AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete) — Amendment Number: _____

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: NE Regional

3. PROJECT NUMBER: 298-0165

4. BUREAU/OFFICE: Near East — 03

5. PROJECT TITLE (maximum 40 characters): Epidemiology of Arthropod-Borne Diseases

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 09 DD 30 YY 86

7. ESTIMATED DATE OF OBLIGATION (Under 'B' below, enter 1, 2, 3, or 4)
A. Initial FY 81 B. Quarter 4 C. Final FY 86

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY 81 B. FX	C. L/C	D. Total	LIFE OF PROJECT E. FX	F. L/C	G. Total
AID Appropriated Total	2,000		2,000	7,000		7,000
(Grant)	(2,000)	( )	(2,000)	( )	( )	( )
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1						
Other U.S. 2						
Host Country		930	930		2,400	2,400
Other Donor(s)						
TOTALS	2,000	930	2,930	7,000	2,400	9,400

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	2. Loan	D. OBLIGATIONS TO DATE 1. Grant	2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	2. Loan	F. LIFE OF PROJECT 1. Grant	2. Loan
(1) ESF	$511	550				2,000		7,000	
(2)									
(3)									
(4)									
TOTALS									

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 541

11. SECONDARY PURPOSE CODE:

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code	R/H						
B. Amount	7,000						

13. PROJECT PURPOSE (maximum 480 characters)

To initiate complementary research in Egypt and Israel to characterize the epidemiology and epizoology of three diseases (Rift Valley Fever, Malaria and Leishmaniasis) and develop scientifically based public health control strategies.

14. SCHEDULED EVALUATIONS
Interim MM 10 YY 82 | MM YY
Final MM 09 YY 86

15. SOURCE/ORIGIN OF GOODS AND SERVICES
[x] 000 [ ] 941 [x] Local [ ] Other (Specify) _____

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)

17. APPROVED BY
Signature:
Title: Assistant Administrator, Bureau for Near East
Date Signed: MM 08 DD 21 YY 81

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION
MM DD YY

AID 1330-4 (8-79)

INSTRUCTIONS

The approved Project Data Sheet summarizes basic data on the project and must provide reliable data for entry into the Country Program Data Bank (CPDB). As a general rule blocks 1 thru 16 are to be completed by the originating office or bureau. It is the responsibility of the reviewing bureau to assume that whenever the original Project Data Sheet is revised, the Project Da a Sheet conforms to the revision.

Block 1 -Enter the appropriate letter code in the box, if a change, indicate the Amendment Number.

Block 2 - Enter the name of the Country, Regional or other Entity.

Block 3-Enter the Project Number assigned by the field mission or an AID/W bureau.

Block 4 - Enter the sponsoring Bureau/Office Symbol and Code. *(See Handbook 3, Appendix 5A, Table 1, Page 1 for guidance.)*

Block 5 - Enter the Project Title *(stay within brackets, limit to 40 characters).*

Block 6 - Enter the Estimated Project Assistance Completion Date. *(See AIDTO Circular A-24 dated 1/26/78, paragraph C, Page 2.)*

Block 7A. - Enter the FY for the first obligation of AID funds for the project.
Block 7B. - Enter the quarter of FY for the first AID funds obligation.
Block 7C. - Enter the FY for the last AID funds obligations.

Block 8 - Enter the amounts from the 'Summary Cost Estimates' and 'Financial Table' of the Project Data Sheet.
NOTE: The L/C column must show the estimated U.S. dollars to be used for the financing of local costs by AID on the lines corresponding to AID.

Block 9 - Enter the amounts and details from the Project Data Sheet section reflecting the estimated rate of use of AID funds.
Block 9A. - Use the Alpha Code. *(See Handbook 3, Appendix 5A, Table 2, Page 2 for guidance.)*

Blocks 9B., C1. & C2. - See Handbook 3, Appendix 5B for guidance. The total of columns 1 and 2 of F must equal the AID appropriated funds total of 8G.

Blocks 10 and 11 - See Handbook 3, Appendix 5B for guidance.

Block 12 - Enter the codes and amounts attributable to each concern for Life of Project. *(See Handbook 3, Appendix 5B, Attachment C for coding.)*

Block 13 - Enter the Project Purpose as it appears in the approved PID Facesheet, or as modified during the project development and reflected in the Project Data Sheet.

Block 14 - Enter the evaluation(s) scheduled in this section.

Block 15 - Enter the information related to the procurement taken from the appropriate section of the Project Data Sheet.

Block 16 - This block is to be used with requests for the amendment of a project.

Block 17 - This block is to be signed and dated by the Authorizing Official of the originating office. The Project Data Sheet will not be reviewed if this Data Sheet is not signed and dated. **Do not initial.**

Block 18 - This date is to be provided by the office or bureau responsible for the processing of the document covered by this Data Sheet.

EXECUTIVE SUMMARY

A. OBJECTIVE

The purpose of this project is to develop and administer a cooperative research project to characterize the epidemiology and epizoology of three arthropod-borne diseases (Rift Valley Fever, Malaria, and Leishmaniasis) in Egypt and Israel. The project will examine the geographic scope of certain selected arthropod-borne diseases in man, identify the various foci within this range, determine domestic and wild animal reservoirs if any, determine the insect vectors involved, and quantify the disease problem from a public health viewpoint in order to develop scientifically-based control strategies. Efforts will be directed toward broadly-based serologic surveys to determine the magnitude of the problem and isolation and identification of the specific pathogens.

To achieve these goals, the following steps will be taken: a) A system of field facilities will be established for the study of the entomological and epidemiological aspects of the designated diseases. These facilities will include mobile field laboratories in Israel and Egypt. The Egyptian mobile field station will have responsibility for studies throughout Egypt from the Nile Delta through the length of the Nile Valley. Special emphasis will be placed on the Canal Areas, the Sudan border and the area of Lake Nasser. the Israeli mobile field station will concentrate its studies along the Sinai border and in the Negrev Desert. b) Central laboratory facilities in Cairo and Jerusalem will be improved to support and evaluate field-based activities.

The project will be administered thorugh a PASA with the U.S. National Institutes of Health who will have responsibility for coordinating, administering, technically reviewing and evaluating the cooperative research program. NIH will issue subcontracts with Ain Shams University in Egypt and Hebrew University in Israel to carry out the research.

B. BUDGET

	TOTAL
U.S. Technical Assistance (thru NIH)	$ 1,134,500
Ain Shams University (Personnel, Training, Equipment and Vehicles)	3,620,877
Hebrew University (Personnel, Training	2,244,576
	$ 6,999,453 *

* See detailed Budget breakdown

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
Bethesda, Maryland 20205

April 14, 1981

Mr. Alfred D. White
Assistant Administrator
Bureau for Near East
US Agency for International Development
Washington, D.C. 20523

Dear Mr. White:

It is my pleasure to forward the enclosed interagency (PASA) proposal entitled "Epidemiology and Control of Arthropod-Borne Diseases in Egypt and Israel" to USAID for your formal consideration for funding beginning October 1, 1981.

You may recall that the technical portion of the proposal was submitted through the Office of International Health (OIH), DHHS, on July 23, 1980. Within NIAID, it had received review and clearance by our Scientific Director and the Institute's Policy Council. The subsequent changes have been developed in consultation with USAID staff to reflect current policy regarding Egyptian-Israel regional cooperation and Agency budgetary guidelines.

At her request, I am also transmitting ten (10) additional copies of the proposal to Mrs. Barbara Turner of your staff. Please do not hesitate to contact me if you have any technical or administrative questions.

Sincerely yours,

Richard M. Krause, M.D.
Director, National Institute of
Allergy and Infectious Diseases

cc: Dr. K.A. Western, Asst. Director for International Research, NIAID/ Project Co-officer
Dr. Robert Gwadz, Research Entomologist, NIAID/Project Co-officer
Dr. Claude Lenfant, Director, Fogarty International Center, NIH
Dr. John Bryant, Director, Office of International Health, DHHS
Mrs. Barbara Turner, NE/TECH, USAID

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Title of Project

Epidemiology and Control of Arthropod-Borne Diseases in Egypt and Israel

Collaborating Institutions

Ain Shams Center for Research and Training in Malaria and Other Arthropod-Borne Diseases, Ain Shams University, Cairo; Kuvin Centre for the Study of Infectious and Tropical Diseases, Hebrew University, Jerusalem.

