sota etc., the Iraq Veterinary Laboratory in Abu Ghraib had developed in 1968 an attenuated local strain and vaccine is now being produced there on an experimental basis. According to the Iraqi delegation attending the meeting, the newly developed vaccine would be highly successful in protecting local poultry from the disease and it is envisaged to extend its production as soon as better facilities have become available. Most of the laboratories in the region producing Newcastle Disease vaccine can increase this production considerably if requested by other countries to supply them.

The delegation from Jordan stated that their country hoped to be in a position to produce this vaccine as of 1972 as the troubles experienced there last September prevented the Amman laboratory from starting this production. The present yearly requirements of Jordan amount to 2,000,000 doses K strain and 10,000,000 doses F strain. As far as Kuwait is concerned 7,000,000 doses of B1 and La Sota vaccines are imported every year by the local veterinary department from outside the region for free distribution to the farmers whereas a certain amount of K strain vaccine is imported from Lebanon to protect egg-laying flocks. Efforts to develop a tissue culture vaccine are being made in various laboratories in the region including Lebanon, Syria, etc..

(4) Infectious Bronchitis

The meeting emphasized the danger involved for non-infected countries in importing live vaccine for preventive use and recommended that because the latter particularly the "hot" strains may introduce or spread the infection, the use of live vaccines be restricted to countries where the disease has been identified.

Even in infected countries the use of the "hot" vaccinal strains should be prohibited and only mild attenuated strains should be locally prepared or imported into such countries in

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in order to control the disease. The delegation from Lebanon emphasized the need to differentiate Infectious Bronchitis from other respiratory diseases, particularly CRD before the use of a mild live vaccine can be considered. In sporadically infected countries such as Jordan, only egg-laying and breeding flocks are being vaccinated with mild strains.

(5) African Horsesickness

This infection has apparently disappeared from the region since 1961 approximately. Consequently most of the laboratories in the region stopped producing the relevant vaccine, but some of them carry on producing it on a very small scale. The vaccine produced until recently was prepared from mouse brain and is still used in some countries to protect valuable horses only. A tissue culture vaccine developed at the Razi Institute a few years ago is now the only one being prepared in this Institute in limited quantities whereas in UAR this type of vaccine is being prepared for future possible use. The meeting however recognized that during the past decades African Horsesickness has been known in the region to reoccur at more or less cyclical intervals. This is why the meeting recommended that a minimum of half a million doses be stored in each of the two vaccine producing institutes, i.e. the Razi Institute Iran, and the Abbassia Laboratory Cairo, UAR, so that it would be ready for emergency use if necessary in the whole region. The vaccine thus recommended to be stored is of the tissue culture polyvalent type until such time as the typing of the strain responsible for possible local outbreaks can be done. After the typing has been done, it may well be that a monovalent vaccine would be sufficient to control the outbreak under consideration. The estimation of the quantity of vaccine recommended to be stored was based on the fact that the minimum shelf life of the product at deep-freeze temperature ($-20^{\circ}C$) was considered to be 6-7 years long.

(6) Bluetongue

The meeting was informed by the UAR delegate that this infection was only prevalent in imported sheep such as those of merino breed whereas no sign of it can be observed in local breeds. In UAR four classical strains of the virus had been identified when strain No.16, the same as in Pakistan was isolated more recently. Experimental work on the adaptation

and attenuation on tissue culture of the 16 strains presently responsible for outbreaks all over the world is continuing in the Abbassia Laboratory and the development of a polyvalent vaccine incorporating the above 16 strains is on its way. A serological survey involving not only sheep but also cattle, buffaloes, goats and camels is being carried out in UAR to appraise the incidence and the epizootiology of the disease in this country. The UAR representative stated that the Abbassia Laboratory will be ready to consider accepting samples for identification from the other countries of the region. One of the strains isolated in UAR was also identified in Cyprus where the disease occurs on a seasonal basis in imported sheep.

As in the case of African Horsesickness, it is obvious that the use of a polyvalent vaccine will only be required at the onset of an outbreak before the latter has been typed. When this is done, the use of a monovalent vaccine only could again be considered. It was recalled by the delegation from UAR that no virus carrier exists in Bluetongue so that the presence of neutralizing antibodies in suspected sera would be the evidence that the animals concerned were previously exposed to infection.

(7) Sheep and Goat Pox

These two diseases are prevalent in most countries of the region and the classical inactivated vaccine produced from infected tissue according to the Borrel technique is still being prepared in countries like Afghanistan, Syria, Turkey, etc...

In the Razi Institute, Iran, sheep pox vaccine has been prepared on a large scale in tissue culture (lamb kidney cells) since 1965 and 22,000,000 doses approximately were produced in 1970 using a strain originating from Yugoslavia. Tissue culture vaccine is also produced against goat pox at the same Institute and 11,000,000 doses were produced in the same year.

In Lebanon, until 1968, the Roumanian strain was used for the preparation of vaccine according to the Borrel method. However, since then, vaccine is being prepared on tissue culture (sheep testis cells) only, using the Roumanian strain. Although in 1970 over 400,000 doses only were produced, the capacity of production could reach in the future 10-12 million doses if necessary. The same techniques of production applied to goat pox vaccine are still under an experimental stage.