Administration

National Institute of Allergy and Infectious Diseases, National Institutes of Health, U.S.A.

Starting Date

October 1, 1981

Duration

Five years

1. Introduction

Egypt and Israel occupy a strategic location at the crossroads of Africa and Asia. To the west, Egypt faces the Mediterranean coast and North Africa while its southern border with Sudan is an opening to Central Africa. To the east through the Sinai lie Israel and the Middle East. In this central location these two countries have long shared common health problems and are currently experiencing a wave of new diseases. Arthropod-borne pathogens remain a constant threat to human populations; some of these organisms pose a significant threat to livestock. All produce disease conditions which lessen the quality of life and hinder development. Three arthropod-borne diseases have been selected for study in the initial phases of this program. All three currently affect populations in at least part of the study area and all three have the potential for epidemics or for extension into adjoining areas. Rift Valley fever (RFV), malaria, and leishmaniasis were chosen because of the serious threat they pose to the area's inhabitants, because all are transmitted by flying insects, and because two, RVF and leishmaniasis, may share common vectors and reservoir hosts.

RVF is an apparent newcomer to the area, first reported in Egypt in 1977, but now endemic. This viral disease is normally considered pathogenic to livestock, seldom infecting man and very seldom fatal in humans. However, Egypt in 1977 experienced between 20,000 and 200,000 human cases with a minimum of 600 deaths. Residual blindness in survivors was common. The disease has spread to United Nations peace-keeping troops in the Sinai and now poses a major threat to man and domestic animals in Israel. Malaria, long endemic in the region, continues to smoulder throughout Egypt with the potential for periodic epidemics. Introduction of the dreaded African vector, Anopheles gambiae, from Sudan via Lake Nasser remains a major fear of malariologists. Leishmaniasis is a constant problem in Israel, with its spread closely related to irrigation and reclamation.

Clearly, cooperative studies of these problems by scientists in Egypt and Israel could bring to bear a variety of experiences and expertise lacking in any one institution. The orientation of the scientists at Ain Shams University has been toward epidemiology, serology and entomology of RVF and malaria. The Israeli group has concentrated on immunology of leishmaniasis and malaria, but has had considerable experience in malaria control and the development of seroepidemiological tests. The combination of the field-oriented Egyptian studies with laboratory oriented Israeli units could be most fruitful.

The reopening of the Sinai provides a unique opportunity to establish a center for field research in an area which currently acts as a buffer zone between the more heavily populated areas of Egypt and Israel. Moreover, planned development of the Sinai for agriculture, industry, and tourism expose that area to the same problems existing in adjoining areas. Closely integrated studies centered in the Sinai would provide information on disease patterns in that area, act as a sentinel for transmission through the area, and provide information for comparison with similar on-going studies of these same diseases in Egypt and Israel.

Eventually, the scope of cooperation will extend well beyond the three diseases mentioned above and include other arthropod-borne diseases, general community health and delivery of health care. Once in place and functioning, this initial cooperative venture could serve as a model and base for studies continuing well beyond the term of this proposal.

2. Purpose

The overall purpose of this study will be to characterize the epidemiology and epizootiology of arthropod-borne diseases in relation to the expanding human settlement in the Sinai and in the more populated areas of Israel and Egypt. More specificially, the program of study will examine the geographic scope of certain selected arthropod-borne diseases in man, identify the various foci within this range, determine domestic and wild animal reservoirs if any, determine the insect vectors involved, and quantify the disease problem from a public health viewpoint in order to develop scientifically-based control strategies. Efforts will be directed toward broadly-based serologic surveys to determine the magnitude of the problem and isolation and identification of the specific pathogens.

To achieve these goals, the following steps will be taken: a) A system of field facilities will be established for the study of the entomological and epidemiological aspects of the designated diseases. These facilities will include a fixed field station in the Sinai and mobile field laboratories in Israel and Egypt proper. The Egyptian mobile field station will have responsibility for studies throughout Egypt from the Nile Delta through the length of the Nile valley. Special emphasis will be placed on the Sudan border and the area of Lake Nasser. The Israeli mobile field station will concentrate its studies along the Sinai border and in the Negev Desert. b) Central laboratory facilities in Cairo and Jerusalem will be improved to support and evaluate field-based activities.

3. Administrative Organization

This program will be administered by NIAID with funds provided by USAID. Separate contracts will be awarded to Ain Shams University and Hebrew University with the duties and responsibilities of each unit specified in the contract workscope.

Project Officer

The NIAID-appointed Project Officers (P.O.) will have overall responsibility for conduct of this project, assignment of duties and responsibilities, and

implementation of the workscope. The P.O.s will have sole authority to modify the workscope and alter project protocols to facilitate completion of stated goals within the objectives of the general project and with the concurrence of USAID.

Principal Investigator

The Principal Investigators (P.I.) of each cooperating unit, Ain Shams and Hebrew Universities, will have primary responsibility for the operations of their respective units. The P.I. will direct implementation of designated protocols, oversee recruitment of staff and procurement of supplies and equipment, and insure timely submission of semi-annual and annual reports.

4. General Outline of Procedures

Host Factors

Prevalence and Incidence of Disease Entities.--This will include: a) a surveillance program to document the occurence of human cases and map the area of human involvement, and b) serologic surveys of domestic and wild animals throughout suspected zoonotic areas.

Surveillance Program.--This will be coordinated through the central laboratories of the two institutions in Jerusalem and Cairo. Clinicians and nurses supervised by epidemiologists will monitor hospital records and enlist the aid of hospital personnel to report current cases of suspected disease. Following discovery, personnel of the central laboratory will commence in-depth study, collect acute and convalescent serum, and compile complete health records. In cases detected during the acute phase of illness, maximum effort will be made to obtain specimens before treatment to facilitate isolation of pathogens.

Serologic surveys.--These will be coordinated by the central laboratories through the various field survey teams and the central field station in the Sinai. Project personnel will visit farming settlements, villages, herdsmen and nomads to obtain human blood samples. Random samples will be appropriate for study of malaria and RVF. Selected samples with emphasis on individuals

at greatest risk (e.g. farmers) will be taken for studies of leishmaniasis. Wild and domestic animals will be intensively sampled to determine reservoir hosts of RVF and leishmaniasis.

Serologic tests.--These will be done with specimens from a) humans with diagnosed or suspected infections, b) humans in the survey areas, c) livestock, and d) wild animals.

A wide range of serological tests are available, although not all are applicable to all of the diseases in question. For malaria surveys each blood sample will be divided and processed simultaneously in Cairo and Jerusalem. The Ain Shams group will apply the ELISA and flourescent antibody (IFA) tests while the Hebrew University group will examine the same samples with a newly developed radio-immunoassay (RIA). These same samples would be tested for evidence of exposure to RVF by the Egyptians and leishmania by the Israelis. This multi-disease analysis of each serum sample promises to yield data of enormous importance to a more thorough understanding of the epidemiological situation.

Isolation and/or Identification of Disease Agents.--Protozoan parasites causing leishmaniasis are normally cultured from lesions and typed by serotyping of secreted factors, measurement of bouyant density of nuclear and kinetoplast DNA or determination of iso-enzyme variants. In addition parasite material may be isolated from infected flies.

Malaria parasites are normally identified from stained blood slides. *Plasmodium falciparum* is being grown *in vitro* at both Ain Shams and Hebrew Universities and these techniques may be applied to characterization studies.

Isolation and characterization of the viral agent of RVF requires P-3 level containment facilites and is currently being conducted by the Ain Shams group in cooperation with the U.S. Navy Medical Research Unit No. 3 (NAMRU-3) in Cairo. ~~One aspect of this proposal will be the outfitting of P-3 containment facilities at Ain Shams University to alleviate pressure on the already overtaxed NAMRU virologists. Eventual self-sufficiency by Ain Shams in virology is one of the aims of this proposal.~~ *

This element of proposal (P-3 Level Containment unit) not approved by AID.

RVF virus is usually isolated from infected blood by injection into mice. A number of serological tests have been useful in identifying the virus.

Entomological Factors

Identification of Vector Species.--Precise definition of the insect vectors of RVF, malaria, and leishmaniasis remains a major goal of any program designed to describe the epidemiology of these diseases and develop control strategies. In the Sinai, these vectors have not been identified. Direct incrimination will require isolation of organisms from infected insects coupled with epidemiological association of insect population with infections in man or animals.