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In the Pendik laboratory, Turkey, a tissue culture vaccine using calf kidney cells has also been developed and the immunity conferred was found excellent after over eight months. Experiments for testing the protective value of this vaccine for a further period are still continuing. The only adverse reaction observed following the experimental use of the vaccine is a slight temperature in 20 or 30% of the vaccinated animals but no necrosis was present at the site of inoculation. In Iraq, an attenuated strain adapted to tissue culture was recently imported from the Pendik laboratory but the vaccine produced at Abu Ghraib with this method is still at an experimental stage. One of the problems with which producing laboratories are confronted is the finding of fully susceptible sheep to test the potency of the tissue culture vaccine. One of the solutions recommended by the meeting to overcome this problem was to raise susceptible animals in a farm attached to the producing laboratories and provided with adequate isolation facilities. Contrary to the short term immunity conferred by the Borrel type vaccine which is of the order of 4 to 6 months, the tissue culture vaccine proved ah the Razi Institute to confer a 2 years long immunity in 89% of vaccinated animals. In UAR, tissue culture vaccine is going to replace in the near future the Borrel type and the present production which is still in an experimental stage will be soon increased. In Jordan, where this vaccine is not produced, the requirements of the country are approximately 60,000 doses of each sheep pox and goat pox.

It was also noted that Lebanon exported 220,000 doses of sheep pox and 20,000 doses of goat pox to Saudi Arabia last year whereas Kuwait and Libya imported during the same period 100,000 doses and half a million doses from UAR respectively.

(8) Rabies

The meeting noted that although rabies occurs sporadically in most countries of the region, the production or importation of rabies vaccine to protect animals, particularly dogs and cats had never presented any major problem.

Some laboratories such as those of Iraq and UAR produce rabies vaccine for dogs and cats. In the Abu Ghraib laboratory, Iraq, a Semple type vaccine is being prepared whereas in UAR, the vaccine produced is of the avianized type using the Flury strain. Whenever countries in the region are not self-sufficient in this respect they import vaccine from abroad. The usual quantity imported is for each country of the order of a few thousand doses every year.

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Administration of Poultry Virus Vaccines in the Field

Noting the widespread use of drinking water for the administration of Newcastle Disease and other poultry vaccines, the meeting advised against the possible use of tap water containing chlorine or any other water containing salts or chemicals which can inactivate live vaccines before their absorption. In order to prevent the likely destruction of live vaccines through this source, the addition to the water of suitable preservatives such as skimmed milk powder, etc.. should be recommended to prevent the inactivation of the vaccine.

II. BACTERIAL DISEASES

(9) Contagious Bovine Pleuropneumonia

The meeting noted that with the exception of the Sudan where it is considered widespread and of UAR where a limited focus of infection was identified in one province (Tahrir) approximately two years ago, the disease does not occur in the rest of the region.

In UAR, following preliminary investigations of the above outbreak, the policy adopted for eradicating the disease was that of testing and slaughter of reactors. No vaccination has therefore or will ever be carried out and consequently no vaccine production has ever been envisaged.

The meeting however recognized that the Sudan which hosted during its first phase the NEAHI unit concerned with CBPP diagnosis and vaccine production could still play an important part in the above activities and keeping in mind the potential danger of this infection to the rest of the region, it expressed the wish that the Sudan be one way or another associated again with the present and possible follow-up activities of the NEAHI Coordinating Unit in accordance with the wishes expressed by the participants in the second meeting of the NEAHI Advisory Committee in Rome last November. In order to promote the re-establishment of the former association and the cooperation of the Khartoum laboratory, particularly of its CBPP section, the meeting recommended that an observer from the Sudan be invited to attend, at the Coordinating Unit's expenses, the third meeting of the NEAHI Advisory Committee.

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(10) Contagious Caprine Pleuropneumonia

The representative from Kuwait stated that this infection was a real problem in this country and it was not unusual to observe a 20-30% mortality in infected goat herds.

In Turkey, where this infection is also of great economic significance, an inactivated vaccine (formalin treated) is being produced on a routine basis, but its efficiency and the length of immunity conferred leaves still much to be desired. Experiments have been going on for some time in Pendik for the development of a live attenuated vaccine but more tests are needed before this or other types of vaccine can be produced and utilized on a large scale in the field.

The meeting noted that in Central and Western Africa, some laboratories such as Farcha near Fort Lamy, Chad and Dakar, Senegal have been engaged for several years in the development of a vaccine to control this infection and these laboratories would most probably be in a position to supply both vaccines and antigens in connection with this infection. However the meeting recommended that further research be carried out in the region itself to enable it to become self-sufficient in this respect and that, in view of the importance of this infection to the region as a whole, UNDP further support this research if assistance were requested to this effect by the governments.

(11) Anaerobic Diseases

Generally speaking, the meeting recognized that although this group of diseases may be of importance to some countries in the region, they were by far of lower significance than those caused by viruses. This is the reason why, as can be seen from Appendix I, a certain number of laboratories producing vaccines against viral diseases do not produce any against anaerobic diseases. Those countries which do not produce import them from outside the region. This is the case in particular of Iraq, Jordan, Lebanon and others. As a result there was virtually, as far as one could assess, no intra-regional trade of such vaccines at present nor any of any significance to anticipate in the future.

(12) Anthrax

The majority of the vaccine producing laboratories in the region prepare anthrax vaccine for local consumption in the respective countries and are therefore self-sufficient in this respect. The same type of vaccine is being produced

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by all of them, i.e. a spore suspension of virulent (B.anthracis) prepared according to the stern method. However, some countries like Kuwait import some 150,000 doses of vaccine from outside the region and Jordan imports from Lebanon some 400-500,000 doses every year.

(13) Fowl Cholera

This infection is a problem to only a few countries in the region such as UAR but is in any case of a much lower importance as a poultry disease than any other disease of virus origin.

The vaccine made of inactivated Pasteurellae or Roberts Type I provides a relatively low level of immunity and of short duration and its efficiency is known to depend on the density in bacterial cells included in each single dose.

III. STORAGE OF VACCINES AND VACCINAL STRAINS

The CUB's laboratory instrument specialist introduced the subject to the meeting and emphasized the essential necessity for producing laboratories to keep vaccinal strains banks in deep freezers and to ensure for their preservation at a constant temperature a regular electricity supply by the provision of stand-by generators.

In the great majority of countries in the region, the electric power is liable to frequent failures and this accounts for a great proportion of breakdowns in electrically operated instruments, particularly those used for refrigeration. This equally applies to the storage of vaccine in the laboratories before issue to the field. This is why the use of duplicated prefabricated cold-storage rooms was highly recommended by the CUB's instrument specialist as the only reliable method of keeping the potency value of vaccines.

The meeting recognized the full importance of the provision by the governments concerned of qualified engineers or laboratory instrument technicians on a full time basis to vaccine producing laboratories. This unfortuantely did not receive in the past sufficient attention on the part of certain governments. The meeting therefore recommended that

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in laboratories where such personnel are not available yet, the governments concerned appoint them as soon as possible so that they can be trained by the CUB's instrument specialists both on the job in their respective countries and on the occasion of regional training courses to be arranged by the NEAHI Coordinating Unit.

The advantages and disadvantages of the use of large size shelf freeze-dryers versus that of smaller freeze-drying units were then described by the CUB's instrument specialist. The meeting agreed that wherever possible and whenever the scale of vaccine production justifies it, preference be given to large size freeze-dryers using vials instead of ampoules so as to avoid several manipulations such as neck constricting, secondary drying, final flame sealing, all of which introduce additional contamination hazards and the risk of overheating the final product. The large size freeze-dryer can conveniently be installed in partition wall so that all machinery can be located on one side of the walls allowing a much better sterility standard in the shelf loading areas on the other side.

The meeting also recommended the use of neutral glass for vaccine containers to comply with general technical specification set up by the CUB's instrument specialist as the keeping qualities of vaccine depend to a great extent on the quality of the glass containers.

The meeting also strongly emphasized the systematic use of recording devices in cold-storage rooms where vaccines are being kept. This will enable the producing laboratories to discard vaccine batches which would have undergone a drastic change of temperature due to some electrical or mechanical failure of cold storage rooms.

IV. FIELD UTILIZATION OF VACCINES

The meeting appreciated that the live vaccines which, following the necessary tests, were recognized safe and potent by the producing laboratories before issue to the field can lose their immunizing value following an improper handling in the field before their inoculation into the animal and that it was not unusual to see that vaccines are stored in the field under adverse conditions of temperature, in faulty refrigerators or even outside refrigerators.

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In order to prevent the mishandling or misuse of vaccines, the meeting therefore recommended that all vaccines should be properly labelled and that the name of the producing laboratory, nature of vaccine, batch number, date of manufacture, storage requirements, method of reconstitution, etc.. be clearly spelled out on the label with indelible ink.

V. BANKS OF VACCINAL AND CHALLENGE STRAINS

The meeting expressed its concern over the possible loss in laboratories of vaccinal or challenge strains of pathogens due to some unexpected circumstances such as fire, earthquakes, war, etc.. or even more simply due to electrical failures or mechanical breakdowns. In order to obviate such mishappenings, the meeting recommended that all laboratories where such strains are being kept deposit duplicates of the latter in at least another laboratory of another country in the region.

The meeting also recommended that CUB request the departments of veterinary services and the directors of the producing laboratories to supply a list of vaccinal and challenge strains which they would like to obtain from another laboratory in the region or of which they would like to deposit duplicates in other countries.

VI. INTRAREGIONAL RINDERPEST VACCINATION CAMPAIGN

The meeting noted the general deterioration of the rinderpest situation in the Near East region since 1969 whereas the latter had virtually remained free from the disease for the previous years. Although some improvement was observed in this respect in certain countries, the position in others is still preoccupying.

It was appreciated that vaccination campaigns and other prophylactic measures being carried out on a national basis by the various countries concerned would be insufficient to eradicate the infection from the region in view of the constant movements of cattle across the borders due to trade, both legal and illegal, nomadism, transhumance, etc.. These movements will unavoidably result in the future as much as in the past two years in the dissemination of the infection from country to country or the reinvasion of a country which

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would have been successful in eradicating it from its territory.

For this reason, the meeting recommended that concerted efforts be made by all countries on a regional basis to eradicate the disease through vaccination and other prophylactic measures and that CUB strengthen the liaison and cooperation between such countries and assist them in achieving the final goal. For this purpose, it was considered that the assignment to the Abbassia Laboratory, Cairo of an FAO virologist specialized in rinderpest, as recommended by a recent FAO evaluation would not be sufficient to meet the requirements and the meeting recommended that a regional rinderpest coordinator be assigned as soon as possible to CUB in order to coordinate laboratory and field national activities along the lines successfully adopted in the joint regional rinderpest campaign (Joint Project 15) on the African Continent.

The meeting also recommended that detailed proposals concerning the organization of a regional campaign for the Near East region be prepared by CUB and submitted to the second meeting of the FAO Regional Commission for Animal Production and Health and the third meeting of the NEAHI Advisory Committee, to be held in June 1971 in Nicosia and Beirut respectively for the consideration of these two meetings.

The meeting further appreciated the importance of assessing the efficacy of such a vaccination campaign and recommended that a serological survey be undertaken in cattle and buffaloes in order to appraise the status of immunity in such animals following vaccination. With this purpose in mind, the meeting recommended that facilities be made available as far as possible by the governments concerned to all laboratories to enable them carry out the above serological survey.

VII. FINANCIAL PROCEDURE FOR FACILITATING INTRA-REGIONAL TRADE OF VACCINES IN THE REGION.

The meeting recognized that a certain number of countries in the region did not produce any vaccine or all types of vaccines required for their local consumption and had to consequently import them from other countries within or outside the region. Amongst the latter countries, some experience no foreign exchange difficulties for ordering these vaccines, whereas others cannot import them because of limitation of foreign currencies and would be in need of an outside source of assistance such as UNDP or FAO to overcome this difficulty.