Mosquito Vectors of Malaria.--Infected mosquitoes may show plasmodial oocysts developing on the gut or sporozoites in salivary glands. Neither stage can be further cultured, but serological tests such as IFA and CSP (circum sporozoite-precipitant) can be used to identify the species of sporozoite found.

Phlebotomine Vectors of Leishmaniasis.--Leishmania may be isolated from pooled flies and cultured in NNN medium.

Insect Vectors of RVF.--Although mosquitoes have long been considered the vectors of RVF and *Culex pipiens* has been found naturally infected in Egypt, recent assignment of the RVF virus to the Sandfly Fever group has raised the prospects of involvement of phlebotomine and ceratopogonid flies in the transmission of this organism, primarily among domestic and wild animals. Virus may be demonstrated in infected flies by allowing the insects to feed directly on hamsters or by virus growth in tissue culture seeded with material from pooled flies.

Field Biology of Arthropod Vectors.--Once vector species have been precisely identified, a series of studies will be initiated to characterize their behavior and bionomics. Patterns of population fluctuation, range of distribution, seasonality, host preferences, flight range, and lonevity will be determined for all concerned species.

Laboratory Biology of Arthropod Vectors.--These studies will proceed in parallel with the field studies and will be conducted at the field and central laboratories. The objective of this phase of the program is to characterize the important biological attributes of the known vector arthropods which influence their ecological adaptations, and enable us to make predictions regarding their success in nature. Specifically, studies will be directed to: 1) rhythms of host seeking activity, 2) dynamics of host-predilection, and 3) dynamics of feeding, with emphasis on those factors which might contribute to maximizing transmission of pathogenic agents. The ability of these insects to utilize different hosts or host-predilection is important in these studies, since this factor may limit the vector species to specific habitats where the preferred hosts occur.

Model Focal Areas.--These studies will be initiated in the second or third year of the proposed project. Following implementation of the surveillance program, serologic surveys, and precise incrimination of vectors, two (2) or possibly three (3) study sites (focal areas) will be selected for intensive study of the ecological interrelationships that affect the maintenance and spread of these diseases. Sites representative of the habitats in which humans become infected will be selected. Sampling of domestic animals and humans in the focal area will be done at regular intervals throughout the year to monitor changes in the serologic status of these hosts and the occurrence of vector species. Trapping of wild vertebrates will be done to ascertain their role in sustaining these vectors and amplification of the disease. Sampling designs will be adapted to facilitate quantitative measurement of important host species.

Environmental parameters, particularly temperature, relative humidity, and solar radiation intensity, will be measured in the Model Focal Areas. Measurement of these physical factors in microclimates, e.g., densely vegetated walls of dry river beds, small mammal burrows, etc., will be especially important in understanding the environmental conditions of the insect vector habitat. In addition, topographic and hydrological studies will be done. Relationships between these environmental parameters, vector population size, and patterns of disease transmission will be charted.

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5. Implementation of Project

This project will investigate three arthropod-borne diseases simultaneously and, in general, the outline for the three studies are similar. Details of some of the procedures are considered in Section 4.

Year 1

Spot serological and parasitological surveys will be conducted in all populated areas of Egypt and Israel to determine past or present infection with the organism in question.

Entomological investigations will be initiated to identify the potential arthropod vectors of RVF, malaria, and leishmaniasis.

Years 2, 3, and 4

Longitudinal serological and parasitological surveys will be conducted on human populations at risk in order to chart seasonality of infection and general epidemiological parameters.

Animal surveys will be conducted to determine infection with RVF virus or leishmania in reservoir hosts.

Entomological studies will focus on precise characterization of vector species including longitudinal studies of population dynamics, vector competence, genetics, cytogenetics, and insecticide susceptibility.

Year 5

Serological and parasitological studies will be completed and a clearer understanding of the epidemiology of the subject diseases will be available. Based on in-depth examination of the entomological aspects of transmission, rational, economically, geographically, and biologically feasible control schemes will be developed for regulation of vector species.

6. Cooperative Aspects of the Program

The Malaria Research Unit at Ain Shams University, in cooperation with the Egyptian Ministry of Health, has a history of studies on serology, parasitology, and entomology of malaria and filariasis, and more recently on Rift Valley Fever. These studies have emphasized field investigation and have attempted to chart the magnitude of the disease problems, describe the biology of the arthropod vectors, and develop control schemes.

The Tropical Medicine group at Hebrew University is currently interested in biochemical and immunological approaches to the study of tropical diseases. At the same time more applied studies have led to the production of a prototype vaccine for leishmaniasis. Historically, the group grew out of programs which successfully eradicated malaria from Israel and the Unit has maintained an expertise in protozoology, virology, and entomology. At present, entomological interest centers on the biology and physiology of mosquitoes and the phlebotomine vectors of leishmania.

The Unit maintains a close working relationship with field-oriented entomologists at Ben Gurion University.

The collaborative nature of this program will bring together scientists from Egypt and Israel to work together on common health problems. The Egyptian group will bring an orientation to field studies along with the expertise and personnel necessary to carry out these studies. The Israeli group will offer its experience in laboratory oriented studies and its significant experience in malaria eradication.

Together, the two Units present a formidable array of talents and interests covering all aspects of the disease problem from vector biology to human pathology.

The primary focus of collaborative studies will be the Sinai, where Egyptian field teams will investigate the actual or potential insect vectors of RVF, malaria, and leishmaniasis. At the same time serological studies of human and animal populations will be used to determine the actual infectious states.

Characterization of sera will be another area of intense cooperation. In many study areas, human sera will be tested for presence of antibodies against RVF, malaria, and leishmania. Each sample will be divided; the Egyptian lab will test for RVF and malaria, the Israeli lab will test for malaria (using another technique) and leishmaniasis.

This proposal provides a unique opprotunity to bring together scientists from two universities long separated by distance, culture, religion, and war. Each brings its own expertise and its own orientation. Collaboration will be mutually beneficial, the joint productivity enhanced, and the results a superior research effort which will benefit the peoples of each country and of the whole region.

7. Future Funding

These contracts will allow the establishment of research facilities and the initiation of a research program unique in its capabilities and goals. Once in place and functioning, this program will attract scientists and scholars interested in a wide range of public health problems.

The WHO has already expressed interest in the program and a number of private foundations have been cont acted. All feel that if the cooperative program were initiated and functioning as proposed, future funding could be obtained from sources other than the U.S. Government.

8. Summary

This proposal shall provide an administrative structure and a system of physi. facilities in which a series of coordinated studies on common health problems can be conducted by scientists and health professionals from Egypt and Israel. The combination of strong central laboratories with well-equipped and staffed field facilities provides an opportunity for in-depth epidemiological and entomological studies on three important diseases.

The very nature of the project stresses cooperation with the bringing of diverse talents and orientations to bear on specific disease problems. The

opportunity for mutual enrichment, the learning of new techniques, and the development of better methods coupled with the possibility of lessening the threat of human infection would be reason enough for participation. Moreover, this proposal lays the groundwork for longterm cooperation between neighbors and unlimited opportunity for future studies. The inclusion of other Egyptian and Israeli organizations in addition to scientists from other nations is a natural consequence of these initial studies. The proposal would create a model for future cooperative studies on serious problems in an area where the problems exist and the prospect for achievement are great.

ESTIMATED
PROJECT BUDGET

	FY 81	FY 82	FY 83	FY 84	FY 85	TOTAL
U.S. Technical Assistance (through NIH)	$ 156,000	$ 201,000	$ 236,000	$ 258,500	$ 283,000	$ 1,134,500
Ain Shams University - Egypt	(941,600)	(716,392)	(633,031)	(671,835)	(658,019)	(3,620.877)
- Personnel	98,200	114,982	133,481	153,835	176,219	676,717
- Training Positions (In-Country)	28,500	31,410	34,550	38,000	41,800	174,260
- Equipment	491,900	310,000	200,000	200,000	160,000	1,361,900
- Vehicles and Maintenance	215,000	150,000	150,000	160,000	155,000	830,000
- Other Costs (Conferences, publications, per diem etc)	108,000	110,000	115,000	120,000	125,000	578,000
Hebrew University - Israel	(458,525)	(390,050)	(426,655)	(468,521)	(500,825)	(2,244,576)
- Personnel	99,000	109,400	115,340	126,375	126,759	576,874
- Training Positions (In-Country)	101,500	116,650	124,315	141,146	155,260	638,871
- Equipment						
- Vehicles & Maintenance	39,000	43,000	47,000	52,000	57,000	238,000
- Other Costs (Conferences, publications etc)	21,000	21,000	21,000	24,000	24,000	111,000
TOTAL U.S.	$1,556,125	$1,307,442	$1,295,686	$1,398,856	$1,441,844	$ 6,999,953
Ain Shams University						
- Personnel	$ 56,300	$ 61,931	$ 68,124	$ 74,936	$ 82,429	$ 343,000
- Equipment	200,000	in-kind				200,000
- Facilities	400,000	in-kind				400,000
TOTAL GOE						$ 943,720
Hebrew University						
- Personnel	$ 237,530	$ 261,283	$ 287,411	$ 316,152	$ 347,767	$ 1,450,143
- Equipment	in-kind					
- Facilities	in-kind					
TOTAL GOI						$ 1,450,143

Title of Project

Epidemiology and Control of Arthropod-Borne Diseases in Egypt and the Sinai.

Collaborating Institutions

Ain Shams Center for Research and Training in Malaria and Other Arthropod-Borne Diseases

Administration

Ain Shams University, Cairo, Egypt

Principal Investigator

Dr. Sherif El Said

1. Introduction

Arthropod-borne diseases present a clear danger to the health of the people of Egypt, particularly to those in the rural areas least able to cope with additional problems. Three diseases, Rift Valley fever (RVF), malaria and leishmaniasis have been selected for study in the initial phases of this program. It is anticipated that filariasis will be added at some time in the future.

RVF is the arthropod-borne disease of greatest concern in Egypt today. Recent epidemics have had a serious effect on human populations. Moreover, the same disease in livestock has produced devastating losses resulting in prolonged meat shortages. The danger of repeated epidemics and epizootics remains and the potential for export of the virus into other countries of the Mediterranean basin cannot be minimized.

Malaria is an ancient scourge of Egypt and periodic epidemics have seriously affected the development of the country. For the last three decades malaria has smouldered, remaining at a low but unacceptable level of endemicity in a number of areas. Anopheles pharoensis and Anopheles multicolor are the most important Egyptian vectors. An. gambiae is absent in Egypt, but has invaded in the past, and the potential for reintroduction is great. Constant monitoring of the Lake Nasser area is critical to prevent establishment of this mosquito

in Egypt. Recent discoveries of An. stephensi, a major Asian malaria vector, on the Red Sea coast is another example of the vulnerability of Egypt to invasion.

Leishmaniasis is not considered a major health problem in Egypt today. However, a number of endemic foci have been detected on the eastern bank of the Suez Canal. The disease is important in countries bordering Egypt and infections have been regularly detected in Egyptian workers returning from overseas assignments. The potential for establishment of this pathogen as a serious problem in Egypt is great.

2. Purpose and Workscope

Studies on Rift Valley fever (RVF)

a) Serological studies shall be conducted on human populations in Egypt and the Sinai to demonstrate the extent of present or previous infections with RVF.

b) Domestic and wild animals shall be surveyed to determine levels of non-human infection. Special emphasis shall be placed on isolation of virus from small mammals and description of the transmission cycle within the reservoir population.

c) Actual or potential arthropod vectors of RVF shall be identified. Population dynamics, vector competence, and insecticide susceptibility shall be characterized in order to develop a rational control strategy compatible with biological, geographic and economic realities.

d) The role of phlebotomine sandflies, if any, in the feral and domestic transmission of RVF shall be determined.

Studies on Malaria

a) Serological and parasitological studies shall be conducted on human populations in Egypt and the Sinai to demonstrate the extent of present or previous infection with malaria.

b) Actual or potential vectors of malaria shall be identified. Population dynamics, vector competence, and insecticide susceptibility shall be characterized in order to develop control strategies.

c) The Red Sea coast shall be carefully monitored for evidence of expansion of populations of *Anopheles stephensi*. Lake Nasser and the Sudanese border shall be carefully monitored to detect introductions of *An. gambiae*.

Studies on Leishmaniasis

a) Entomological studies shall concentrate on determining potential vectors of leishmaniasis, particularly in the oases of the Western Desert and in the Sinai.

b) Rodent populations shall be surveyed to determine the presence of leishmanial parasites and/or their susceptibility to infections.

c) Workers recently returned from Saudi Arbia, Iraq and other Middle East countries where leishmaniasis is endemic shall be surveyed for infections.

d) Control strategies to prevent introduction or spread of leishmanial parasites in Egyptian populations shall be developed.

Training

This program shall provide numerous opportunities for support and training of young Egyptians. Training opportunities will be provided at several levels.

a) Technicians

The lack of well-trained professional technicians remains a major deficiency in the Egyptian bio-medical research establishment. This program will provide training and support opportunities for a number of technicians. It is anticipated that many of these will remain as full time staff members at Ain Shams. In addition, technical personnel from the Ministry of Health will receive advanced training in parasitology, virology, entomology and field survey technique.

b) Graduate Students

As a teaching institution, Ain Shams University bears a major responsibility for the education and training of young scientists. This program will support a number of graduate students who will assist in the research effort while working toward advanced degrees. The importance of this opportunity to work on a major research project cannot be minimized and the experience gained will be invaluable.

c) Post-doctoral Research Associate

A limited number of positions will be available to post-doctoral students who can make a major contribution to the research effort. Both research and clinical doctorates will be given an opportunity to further their training in the specific area of arthropod-borne diseases.

3. Administrative Organization

Funding

This program will be administered by NIAID with funds provided by USAID. A contract will be awarded to Ain Shams University with duties and responsibilities specified in the contract workscope.

Project Officers

The NIAID-appointed Project Officers (P.O.) will have overall responsibility for conduct of this project, assignment of duties and responsibilities, and implementation of the workscope. The P.O.s will have sole authority to modify the workscope and alter project protocols to facilitate completion of stated goals within the objectives of the general project and with the concurrence of USAID.

Principal Investigator

The Principal Investigator (P.I.) at Ain Shams will have primary responsibility for the operations of the unit. The P.I. will direct implementation of designated protocols, oversee recruitment of staff and procurement of supplies and equipment, and insure timely submission of required reports. The P.I. will also work for cooperation between the various groups and insure the ready flow of personnel, information, and materials throughout Egypt and the Sinai.

Project Leaders

The Project leaders will be senior staff personnel with primary responsibility for their specific project areas. They will oversee the conduct of research in their areas, answer to the P.I. and advise the P.I. as to progress.

Cooperating Units

Within Egypt.--The Faculties of Medicine and Public Health at Ain Shams University provide an important resource of expertise and experience in parasitology, epidemiology and clinical medicine. Involvement of key members of these faculties is assured by their participation in the governing of the Ain Shams Center and by their assignment to specific duties within the project. The Egyptian Ministry of Health is closely involved with the Ain Shams group, providing technical and advisory support for several ongoing investigations. At the same time, Ain Shams is providing supervision to field teams and is training senior technicians employed by the Ministry.

Cooperation of the Ministry in the proposed project is critical and is expected at several levels. Senior Ministry staff will be available to advise on various aspects of epidemiology, serology, entomology and clinical parasitology. Field teams of the Ministry will be available to assist in collection of serological and entomological specimens

The U.S. Naval Medical Research Unit #3 (NAMRU-3) is a Cairo based organization closely allied with the Ain Shams group. Cooperation in studies of RVF are already underway and will continue. Some Ain Shams staff members are working at NAMRU while some NAMRU staff members are conducting investigations at Ain Shams facilities. Ain Shams is responsible for supporting many of the NAMRU entomological studies relating to RVF.