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An observer from UNDP made it clear to the meeting that if UNDP assistance were to be requested by the countries concerned in this connection, a prerequisite condition for UNDP's possible assistance would be that the vaccines be imported from laboratories in the region, on the condition that qualities and prices be comparable to those offered by laboratories outside the region. This would go a long way to strengthening intra-regional cooperation in the above field.

After considering the countries in the region which would require importing vaccine and at the same time experience foreign exchange difficulties, only a few of them, particularly Afghanistan, Jordan, Syria, the Yemen Arab Republic and the People's Democratic Republic of Yemen, may qualify for the assistance envisaged.

Before UNDP can consider further providing such assistance, if required by the governments concerned, they would like to be informed of the magnitude of the amounts which may be required every year and as insufficient information was made available to the meeting in this connection, the latter recommended that the matter be referred to the third meeting of the NEAHI Advisory Committee and that additional information be provided by the governments concerned as to the types of vaccines required, the quantity, approximate cost and potential source of supply.

The meeting also noted that although some producing countries would accept payment in local currency, others would insist that payment be effected in a convertible currency.

VIII. OBSERVERS FROM NEAHI NON-PARTICIPATING COUNTRIES TO ATTEND FUTURE TECHNICAL MEETINGS OF THOSE OF THE NEAHI ADVISORY COMMITTEE.

Some participants in this meeting expressed the wish that in order to promote the interest of so far non-participating countries in NEAHI in joining this regional complex, the report of technical meetings such as the present one be circulated to the veterinary representative of the Arab League and that if possible a veterinary observer be nominated by similar inter-governmental organizations to attend any further technical meetings of the same nature of even further meetings of the NEAHI Advisory Committee.

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Although the meeting appreciated that this would be desirable for a technical point of view, it was considered that any decision to send observers to such meetings should be referred for consideration to the third NEAHI Advisory Committee meeting. The UNDP observer observed that no provision existed in CUF's Plan of Operation which would entitle inter-governmental organizations to attend the NEAHI Advisory Committee meetings. However, if the latter Committee recommended the attendance by such observers of its future meetings, there would probably be no objection in this connection on the part of UNDP.

If other inter-governmental organizations required the same privilege it is expected that they would probably also be authorized by the same committee to send their veterinary observers, if any could be nominated by them.

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RECOMMENDATIONS

1. Support of Veterinary Vaccine Production in the Region

Considering that the self-sufficiency of the Region in vaccine production is one of the main objectives formulated in the NEAHI original concept, the meeting recommends that UNDP continued support be particularly provided, if requested by the participating governments, for the strengthening of vaccine production institutes in order to meet both internal requirements of the countries concerned and the possible demand of the other countries in the region.

2. Intraregional supply of vaccine

Although the meeting appreciated that the price of imported vaccines is an important factor to be considered by the potential importing countries, it recommends that as far as possible in order to permit the maximum use of resources available in the region preference be given to vaccines produced in the region provided that their potency and safety qualities are comparable to those of vaccines imported from outside the region.

3. Procedure for supply of vaccine from country to country in the region

Because in some countries of the region the procedure for obtaining the necessary budget funds for the import of vaccine to control an exotic disease recently introduced is relatively lengthy, it is recommended that the vaccine producing laboratories supply immediately the amount of vaccine requested without waiting for the actual instrument of payment provided that the required written commitment from the requesting government officials concerned is received.

4. FMD vaccine production and typing

Considering that in order to be fully potent an FMD vaccine must include the type (s) responsible for local outbreaks, the meeting recommends that the present vaccine producing institutes carry out systematic typing of outbreaks before producing vaccines for local consumption or export to countries in the region.

5. FMD vaccine production and typing

The meeting being informed that amongst the three FMD vaccine producing institutes in the region one, i.e. the Razi Institute, will be in a position to accept for typing suspected samples from the region when isolation facilities have been completed towards the end of 1971, recommends that this institute produce and supply to requesting countries in the region the necessary amount of vaccine, incorporating the virus types identified by them. It is hoped that the same facilities will be offered by the Ankara and Cairo Institutes when they become available, i.e. within the next few years.

6. FMD Typing

Pending the availability of the necessary typing facilities in the region the meeting recommends that suspected samples be sent to the World Reference Laboratory, Pirbright, U.K. for typing and if necessary sub-typing.

It is also recommended tht, in order to ensure increased efficiency in the control of FMD, more samples be sent to the Pirbright Institute for typing; and that when samples are sent to a typing institute within the region, duplicate samples are sent to Pirbright.

7. Rinderpest vaccine production

Considering that the WHO Expert Committee on Standardization has established requirements for the production of and testing of the various Rinderpest live vaccine including that prepared on cell culture, the meeting recommends that the laboratories in the region producing the latter strictly follow the above requirements.

8. Stocks of Rinderpest vaccine in the region

Having considered the minimum amount of vaccine needed to meet the needs of an emergency caused by the introduction of Rinderpest into a country of the region, the meeting recommends that a minimum of two million doses of Rinderpest cell culture vaccine be held permanently by each of the three producing institutes, i.e. the Abbassia Institute in Cairo-UAR, the Razi Institute, Iran, and the Ankara Institute, Turkey.

Keeping in mind the relatively limited shelf life of the vaccine even if preserved at deep-freeze temperatures and in order to avoid undue wastage of the vaccine kept as a reserve in these laboratories, the meeting recommends that use of the reserve be systematically made before the expiry date of the vaccine, by each producing laboratory for meeting national requirements and be replenished on a routine basis.

9. Rinderpest vaccine reconstitution

Although the respective merits of physiological saline and solution and distilled water for reconstitution of cell culture Rinderpest vaccine is still the object of some controversy, in view of the unpublished experimental work carried out on this subject by various laboratories within and outside the region, the meeting recommends that preference be given to saline.

10. Rinderpest vaccine dispensing

Because in many countries in the region it is necessary to vaccinate a limited number of cattle on each premises, and keeping in mind the very limited life of Rinderpest tissue culture freeze-dried vaccine once it is reconstituted, the meeting recommends that Rinderpest vaccine producing institutes which are still dispensing in 200 doses or more per container make the necessary arrangements as soon as possible to provide vaccine in containers of 50 and 100 doses.

11. Intraregional Rinderpest vaccine utilization in the field

Considering the deterioration of the Rinderpest situation in the region during the last two years and the difficulties of controlling the disease on a national basis, the meeting recommends that CUP strengthen the liaison and cooperation between the countries concerned so that concerted action by vaccination and otherwise be achieved and eradication of the disease from the region be assisted.

With this purpose in mind, the meeting recommends that a regional Rinderpest coordinator responsible for laboratory and field activities be assigned as soon as possible to CUB and that detailed proposals concerning the implementation of a joint intra-regional vaccination campaign both in terms of national requirements and international assistance required be submitted for their consideration to the second meeting of the FAO Regional Commission for Animal Production and Health and the third meeting of the NEAHI Advisory Committee scheduled to be held in June 1971 in Nicosia and Beirut respectively.

The meeting also recommends that a serological survey for the presence of Rinderpest antibodies be undertaken in cattle and buffaloes in each country where a vaccination campaign is undertaken in order to appraise the status of the vaccinated and non-vaccinated animals and to assess the efficacy of the vaccination campaign. However, the meeting recommends that vaccination be systematically applied before the results of the above serological survey becomes available. For the purpose of carrying out the latter survey, the meeting recommends that laboratory facilities be as far as possible made available by the governments concerned in every country where a rinderpest vaccination campaign is undertaken.

12. Newcastle Disease Vaccine Production

Recognizing the risk of transmission of pathogens through eggs which are used for the preparation of poultry vaccines, the meeting recommends that endeavours be made by laboratories producing Newcastle Disease vaccine to prepare the latter as

far as possible from SPF eggs, particularly when the vaccine is to be used for the protection of breeding and egg-producing stocks. Whenever SPF eggs are used for this purpose, this should clearly appear on the labels of the relevant biologicals.

13. Newcastle Disease and other poultry vaccines. Administration in the field.

Keeping in mind the widespread use of drinking water for the administration of Newcastle Disease and other poultry vaccines, the meeting recommends that special attention be paid to the addition of suitable preservatives in order to prevent the vaccine being inactivated by chemicals, particularly chlorine, included in some water supplies.

14. Infectious Bronchitis vaccine utilization

In view of the considerable risk of spreading the infection through the indiscriminate use of "hot" vaccinal strains, the meeting recommends that the use of live vaccines be restricted to countries where the disease has been identified. In such countries the live vaccines to be used should be prepared from mild attenuated strains of the virus.

15. Stocking of African Horsesickness Vaccine in the region

In view of the possible recurrence of African Horsesickness in the region and the necessity to have constantly on hand a stock of vaccine in order to meet any emergency requirements, the meeting recommends that 500,000 doses of polyvalent tissue culture vaccine be prepared and stocked by each of the two institutes producing this type of vaccine in the region i.e. the Razi Institute, Iran and the Abbassia Institute in Cairo, UAR.

16. Contagious Bovine Pleuro Pneumonia Vaccine production and diagnostic centre, Khartoum, Sudan.

Since it was recognized that during the first phase of NEAHI the Sudan Unit had played an important part in vaccine production and diagnosis of this infection in the region and keeping in mind the original concept of NEAHI which is to promote regional cooperation in the diagnosis of animal diseases, the meeting recommends that an observer from the Sudan be invited to attend at CUB's expenses the third meeting of the NEAHI Advisory Committee scheduled in Beirut in June 1971.

17. Contagious Caprine Pleuro Pneumonia vaccine development

In view of the importance of Contagious Caprine Pleuro Pneumonia to many countries in the region and the unsatisfactory nature of immunity conferred by vaccines presently prepared by some institutes, the meeting recommends that UNDP support be provided on government request for research aiming at the development of a more potent vaccine to control the disease.

18. Improvement of vaccine production and storage techniques

Recognizing that the availability of counterpart laboratory instrument specialists is a pre-requisite condition for the production of safe and potent freeze-dried vaccines, the meeting recommends that qualified engineers be appointed by governments to vaccine producing laboratories on a permanent basis so that they can be trained by the CUB's Instrumentation Specialists.

19. Dispensing of vaccines

Considering that the keeping qualities of vaccines are to a great extent dependent on the quality of the containers, the meeting recommends that vaccine containers should always be made of neutral glass of the highest quality and meet the technical specification standards recommended by the CUB's Instrumentation Specialists.

20. Field Utilization of Vaccines

Considering that vaccines used in the field are often improperly handled with consequent loss of efficiency, the meeting recommends that written instructions be systematically issued by the manufacturing laboratory and/or the Department of Veterinary Services to vaccination teams concerning vaccine utilization in the field, i.e. storage temperature up to the time of its actual inoculation into the animal, nature and amount of diluents, life duration etc.

The meeting also recommends that proper labelling of vaccines, including the name of the producing laboratory, nature of vaccine, batch number, date of manufacture, etc. should always be printed on containers with indelible ink by the manufacturing laboratories.

21. Banks of Vaccinal and Challenge Strains of Pathogens

Considering that the reliability of the conditions of storage of vaccinal or challenge strains of pathogens varies from country to country and that it is necessary to make sure that such banks remain available to vaccine producing laboratories in the region for further production and references, the meeting recommends that

banks of such strains be always duplicated in the producing countries and be stocked in at least one other country of the region so as to prevent their possible loss due to unexpected circumstances.

22. Exchange of banks of pathogenic strains

The meeting recommends also that CUB request the countries in the region to supply a list of vaccinal and challenge strains which they would like to obtain from or deposit in another country. The necessary authorizations will then be requested in due course by CUB from the Departments of Veterinary Services of the receiving countries in accordance with the usual international practices.