Several U.S.-based institutions are providing ongoing advice and support to Ain Shams and will continue to do so in the future. CDC is involved in serological studies, providing training and advice on the application of IFA and ELISA to malaria. Scientists from Yale University have been cooperating with NAMRU and Ain Shams on RVF studies. The Walter Reed Army Institute of Research is providing assistance in medical entomology and is planning to post a scientist at Ain Shams for a period of two or more years. The Harvard School of Public Health is providing entomological support through Dr. Andrew Spielman of the Department of Tropical Public Health. The London School of Hygiene and Tropical Medicine is providing training to Ain Shams personnel in serology and epidemiology while scientists from London are serving as consultants to Ain Shams programs. A collaborative study on serological detection of immunity to malaria sporozoites has been initiated with Dr. Ruth Nussenzweig of the Department of Parasitology, N.Y.U. School of Medicine. This collaboration will call for the training of Ain Shams scientists in New York and the work of N.Y.U. scientists in Egypt. All of the foregoing collaborations will be expanded under the terms of this proposal.

Epidemiology Center

The Ain Shams Center has entered into an agreement with Dr. M. El Alamy, Director of the Qalyub Center for Field and Applied Research (MOH) and

Senior Advisor to new Epidemiology Study Center in the delta. The delta study areas have been subjected to intensive demographic surveys and will provide baseline information useful for in-depth epidemiological studies on the arthropod-borne diseases of concern. This arrangement will provide a unique opportunity to affiliate an Egyptian epidemiology group with a superb international reputation, the Centers for Disease Control and U.S. universities active in Qalyub. This association should be mutually beneficial and provide valuable opportunities and experience to the Ain Shams group.

The Sinai Field Station

A permanent field operation will be developed in the Sinai peninsula for the conduct of the intensive surveys planned for that area. A permanent station will be located in facilities of the new Suez Canal University at Ismailiya. Staff from the Canal University will be trained and form the nucleus of teams conducting surveys in the Sinai.

The faculty at the Canal University is oriented toward community medicine and has primary responsibility for the health of the inhabitants of the Sinai. Involvement in this project will give the Canal University staff an added dimension in epidemiology, parasitology and entomology, and address the problems of arthropod-borne disease which are now almost totally ignored.

4. Cooperative Aspects of the Program

The Malaria Research Unit at Ain Shams University, in cooperation with the Faculties of Medicine and Public Health, the Egyptian Ministry of Health, and NAMRU-3 has a history of studies on serology, parasitology, and entomology of malaria and filariasis, and more recently on Rift Valley Fever. These studies have emphasized field investigation and have attempted to chart the magnitude of the disease problems, describe the biology of the arthropod vectors, and develop control schemes.

The collaborative nature of this program will bring together scientists from all over Egypt to work together on a number of health problems. The entomology group will bring an orientation to field studies along with the expertise and personnel necessary to carry out these studies. The Faculty of Medicine group will offer its experience in laboratory oriented studies. Together, these units present a formidable array of talents and interests covering all aspects of the disease problem from vector biology to human pathology. The involvement of scientists at the Suez Canal University is particularly important.

The primary focus of collaborative studies will be the Sinai, where Ain Shams and Canal University field teams will investigate the actual or potential insect vectors of RVF, malaria, and leishmaniasis. At the same time serological studies of human and animal populations will be used to determine the actual infectious states. Characterization of sera will be another area of intense cooperation. In many study areas, human sera will be tested for presence of antibodies against RVF, malaria, and leishmania. The area of Lake Nasser will be a second area of particular interest.

The proposal provides a unique opportunity to bring together scientists from the Ministry of Health, the Faculties of Medicine and Science, other Egyptian Universities, and Scientists from the U.S. and other countries. Each brings its own expertise and its own orientation. Collaboration will be mutually beneficial, the joint productivity enhanced, and the results a superior research effort which will benefit the peoples of Egypt and the whole region.

5. <u>Existing Facilities and Local Contribution</u>

The Ain Shams Unit, in achieving status as an interdepartmental research Center, now has the capacity to increase its faculty to include physicians, veterinarians, epidemiologists, and others with interests in arthropod-borne diseases. The Center will function as a separate unit with its own budget, answering directly to the President of the University.

The Ain Shams Center for Reserach and Training in Malaria and other Arthropod-borne diseases occupies two floors in the Faculty of Sciences building on the University Campus in Abbassia, a suburb of Cairo. Facilities include 35 rooms used as laboratories, insectaries, animal rooms, a dark room, offices, and an audio-visual center. The laboratories are well furnished with modern scientific equipment including centrifuges, a laminar flow hood, incubators, and balances. Optical equipment includes a wide range of research microscopes, many with phase-contrast lenses and some equipped with cameras. Insectary facilities include six modern units with temperature, humidity, and photoperiod control.

In the past two years, the University has committed over $400,000 for the construction of new laboratory and insectary facilities for the Center. In addition, over $200,000 has been spent to equip these laboratories. Five rooms to house the P-3 level containment facilities needed for virological studies relating to RVF have been completed and await furnishing. The level of University commitment to salary support of staff is outlined in the budget.

6. Future Funding

This contract will allow the establishment of research facilities and the initiation of a research program unique in its capabilities and goals. Once in place and functioning, this program will attract scientists and scholars interested in a wide range of public health problems.

The WHO has already expressed interest in the program and a number of private foundations have been contacted. All feel that if the program were initiated and functioning as proposed, future funding could be obtained from sources other than the U.S. Government.

7. Budget Justification

Personnel.--The size and geographic range of this program requires a full-time staff of highly skilled and dedicated physicians, scientists, technicians, and support personnel in Egypt.

The Egyptian university system requires that a faculty member spend only 8-12 hours per week in teaching and research. For this they receive approximately $100-200 per month. Consequently, faculty members usually hold one or more outside jobs. Clearly, if this program is to succeed, investigators must be expected to devote a full-work week to the project without the need for outside employment. Compensation for time spent over what is required by the University must be considered a requisite of the project.

Equipment.--Most of the requested equipment is basic to laboratory functions. The equipment for the Sinai facility will allow the first-time outfitting of those laboratories. The insectaries in the Sinai and Cairo are essential for the entomological investigations which make up a major segment of these studies.

~~The P-3 level containment facilities are needed to conduct isolation and characterization of the viral agent of RVF. Ain Shams has constructed the rooms to house these facilities. This proposal requests funds for the air supply and exhaust systems necessary for secure handling of the pathogen. Laminar flow hoods, autoclaves, and other pieces of equipment will furnish these containment facilities.~~ *

A mini-computer system is required by Ain Shams to handle the vast amounts of data generated by their field and laboratory teams.

Continuing, but unspecified, equipment costs in years 2-5 will include purchases of unanticipated equipment, maintenance of equipment already in place, and purchase of expendable items. Among expendables are the large quantities of glass and plastic-ware needed for serological tests and parasite culture, the animals, food and bedding needed for virological studies in animals, serological reagents, chemicals, and general laboratory supplies.

* This element of proposal (P-3 Level Containment Unit) not approved by AID.

Vehicles.--Vehicles for transport of field teams represent one of the major components of this proposal. It will be necessary for the field teams to cover all of Egypt proper from the Delta to the Sudan border in addition to studies in the Sinai. Without vehicles these studies would be impossible.

Four-wheel drive vehicles are needed to reach less accessible villages, particularly in the Western Desert and the Sinai. Maxi-van type vehicles, actually rugged mini-buses, are needed to transport larger teams on the better roads along the length of the Nile and for direct transport to the Sinai field station.

The continuing cost of vehicle operation recognizes the high cost of maintenance in the desert environment. Poor roads and long distances require regular replacement of tires and high repair costs as well as general fuel expenses. Vehicles will be used daily over long distances.

8. Summary

This program shall provide an administrative structure and a system of physical facilities in which a series of studies on health problems can be conducted by scientists and health professionals in Egypt. The combination of strong central laboratories with well-equipped and staffed field facilities provides an opportunity for in-depth epidemiological and entomological studies on three important vector borne diseases of humans and animals.

The very nature of the project stresses cooperation with the bringing of diverse talents and orientations to bear on specific disease problems. The opportunity for mutual enrichment, the learning of new techniques, and the development of better methods coupled with the possibility of lessening the threat of human infection would be reason enough for participation. The proposal would create a model for future cooperative studies on serious health concerns in an area where the problems exist and the prospect for achievement are great.