23. Financial procedure for facilitating intraregional trade of vaccines in the region

Considering that certain countries which do not produce certain types of vaccine may have to import them from other countries in the region but may be prevented from doing so by foreign exchange difficulties, the meeting recommends that countries in the region which would be interested in requesting UNDP/FAO support to overcome such difficulties submit the necessary information as to the order of magnitude of their requirements to the third meeting of the NEAHI Advisory Committee scheduled in Beirut in June 1971 so that the necessary machinery may be developed, if possible, by UNDP in consultation with the governments concerned.

* * * * *

APPENDIX I

C Y P R U S

VACCINE PRODUCTION

OF THE CENTRAL VETERINARY LABORATORY, NICOSIA

Nature and Type	NUMBER OF DOSES PRODUCED IN 1963	1964	1965	1966	1967	1968	1969	1970
Newcastle Disease K Strain	268,600					898,000		979,000
" Intramuscular (chicks)	198,800							
" Intraocular	282,500							
" Drinking Water (DW)	938,950	650,000**	535,000	954,000	574,900	635,000	1,360,000	2,436,500
Fowl Pox	131,604	186,000**	354,000	224,400	492,000		260,000	1,080,000
Pigeon Pox	64,000		125,000		600,000		340,000	
Anthrax	636,000*	750,000**	825,000	603,000	709,750	635,000	1,383,700	1,282,000
Enterotoxaemia								215,450
Virus Abortion								16,000

* Export Price : £10 per 1,000 doses

** Export Price : £10 per 1,000 doses

APPENDIX I (CONTINUED)

I R A N

VACCINE PRODUCTION OF THE RAZI INSTITUTE

Nature and Type	NUMBER OF DOSES PRODUCED IN 1968	1969	1970	Dose Price F.O.B. US$	Capacity of Production
F.M.D. (inactivated	1.415.082	2.400.975	2.370.000	(x)	6.000.000
Rinderpest (live-modified T.C.)	200.000	16.419.500	6.920.100	0.02	40.000.000
Sheep Pox (live-modified T.C.)	30.030.000	16.086.250	21.941.000	0.02	40.000.000
Goat Pox (live-modified T.C.)	9.008.000	5.168.600	11.344.000	0.02	40.000.000
African Horsesickness (live, T.C.)	374.000	70.000	62.500	0.50	2.000.000
Newcastle (live) B1 strain (Oral	40.664.950	57.939.150	80.161.900	0.01	120.000.000
Newcastle (live) B1 strain (Inoc.	9.962.550	9.419.000	12.186.900	0.01	40.000.000

(x) Monovalent : 0.10

Bivalent : 0.15

Trivalent : 0.20

APPENDIX I (CONTINUED)

I R A Q

VACCINE PRODUCTION

OF THE ABU GHRAIB INSTITUTE

Nature and Type of vaccine	1968	1969	1970	sale price per dose
Newcastle*	1,225,000	3,250,000	8,149,100	1 fil
Fowl Pox	215,000	380,000	440,000	1 fil
African Horsesickness**	13,920	11,000	7,300	
Sheep Pox***	2,700,000	2,200,000	1,819,700	
Rabies (Semple)	275	270	8,350	100 fils
Anthrax	488,550	539,500	957,700	
Black Quarter	393,180	310,200	457,988	
Haemorrhagic Septicaemia	480,606	396,818	472,087	

(*) B1 strain to be administered in drinking water. In addition 1½ million doses of AG/68L were produced experimentally.

(**) Mouse brain passage

(***) Borrel method. In addition one million doses of T.C. vaccine (Roumanian strain) was produced experimentally.

APPENDIX I (CONTINUED)

L E B A N O N

VACCINE PRODUCITON OF THE FAMAR LABORATORY

Nature & Type	1962	1963	1964	1965	1966	Export Price/dose LL
Newcastle Disease						
F Strain *	200,000	350,000	700,000	2,200,000	12,560,000	0.0125
K Strain *	100,000	110,000	300,000	1,000,000	1,775,000	0.0125
Fowl Pox ** (Roumanian Strain)				1,000,000	2,150,000	0.02
Sheep Pox*** (Roumanian Strain)	-	-	-	-	-	-
Goat Pox (Roumanian Strain)					232,000	0.04
Anthrax (Stern's method)				200,000	180,000	0.03

Nature & Type	1967	1968	1969	1970	Export Price/dose LL
Newcastle Disease					
F strain *	13,000,000	28,500,000	48,000,000	51,500,000	0.0125
K strain *	8,500,000	5,500,000	15,500,000	14,000,000	0.0125
Fowl Pox ** (Roumanian Strain)	1,020,000	800,000	1,100,000	1,623,000	0.02
Sheep Pox *** (Roumanian Strain)	800,000	1,038,000	250,000	406,000(T.C.)	0.04
Goat Pox (Roumanian Strain)	320,000			112,000	0.04
Anthrax (Stern's method)	700,000	110,000	400,000	150,000	0.03

* dispensed in 1,000 doses

** dispensed in 500 and 200 doses

*** dispensed in 200 and 100 doses

APPENDIX I (CONTINUED)

L E B A N O N
(CONTD)

VACCINE EXPORTED FROM THE FANAR LABORATORY

Country of Import	Types of Exported Vaccines	1967	1968	1969	1970
IRAQ :	Newcastle Disease F Strain				60,000
JORDAN :	Newcastle Disease F Strain	2,850,000	7,000,000	600,000	
	K Strain	1,000,000	400,000	100,000	
	Fowl Pox	150,000			
	Goat Pox	100,000			
	Anthrax	400,000			
KUWAIT :	Newcastle Disease F Strain		5,750,000	1,650,000	60,000
	K Strain		200,000	25,000	
	Goat Pox	1,000,000			
SAUDI ARABIA:	Newcastle Disease F Strain		1,255,000	1,083,000	8,632,000
	K Strain		240,000	1,980,000	
	Fowl Pox	200,000	30,000	130,000	200,000
	Sheep Pox	20,000	8,000	125,000	220,000
SYRIA :	Newcastle Disease F Strain				110,000
U.A.R. :	Newcastle Disease F Strain	1,500,000			

APPENDIX I (CONTINUED)

SAUDI ARABIA

VACCINE IMPORTATION

Nature and type of vaccines, sera and antigens	Origin of Import	Number of doses imported From 1/9/69 To 30/8/70	Number of doses imported From 1/9/70 To 30/8/71
Rinderpest (T.C.)	U.A.R.	25,000	30,000
" Serum	U.A.R.	800 bottles of 250 CM^3	5,000
Newcastle Disease Strain F.(drinking water)	Lebanon	910,000	8,000,000
Newcastle Disease Strain K. (Intra-muscular)	Lebanon	538,000	500,000
Fowl Pox	Lebanon	250,000	500,000
Pigeon Pox	U.A.R.	10,000	50,000
African HOrsesickness	"	500	5,000
Sheep Pox	Lebanon	150,000	500,000
Rabies	U.A.R.	50	5,000
Anthrax	Lebanon	10,000	10,000
Haemorrhagic Septicaemia	U.A.R.	1,000	20,000
Haemorrhagic Septicaemia Serum	"	250	3,000
Tetanus Anti-Serum	U.A.R.	200	3,000
Tuberculin P.P.D. (Bovine)	U.K.	5,000	30,000
Avian Tuberculin	"	500	
Mallein	U.A.R.		1,000
Johnin	U.K.		4,000
Brucella antigen	U.A.R.		2,000
Distemper	A company		1,000

APPENDIX I (CONTINUED)

SYRIAN ARAB REPUBLIC

PRODUCTION OF VACCINES, SERA AND ANTIGENS

CENTRAL VETERINARY LABORATORY,

DAMASCUS

Name and Type	Number of doses produced in 1967	1968	1969	1970	1971 1st quarter
Newcastle Disease K Strain	655,000	1,699,000	1,680,000	2,350,000	400,000
Fowl Pox	195,000	150,000	165,000	130,000	20,000
Sheep Pox	1,695,600	2,310,600	3,231,000	2,535,000	365,000
Goat Pox	14,800	21,400	13,400	15,200	3,600
Anthrax	652,900	1,269,200	1,292,500	1,480,000	245,000
Black Quarter	43,490	41,330	70,580	49,600	6,700

Name	Method of Production
Newcastle Disease K Strain	Freeze-dried, live, from chorio-allantoic membrane of embryonated eggs.
Fowl-Pox	Freeze-dried, live, from chorio-allantoic membrane of embryonated eggs (Hungarian strain)
Sheep Pox	Living suspension of sheep pox virus (Roumanian strain) obtained from sheep tissue
Goat Pox	Living suspension of goat pox virus (Damascus strain) obtained from goat tissue.
Anthrax	Spore suspension of a virulent B.anthracis (Strain 34 F2 of B.anthracis Stern)
Black Quarter	Liquid Culture of Cl.chauvoei formalized (Okinawa strain)
Anthrax Serum	From rabbits hyperimmunized with heat. Killed bacterial cells of B.anthracis, (for Ascoli's test)

.../...

APPENDIX I (CONTINUED)

SYRIAN ARAB REPUBLIC

(CONTD)

Name	Method of Production
Black Quarter Serum	From rabbits hyperimmunized with washed cells of Cl.chauvoei (for Ascoli's test)
Pullorum antigen	Dense suspension of phenol-killed, crystal violet - stained cells of S.pullorum for rapid agglutination test (Nakamura standard strain).
C.R.D. antigen	Dense suspension of phenol killed crystal violet-stained of mycoplasma gallisepticum for rapid agglutination test. (KP - 3 strain)

APPENDIX I (CONTINUED)

T U R K E Y

VACCINE PRODUCTION OF ALL LABORATORIES

Nature and Type of Vaccine	1961	1962	1963	1964	1965
Foot-and-Mouth Disease	150,000	502,809	486,864	430,743	127,266
Rinderpest	-	-	-	-	-
Newcastle Roakin Strain	3,371,600	2,633,050	2,701,600	3,754,700	5,381,200
" B1*	-	-	136,100	209,100	927,100
Fowl Pox	402,500	363,050	326,050	415,600	511,000
Sheep Pox	6,168,250	8,714,060	8,569,380	8,597,920	14,298,270
Goat Pox	547,200	975,080	468,800	232,320	169,840
African Horsesickness**	998,266	1,468,725	1,188,865	632,250	175,500
Contagious Caprine Pleuropneumonia***	303,900	79,000	140,250	152,142	90,785
Black Quarter	593,850	684,800	704,050	562,500	715,550
Pasteurellosis	285,200	303,850	295,950	257,900	222,475
Enterotoxaemia	1,880,000	2,270,250	2,580,600	2,994,300	4,268,033
Calf Septicemia	1,492	3,080	7,133	4,200	2,250
Botulism	11,100	37,700	52,325	29,187	49,500
Contagious Echtyina	25,000	16,100	13,500	58,500	22,500
Ictero-haemoglobinuria	111,800	62,700	161,900	86,025	111,875
Salmonella abortus-ovis	6,550	6,800	11,881	12,950	6,800
Brucellosis S.19	28,000	4,391	7,655	6,850	6,585
Rev.1	-	-	-	-	-
Infectious Hepatitis	-	-	-	-	-

(*) For intranasal or intraocular inoculation in young chicks

(**) Mouse brain passage

(***) Formalin inactivated tissue vaccine.