BUDGET WORKSHEET (1st Year)

Ain Shams University and Field Teams

A. Personnel

Title:	Ain Shams Annual Salary ($) (hours/week devoted to project)	Project Compensation (hours/week devoted to project)
a) Ain Shams Central Laboratory (Cario)		
RESEARCH STAFF		
Dr. Sherif El Said (P.I.)	2,700 (4)	3,600 (30)
Project Leaders		
RVF	2,700 (4)	3,600 (30)
Malaria	2,700 (4)	3,600 (30)
Virology	2,700 (4)	3,600 (30)
Parasitology	2,700 (4)	3,600 (30)
Field Operations	-	3,600 (30)
Principal Professional Assistants		
-	1,800 (4)	2,400 (28)
-	1,800 (4)	2,400 (28)
-	1,800 (4)	2,400 (28)
-	1,800 (4)	2,400 (28)
-	1,800 (15)	-
-	1,800 (15)	-
Veterinarians		
-	2,700 (5)	1,200 (15)
-	2,700 (5)	1,200 (15)
-	2,700 (5)	1,200 (15)

SUPPORT STAFF				
Chief Laboratory Technician @ $2,000	800		1,200	(40)
Technician (4)@ $1,440	2,400	(12)	3,360	(28)
Technician (10)@ $1,440 MOH employees	6,000	(12)	8,400	(20)
Drivers (4)@ $1,800	-		7,200	(160)
Mechanic @ $1,200	-		1,200	(40)
Secretary @ $3,000	-		3,000	(40)
TRAINEE POSITIONS				
Graduate assistants (16)@ $840	-		13,440	(480)
Technicians (10) @ 840	-		8,400	(400)
Per diem for regular collecting trips in Egypt	-		40,000	
Egyptian consultants	-		10,000	
Cairo Personnel Total	41,600		130,600	

b) Sinai Field Facility
(Suez Canal University and Sinai Field Teams)

RESEARCH STAFF				
Sinai project leader	2,700	(4)	3,600	(30)
Professional assistants				
-	1,800	(4)	2,400	(30)
-	1,800	(4)	2,400	(30)
Field team supervisor	1,800	(4)	2,400	(30)
Physician	2,700	(4)	3,600	(30)
Veterinarian	2,700	(4)	3,600	(30)
SUPPORT PERSONNEL				
Drivers (2) @ $1,800	-		3,600	(80)
Technicians (2) @ $1,440	1,200	(20)	1,680	(60)
Collectors (9) @ $600	-		5,400	(180)
laborers (2) @ $360	-		720	(80)
TRAINEE POSITIONS				
Graduate assistants (4) @ $840	-		3,360	(120)
Technicians (4) @ $840	-		3,360	(160)
Per diem for field team	-		30,000	
			66,120	
	14,700			
Total*	56,300*		196,720	

*Ain Sham Contribution to Salary
$56,300
Project Contribution to Salary
$196,720

3. EQUIPMENT

Ain Shams Central Laboratory

a)	ELISA UNIT	
	Tetertek multiskan	12,000
	Titertek multiwash	2,500
	Automatic diluter	3,000
	Microshaker	2,000
	Water bath	1,000
b)	ENTMOLOGY UNIT	
	Dissecting microscopes 6 @ $1,500	9,000
	Environmental heating and cooling units for old insectaries 6 @ $1,300	7,800
	Electrophoresis with scanner	5,000
	Field generator 4 @ $1,200	4,800
c)	GENERAL LABORATORY SUPPORT	
	Hematocrit centrifuge 2 @ $600	1,200
	Semi-micro analytical balance	6,000
	Top-load balance	1,500
	Rotary evaporator	3,000
	High speed centrifuge	8,000
	Table top centrifuge	2,000
	Refrigerator with freezer 4 @ $1,200	4,800
	Reach-in CO_2 incubator	7,000
	Dishwasher for glassware	5,000
	Glassware drier	4,000
	Large capacity distillator 2 @ $3,000	6,000
	Horizontal laminar flow hood 2 @ $7,000	14,000
	Vertical laminar flow hood 2 @ $7,000	14,000
	Deep freezer (-70°C) 2 @ $7,000	14,000
	Deep freezer (-30°C) 2 @ $2,000	4,000
	Liquid nitrogen storage and back-up system	10,000
	Inverted phase microscope 2 @ $4,000	8,000

	Phase contrast microscope 2 @ $6,000	12,000
	Electrical generator for emergency power 2 @ $25,000	50,000
d)	P-3 LEVEL CONTAINMENT FACILITY	
	Air supply and exhaust system for P-3 area	~~50,000~~
	HEPA filters for air system	~~10,000~~
	Renovation of area to meet P-3 safety specifications	~~30,000~~
	Double-door autoclave	~~8,000~~
	Horizontal laminar flow hood	~~7,000~~
	Vertical laminar flow hood	~~7,000~~
e)	EXPENDABLES	
	Mosquito-food, rodent food, paper/cage materials	5,000
	Gowns, boots, masks, gloves for P-3 facility	8,000
	Laboratory supplies	15,000
	Glass and plastic ware	20,000
	Chemicals/reagents	20,000
	Liquid nitrogen	6,000
f)	Computer services for data analysis	30,000 (est)
	Equipment repair	10,000
Cairo Total		~~448,600~~ 336,600

*P-3 Level Containment Facility not approved by AID. FY 81 funding to Ain Shams reduced accordingly.

Sinai Field Operation

a)	CANAL UNIVERSITY LABORATORY	
	Insectary, walk-in with temperature and humidity control 2 @ $11,000	22,000
	Racks, pans, water system, food grinder	6,000
	Liquid nitrogen equipment	5,000
	Deep freezer (-90°C)	7,000
	Deep freezer (-40°C)	2,000
	Refrigerator/freezer 4 @ $1,200	4,800
	Phase contrast microscope	6,000
	Transmitted light microscope 3 @ $2,000	6,000
	Dissecting microscope 4 @ $1,500	6,000
	Water bath	1,000
	Centrifuge	3,000
	pH meter	1,000
	Conversion of lab to rodent facility	8,000
	Cages and racks for rodent room	7,000
b)	SINAI FIELD TEAM	
	Light traps, mosquito cages, sampling equipment	5,000
	Animal traps	7,000
	Dissecting microscopes 3 @ $1,500	4,500
	Transmitted light microscopes 3 @ $2,000	6,000
	Field generator 4 @ $1,200	4,800
	Tents 4 man 10 @ $120	1,200
c)	EXPENDABLES	
	Laboratory/field supplies	8,000
	Liquid nitrogen	6,000
	Glassware and plasticware	10,000
	Insectary/animal room supplies	6,000
	Chemicals/reagents	10,000
		153,300
Equipment Total		~~601,900~~ 491,900

C. VEHICLES

Ain Shams/Sinai

Four-wheel drive utility wagon	
3 @ $20,000	60,000
Maxi-van 2 @ $20,000	40,000
Mobile labs (tent-type) on trailer	
3 @ $5,000	15,000
Fuel, maintanence, insurance for new and existing vehicles	100,000
	215,000

D. ADMINISTRATION

Local and meeting travel	15,000
Reports, publication in Egyptian journals	3,000
Library acquisition	20,000
	38,000

BUDGET WORKSHEET ($ U.S.) AIN SHAMS UNIVERSITY

	1st year	2nd year	3rd year	4th year	5th year
.. Personnel					
Central Lab. (cairo)	130,600	143,660	158,026	173,829	191,212
Sinai Field Lab	66,120	72,732	80,005	88,006	96,807
). Equipment					
Ain Shams (Cairo)	336,600*** ~~448,600~~	250,000*** ~~110,000~~	140,000	140,000	120,000
Sinai facility	153,300	60,000	60,000	60,000	40,000
:. Vehicles	215,000	150,000*	150,000**	160,000**	155,000
). Administration	38,000	40,000	45,000	50,000	55,000
Total	~~1,051,600~~ 941,600	~~606,392~~ 716,392	633,031	671,835	658,019
Grand Total	$3,620,877				

*vehicle for visiting U.S. scientists

**Replacement vechicles

*** $110,000 for P-3 equipment deducted from FY 81 budget.
$110,000 budget in FY 82 for other equipment needs.

Title of Project

Epidemiology and Control of Arthropod-borne Diseases in Israel

Collaborating Institutions

Kuvin Centre for the Study of Infectious and Tropical Diseases, Hebrew University, Jerusalem, Israel.