APPENDIX I (CONTINUED)

TURKEY
(CONTD)

Nature and Type of Vaccine	1966	1967	1968	1969	1970
Foot-and-Mouth Disease	572,000	1,454,558	2,940,380	2,424,100	2,171,350
Rinderpest	-	-	-	5,985,800	29,032,600
Newcastle Disease Roakin	6,223,100	9,626,600	16,638,600	10,257,000	11,172,300
" B1*	2,262,300	3,842,400	4,202,900	4,584,800	4,852,300
Fowl Pox	422,310	785,900	979,300	797,400	733,400
Sheep Pox	12,780,160	10,081,440	8,222,800	7,851,400	6,369,100
Goat Pox	967,360	646,080	575,640	488,960	217,760
African Horsesickness**	219,575	164,525	105,000	93,500	99,000
Contagious Caprine Pleuropneumonia***	182,221	193,292	174,000	134,857	88,983
Black Quarter	609,900	799,000	855,125	798,375	960,000
Pasteurellosis	297,275	164,000	322,000	120,950	78,600
Enterotoxaemia	4,463,333	5,898,328	6,946,333	7,676,000	8,365,200
Calf Septicemia	4,875	3,250	3,116	4,412	57,875
Botulism	32,375	33,400	33,925	33,900	27,037
Contagious Echtyina	100,000	16,700	36,000	36,750	19,750
Ictero-haemoglobinuria	146,050	156,000	135,900	150,450	96,800
Salmonella abortus-ovis	11,055	24,250	28,750	24,800	15,050
Brucellosis S.19	4,500	5,250	2,500	5,200	4,000
Rev.1	-	-	5,468	136,942	75,568

(*) For intranasal or intraocular inoculation in young chicks

(**) Mouse brain passage

(***) Formalin inactivated tissue vaccine.

APPENDIX I (CONTINUED)

U. A. R.

VACCINE PRODUCTION OF THE VETERINARY RESEARCH LABORATORIES
ABBASSIA & DOKKI

NATURE & TYPE	NUMBER OF DOSES PRODUCED IN				
I. VACCINES	1966	1967	1968	1969	1970
Rinderpest (tissue culture)	2,620,000	3,665,000	2,559,400	3,910,400	5,620,000
Newcastle Disease K strain	42,865,000	47,855,000	49,996,000	40,629,500	55,378,500
" " F strain	3,826,200	15,287,800	11,548,000	13,690,500	33,669,000
" " B1 in drinking water	590,000	4,576,000	8,426,000	-	1,452,000
Fowl Plague	185,000	86,000	160,000	-	-
Fowl Pox	9,197,000	10,467,000	10,992,000	5,515,000	4,546,000
African Horsesickness (mouse brain passage)	130,612	56,820	37,049	18,020	27,220
Sheep Pox	1,600,500	1,699,100	2,972,400	2,164,900	1,521,800
Pigeon Pox	312,000	1,664,000	779,000	-	-
Rabies (Flury strain)	3,486	11,655	16,583	8,315	10,400
Haemorrhagic septicaemia (H.S.) (Oil adjuvant)	-	-	4,000,000	3,018,600	1,872,000
H.S. Vaccine (cattle)	4,089,789	5,062,453	559,700	-	-
H.S. (rabbit)	15,660	-	44,000	25,520	129,340
H.S. (formolized - horses)					203,406

APPENDIX I (CONTINUED)

U.A.R.
(CONTD)

NATURE & TYPE	Number of doses produced in 1966	1967	1968	1969	1970
I. VACCINES (Contd)					
Fowl Cholera	2,704,102	2,003,600	1,895,060	2,014,700	1,544,740
Duck cholera	1,931,962	1,188,860	1,497,560	2,423,820	1,740,210
Spirochaetosis	709,080		446,880	542,925	350,271
Black Quarter	131,098	158,148	198,680	222,662	180,184
Black disease	36,250	192,985	136,300	130,065	87,290
Lamb dysentery	89,610	184,160	224,640	96,135	237,805
Pulpy Kidney	88,305	164,290	207,350	245,920	224,095
Gas gangrene			156,020		62,720
II. ANTISERA					
Rinderpest	13,750	3,728	1,433	832	
Haemorrhagic septicaemia	456	2,711	1,514	2,357	656
Tetanus	6,922	4,403	6,825	7,392	4,679
Streptococcosis	1,225				2,725

APPENDIX I (CONTINUED)

U.A.R.
(CONTD)

NATURE & TYPE	Number of doses produced in 1966	1967	1968	1969	1970
III. ANTIGENS					
Mammalian P.P.D. Tuberculin (for cattle)	79,950	35,000	40,000		4,000
Avian P.P.D. Tuberculin	25,500	27,000	-		40,000
Mallein (subcutaneous)	1,380		1,500		742
(eyelid)	3,000	3,000			10,000
Pullorum (stained)	633,000	603,000	476,000	363,000	560,000
Pullorum (unstained)	890	2,500	2,450	250	1,450
Brucellosis	14,000	10,150	13,320	17,000	13,550

APPENDIX I (CONTINUED)

U.A.R.
(CONTD)

NUMBER OF DOSES OF BIOLOGICALS EXPORTED

Nature and Type	1969	1970
I. Vaccine		
Rinderpest tissue culture	1,234,250	1,225,400
Newcastle Disease	570,000	750,000
Fowl Pox	65,000	-
African Horsesickness	3,350	1,540
Pigeon Pox	15,000	10,000
Sheep Pox	1,660,000	84,600
Rabies	100	50
Haemorrhagic Septicaemia	3,000	1,000
Fowl Cholera	20,000	
II. Antisera		
Rinderpest	220	2,000
Haemorrhagic Septicaemia	100	200
Anti Tetanus serum	50	200
Streptococcosis		900
III. Antigens		
Pullorum antigen	50,000	
Mallein		5,600
Mammalian tuberculin (for cattle)	10,500	11,500
Avian tuberculin		6,500