Principal Investigator--Dr. Rachel Galun

1. Introduction

Arthropod-borne diseases present a clear danger to the health of the people of Israel, particularly those in rural farming communities and members of nomadic tribes. Three diseases, Rift Valley fever (RVF), malaria and leishmaniasis, have been selected for study in the intial phases of this program.

RVF is an arthropod-borne disease of great concern in the Middle East. Epidemics in Egypt, and a series of cases in United Nations peace keeping forces in the Sinai led to the immunization of nearly 1,000,000 head of livestock along the Israel/Egypt border. In spite of these precautions, the recent discovery of 6 probable RVF infections in Israeli citizens living behind the immunized barrier flocks has demonstrated the serious nature of the threat.

Malaria has long plagued the countries of the eastern Mediterranean and Israel did not escape this disease. However, an intensive eradication effort and constant surveillance has prevented the reintroduction of malaria into Israel. The disease does exist in neighboring states and the potential for outbreaks within Israel remains. Research on malaria at the Hebrew University has focused on development of new seroepidemiological techniques, immunosuppression during malaria infections, antigenic analysis and vaccine development.

Leishmaniasis persists in Israel as a problem in rural areas, affecting farmers and nomads. Research at the Hebrew University has centered on studies of the sand fly vectors of Leishmania, characterization of parasite types and development of a vaccine.

2. Purpose and Workscope

Studies on Rift Valley Fever (RVF)

a) Serological studies shall be conducted on human, wild and domestic animal populations in areas of Israel bordering the Sinai to detect any movement of RVF infections into Israeli territory.

b) Entomological studies shall be conducted to determine the competence of Israeli mosquitoes and phlebotomine flies for transmission of RVF virus.

Studies on Malaria

a) Serological studies emphasizing the radio-immunoassay (RIA) technique shall be performed on sera from Egypt and the Sinai provided by the Ain Shams group. Potential vectors in the Negev will be surveyed.

Studies on Leishmaniasis

a) Serological and parasitological studies shall be conducted on human populations in Israel and the Negev to demonstrate the extent of present or previous infection with leishmaniasis.

b) Animal reservoirs of the parasite shall be sampled to determine levels of non-human infection.

c) Parasites isolated from human and animal sources shall be characterized.

d) Actual or potential vectors of Leishmania in Israel and the Negev shall be identified and biologically characterized.

Training

This program shall provide numerous opportunities for support and training of young Israelis. Training opportunities will be provided at several levels.

a) Technicians

A limited number of technicians will be trained and supported by this project.

b) Graduate Students

The Hebrew University, as a teaching institution, bears a major responsibility for the education and training of young scientists. This program will support a number of graduate students who will assist in the research effort while working toward advanced degrees.

c) Post-doctoral Associates

A limited number of positions will be available for support of post-doctoral students who can make a major contribution to the research effort. Both research and clinically oriented doctorates will be given an opportunity to further their training in the specific area of arthropod-borne diseases.

3. Administrative Organization

Funding

This program will be administered by NIAID with funds provided by USAID. A contract will be awarded to Hebrew University with duties and responsibilities specified in the contract workscope.

Project Officer

The NIAID-appointed Project Officers (P.O.) will have overall responsibility for conduct of this project, assignment of duties and responsibilities, and implementation of the workscope. The P.O.s will have sole authority to modify the workscope and alter project protocols to facilitate completion of stated goals with the objectives of the general project and with the concurrence of USAID.

Principal Investigator

The Principal Investigator (P.I.) at Hebrew University will have primary responsibility for the operations of the unit. The P.I. will direct implementation of designated protocols, oversee recruitment of staff and procurement of supplies and equipment, and insure timely submission of semi-annual and annual reports. The P.I. will also work for cooperation between the various groups and insure the ready flow of personnel, information, and materials throughout Israel.

Cooperating Units

Hebrew University.--Several groups within the Hebrew University will be involved in this project. The Kuvin Centre for the Study of Tropical and Infectious Diseases will act as overall coordinator of the project. Also within the Hadassah Medical School, the Departments of Protozoology, Virology, and Medical Ecology and Social Medicine will participate. The Department of Zoology of the University will play a particularly important role in the conduct of this project.

Ben Gurion University of the Negev

The Centre for the Biological Control of Mosquitoes at Ben Gurion University will serve as the focus for studies along the Sinai border and in the Negev Desert.

Other Israel Units

The Division of Epidemiology and other units of the Ministry of Health will provide advice and support for the conduct of these studies.

5. Existing Facilities and Local Contributions

The Kuvin Centre occupies laboratories scattered throughout the Hadassah Medical School but by January, 1982 will move to a single floor of a new research facility being completed on the University Campus at Ein Karem.

Basic laboratory equipment is supplemented by an interdepartmental pool which includes scintillation counters, gamma counters, three Phillips electron microscopes, mass spectrometer, ultra-centrifuges, nuclear magnetic resonance and electron spin spectrometers, amino-acid analyzers, etc.

The level of University commitment to salary support of staff is outlined in the budget.

The Kuvin Centre operates on University funds and an endowment of approximately $650,000.

6. Future Funding

This contract will allow an already fully functional research establishment to orient its program toward epidemiology and control of three important diseases with regional cooperation a major goal. Once cooperation is initiated, it is expected that this program will attract scientists interested in a wide range of public health problems.

Funding beyond the term of this project is already being investigated. The Kuvin Centre and its fund-raising arm is exploring private foundations as a source of support. In addition the WHO has expressed interest in the program. All feel that if this cooperative program were initiated and functioning as proposed, future funding could be obtained from sources other than the U.S. Government.

7. Budget Justification

Personnel.--The size and complexity of this project require a full staff of highly qualified clinicians, researchers and technicians. Many of these are already full-time staff members at Hebrew University, some will be paid part-time for work on the project, while a small number will be hired specifically to work full-time.

Individuals in a training status make up an important segment of the research staff and are, by nature, temporary appointments.

Equipment.--The few basic pieces of laboratory equipment requested are necessary for conduct of the project. Expenditures for glassware, chemicals and supplies reflect the considerable amount of material needed for parasite culture and seroepidemiological tests.

Vehicle.--The single vehicle requested for the Negev Desert field station is needed to cover broad areas, often with marginal roads. The continuing cost of vehicle insurance and operating expenses recognizes the high cost of maintenance in the desert environment.

8. Summary

This program shall provide an administrative structure and staff capable of conducting studies on three important arthropod-borne diseases in Israel. Moreover, the program will support and complement similar studies in Egypt. This program seeks to solve local health problems, prevent the introduction of new diseases and in a spirit of mutual cooperation, improve the health of the peoples of the region.

This proposal should create a model for future cooperative studies on a variety of health problems, with cooperation a key to success.

BUDGET WORKSHEET (1st YEAR)

HEBREW UNIVERSITY AND FIELD TEAM

A. Personnel

Title:	Hebrew University Annual Salary ($) (hours/week devoted to project)	Project Compensation (hours/week devoted to project)
a) Hebrew University Central Laboratory (Jerusalem)		
RESEARCH STAFF		
Prof. Rachel Galun (P.I.)	32,000 (10)	6,000 (10)
Prof. Greenblatt	37,230 (10)	-
Prof. Spira	29,720 (10)	-
Prof. Solitzianu	37,230 (10)	-
Prof. Gunders	37,230 (10)	-
Dr. Schlein	24,200 (10)	-
Chief Serologist/ lab. manager		20,000 (40)
Clinical histologist	14,200 (5)	10,000 (15)
SUPPORT STAFF		
Technician (3) @$15,000	-	45,000 (120)
Admin. Assistant/ key punch operator	-	8,000 (40)
Unskilled laborer	-	10,000 (40)

Trainee Positions

Microbiologist (post-doctoral trainee)		16,500	(40)
Student assistants			
M.S. candidates (3) @$7,000	3,000	18,000	(120)
Ph.D. candidates (3) @$11,000	3,000	30,000	(120)
b) Negev Field Team			
Project Supervisor Dr. Joel Margalit	19,720, (5)	10,000	(15)
Entomologist (Post-doctoral trainee)		16,500	(40)
Technician		10,500	(40)
Per diem for field trips -		5,000	
TOTAL	237,530**	205,500	

*Shared costs Israeli Institutions

Hebrew -	$217,810
Ben Gurion -	$19,720
Total	$237,530

**In addition to support staff costs specified in the budget, Hebrew University will provide clerical, secretarial, and administrative support which will not be charged against the project.

B. Equipment

a) Hebrew University Central Laboratory

Fluorescent microscope	15,000
Research microscopes 2@ $2,000	4,000
Dissecting microscopes 2@ $1,500	3,000
Cryogenic's equipment	8,000
Microscope camera and accessories	1,000
Revco - 90°C freezer	5,000
Freezer - 20°C	2,000
Computer terminal (rental per year)	2,000
Balance, semi-micro	3,000
IEC model K	4,000
Microfuge	850
Rotors for refrigerated high speed centrifuge	2,500
Laminar flow hoods 2@ $3,000	6,000
Inverted phase contrast microscope	5,000
Dilution/titration equipment	5,000
Amicon ultra-filtration apparatus	2,500
Spectrophotometer	8,500
Shaking water bath	1,500
Lyophilizer	1,500
Used scintillation counter	3,800
Environmental control cabinets (Refritherm) 3@ $1,560	4,680

Expendables (Jerusalem)

Laboratory supplies	6,000
Liquid nitrogen	4,000
Plastic ware/glassware	10,000
Chemicals	15,000
Animals - mice, psammomes, hamsters, turkeys	6,500
Maintenance of animals	6,500
Equipment maintenance & insurance	3,500
Sundry	4,000
Jerusalem Total	143,830

b) Negev Field Team
(including laboratory at Ben Gurion)

Insectory with temperature and humidity control	20,000
Temperature recorders 4@ $900	3,600
Thermistors 30@ $30	900
Chart recorders 2@ $1,025	2,050
Hygrothermograph 4@ $245	980
paper	150
Dissolved oxygen meter 2@ $900	1,800
Pyrheliograph 3@ $405	1,215
Light Traps 20@ $120	2,400
Small mammal traps 300	1,700
Large animal traps 12	600
Field generator	800
Dissecting microscopes 2@ $1500	3,000

Expendables

Laboratory supplies	3,000
Insert rearing materials	5,000
Glassware	3,000
Chemicals/reagents	4,000
Negev Sub-total	54,195
Equipment Total	198,025

C. Vehicles

Four-wheel drive utility wagon	20,000
Mobile lab. trailer	2,000
Fuel, maintainence, insurance	17,000
Vehicle Total	39,000

D. Administration

Travel	
local and meeting travel	5,000
Reports, local publications	3,000
Library acquisition	5,000
Office supplies	3,000
Administration Total	16,000

BUDGET WORKSHEET ($ U.S.) HEBREW UNIVERSITY

		1st year	2nd year	3rd year	4th year	5th year
A.	Personnel					
	Jerusalem Central Lab.	163,500	179,850	197,835	217,619,	239,381
	Negev Field Lab.	42,000	46,200	50,820	55,902	61,492
B.	Equipment					
	Jerusalem	143,830	80,000	85,000	90,000	90,000
	Negev	54,195	25,000	30,000	35,000	35,000
C.	Vehicles	39,000	43,000	47,000	52,000	57,000
D.	Administration	16,000	16,000	16,000	18,000	18,000
		458,525	390,050	426,655	468,521	500,825

GRAND TOTAL $2,244,624

Role of the National Institute of Allergy and Infectious Diseases

The National Institute of Allergy and Infectious Diseases (NIAID) of the National Institutes of Health (NIH) has accepted responsibility for evaluating, coordinating and administering a cooperative project on "Epidemiology and Control of Arthropod-Borne Diseases in Egypt and Israel."

This project will be funded by the United States Agency for International Development (USAID) and administered by the Contract Management Branch, NIAID. Separate contracts will be awarded to Ain Shams University, Cairo, and Hebrew University, Jerusalem.

NIAID has assigned two Project Officers to coordinate this program, insure a high level of scientific merit and productivity and facilitate cooperation between the two units. The project has been reviewed and approved by the Policy Council, NIAID and endorsed by the Office of International Health, DHHS.

NIAID Budget Justification

Publication.--Funds will be held to cover publication costs, page charges and reprints for articles in international journals and reports arising from the two projects.

Travel (administrative)

a) P.I. (Israel and Egypt). Funds will be held for the Principal Investigator on each project for travel and per diem to Washington annually for consultation.

b) P.O. Funds will provide travel and per diem for the Project Officers each to visit Egypt and Israel twice annually. These trips will allow for careful monitoring of the projects and facilitate the cooperative aspects of the program.

c) NIAID Contracting Officer.--Funds will provide travel and per diem for an annual visit to Egypt and Israel by the Contracting Officer to review financial procedures associated with the projects.

Travel (consultants)

Project consultants provide a means of directing and monitoring conduct of the projects while bringing to bear expertise and experience not available in Egypt or Israel. Consultants also provide training in new techniques, and the interchange of ideas. These consultants are critical for insuring maximum efficency and quality of performance.

Full-time U.S. Investigator.--An entomologist will be posted full-time at Ain Shams University. This scientist will receive initial training at the NIH and be fully prepared to conduct studies in entomology and parasitology or virology. The need for a full time U.S. Virologist will be reviewed during the 1st yea and if appropriate NIH will assign a Virologist at Ain Shams to assist in the Rift Valley Fever research (funds are budgeted). The purpose of a full-time staff member is two-fold. First an investigator working alongside Egyptian colleagues at an Egyptian university can provide for an important exchange of ideas and technology while demonstrating real U.S. involvement in the project. Second, this position will allow a young U.S. investigator to gain experience in an endemic area, having the opportunity to work on field problems with the support of a well qualified local team.

Administrative Support.--Funds will be held to pay partial support for an administrative assistant and a clerk at NIAID in addition to supplies and materials needed to administer these projects.

Annual Conference.--Funds will be held to support a conference at which scientists from the cooperating units, consultants, and scientists from countries with similar problems can discuss recent findings and achievements in addition to broader aspects of the problem of arthropod-borne diseases. This conference may be held in conjunction with a national or international conference on tropical medicine or could be held at independent locations. Nairobi and Washington have been suggested for initial meetings; other mutually convenient sites are under consideration.

NIAID ADMINISTRATIVE BUDGET

1)	Publications	U.S. $5,000
2)	Travel	
	a) P.I. (Egypt) to U.S.	3,000
	P.I. (Israel)	3,000
	b) P.O.(s) to Egypt/Israel 2 trips each year.	16,000
	c) NIAID Contracting Officer	4,000
	d) Consultants	
	Entomology (Anopheles)	5,000
	Entomology (Culex) x 2	10,000
	Virology	5,000
	Serology	5,000
	Epidemiology x 2	10,000
3)	Full time U.S. investigator at Ain Shams salary and travel (2 trips to U.S./yr.)	40,000
4)	Administrative assistant (½ time) Clerk (½ time) supplies and materials	20,000
5)	Annual Joint Conference	30,000
		156,000

NIAID Administrative Budget

	1st year	2nd year	3rd year	4th year	5th year
Publications	5,000	5,000	5,000	5,000	5,000
Travel					
P.I.s	6,000	6,000	6,500	6,500	7,000
P.O.s	16,000	17,000	18,000	19,000	20,000
Contracting Officer	4,000	4,000	4,500	5,000	5,000
Consultants	35,000	39,000	43,000	47,000	52,000
U.S. Investigator	40,000	75,000	98,000	108,000	118,000 *
Administration	20,000	22,000	25,000	28,000	31,000
Conference	30,000	33,000	36,000	40,000	45,000
	156,000	201,000	236,000	258,500	283,000 *
					1,134,500 *

*Funding for 2nd US Investigator(Virologist) included for Years 2-5, per discussions with AID.

UNITED STATES GOVERNMENT

memorandum

DATE: May 14, 1981

REPLY TO ATTN OF: NE/PD/PDS, Stephen F. Lintner, Bureau Environmental Coordinator

SUBJECT: REGIONAL - Epidemiology and Control of Anthropod-Borne Diseases in Egypt and Israel (Regional/Coop. Proposal) (-) - Environmental Clearance

TO: NE/TECH/HPN, Barbara Turner, Project Chairperson

The subject proposed project is exempted from environmental analysis by the provisions of 22 CFR 216.2(c) Categorical Exclusions (1)(iii), (2)(ii) and (2)(iii),"A.I.D. Environmental Procedures".

cc: GC/NE, B. Janigan