

PDBAI 1002

621-0163

TANZANIA

ZANZIBAR MALARIA CONTROL

OP + Project Auth.

FY 81

TANZANIA

ZANZIBAR MALARIA CONTROL

(621-0163)

PROJECT PAPER

Loan No. 621-U-026

Submitted: February, 1981  
Authorized: September 28, 1981  
Obligation: September 30, 1981

Agency for International Development  
Washington, D.C. 20523

AGENCY FOR INTERNATIONAL DEVELOPMENT

WASHINGTON, D.C. 20523

This Project was approved by the Agency for International Development on September 28, 1981 with the following understandings:

In order for this project to have meaningful impact on the incidence of malaria in Zanzibar, the quantified health targets of this endeavor must be raised and its timeframe extended. Specifically, (1) the project will make every effort to effect the greatest possible reduction in the percentage of the Zanzibar population infected by malaria from an estimated 75 percent to far below 50 percent, an objective which AID believes to be both feasible and practical; and (2) recognizing that the malaria control program initiated by this project is in reality a ten year endeavor, every effort must be made during the life of the project to insure that a strong foundation for second phase activities is prepared. To accomplish this, a special evaluation will be undertaken prior to the end of year four of the project, the results of which will be used to define a plan for health and institutional goals for a second phase project and for the full institutionalization of malaria control on Zanzibar beyond the year 1990.

SEP 15 1981

**ACTION MEMORANDUM FOR THE ADMINISTRATOR**

**THRU:** ES

**THRU:** AA/PPC, Larry Smucker, Acting

**FROM:** AA/AFR, F.S. Ruddy

**SUBJECT:** Tanzania - Zanzibar Malaria Control Project (621-0163)

**Problem:** Your approval is required to execute a loan of \$11,771,000 from the Health Appropriation (HE) to the United Republic of Tanzania for the Zanzibar Malaria Control Project (621-0163). It is planned that the entire amount of the Project loan will be obligated in FY 1981. Your approval is also required to authorize the requested waivers.

**Discussion:** The purpose of this Project is to reduce the prevalence of malaria on Zanzibar to a level at which it no longer constitutes a major public health problem. This reduction will be accomplished by adapting known control methods to local conditions so as to assure that the Zanzibar government will be able to maintain effective control of the disease with its own resources. The malaria control program will cover the two islands of Zanzibar and will benefit the islands' entire half million population. It is estimated that this six year effort can reduce the percentage of the population infected by malaria from an estimated 75 percent to below 50 percent.

To effect this 33 percent reduction in malaria prevalence, the Project supports a five point control program:

1. reduction of mortality through prompt treatment with chloroquine of suspected cases;
2. reduction of morbidity through prophylactic use of chloroquine in high risk population groups (infants, children and expectant mothers);
3. reduction of vector populations through residual spraying of houses in rural areas and by the elimination of breeding sites in urban and peri-urban areas;
4. increasing community participation in the malaria control program by developing an effective health education campaign; and
5. operational research or adaptation of the above mentioned control methods to Zanzibar conditions through continuous monitoring of all Project activities.

The institutional development aspects of the Project are designed to improve the administration and management of anti-malarial programs, upgrade personnel skills especially those related to application of control techniques, and improve information

distribution systems and to integrate the malaria control program better into the Islands' primary health care system.

Zanzibar health officials consider malaria to be the most serious disease affecting the Islands. Independent studies by the World Health Organization (WHO) and AID confirm the gravity of malaria and its considerable repercussions on the general health status of Zanzibar's population. In response to these findings, Zanzibar has requested assistance from AID in order to assume their anti-malarial campaign. The resulting Project is consistent with the approved USAID/Tanzania 1983 CDSS and addresses problems identified in the Mission's Health Sector Strategy Paper prepared in 1980. This Project is the only AID funded activity directly assisting the Zanzibar government.

To achieve the Project objectives, the AID contribution will finance two long-term malaria technicians and short-term consultants in related health fields. AID funding will also provide long and short-term training, commodities and expendable supplies. The Host Country contribution will finance the estimated 430 nationals staffing the Malaria Control Unit, a portion of the costs of insecticides, larvicides and drugs, and in-country training costs.

The total estimated cost of the project is \$16.03 million. AID will contribute \$11.771 million and the Zanzibar government will provide \$4.259 million, or approximately 27 percent of total Project costs. Of AID's contribution, approximately \$10.04 million will be in foreign exchange and \$1.729 million will be in local currency. Approximately 30 percent of the Host Country contribution will be in foreign exchange. Project loan funding requirements are summarized in the following table. (Amounts shown are in \$000.)

<u>Input Category</u>	<u>Life-Of-Project Funding</u>
Technical Assistance	1,313
Commodities	2,915
Training	731
Other Costs (including contractor overhead)	2,631
Contingency	759
Inflation	<u>3,422</u>
Total	1,771
Host Country Contribution	<u>4,259</u>
Grand Total	6,030

This Project was initially designed to be grant funded. However, given the unavailability of FY 1981 grant funds, it has been decided to loan fund the Project. The relatively good economic performance of the Zanzibar economy over the past several years indicates that the government can meet the normal AID loan repayment schedule with interest rates of two percent during the ten year grace period and three percent thereafter. The loan maturity period will be for forty years from first disbursement,

including a grace period of ten years. The Zanzibar government has concurred in the decision to loan fund the Project.

The Project is designed so that the Zanzibar government will provide about forty percent of the Project's operational costs over the life of the Project. When AID's assistance terminates, Zanzibar must assume full responsibility for the Project's estimated annual recurrent cost (\$2.9 million) or continue to seek donor assistance in this effort. The Mission has determined that adequate resources are available to the government to meet its contribution to this Project as planned and eventually assume full responsibility for the recurrent costs of the Project.

The analyses presented in the Project Paper show the Project to be socially, technically and economically sound. The Project is based on a careful assessment of the health needs of Zanzibar and then, upon additional technical studies of malaria in Zanzibar by WHO, AID and the Host Country.

The Initial Environmental Examination (IEE) resulted in a negative determination for the Project which was granted at the time of PID approval. The Project intends to use DDT, Malathion and Triton X-207 to reduce vector density. These insecticides are acceptable for use in public health programs under AID environmental regulations.

The Ministry of Health and Social Welfare, acting through its Malaria Control Unit, will be responsible for implementing the Project on behalf of the Zanzibar government. With the organizational changes required of the Ministry as a covenant to this Project, the mission has judged the implementing agent of the Host Country to be capable of executing the Project.

USAID/Tanzania has attested that sufficient planning and analysis have been completed to provide reasonably firm cost estimates for the Project, thus satisfying the requirements of Section 611(a) of the Foreign Assistance Act. The AID/W Project Committee has concluded that the Project's Implementation Plan is realistic and establishes a reasonable time frame (five years) for implementing the Project.

No special problems are anticipated in negotiating the Project loan agreement. Officials of the Zanzibar government have worked closely with USAID/Tanzania staff in developing the proposed Project and have informally approved the draft loan agreement in substance, including a covenant in which the Zanzibar government agrees to reorganize the Malaria Control Unit of the Ministry of Health and Social Welfare.

The Africa Bureau Project Committee reviewed the Project on March 4, 1981 and the Bureau Project Review was held on March 10, 1981. These reviews recommended the Project for approval with several minor editorial changes. At a meeting of the Executive Committee for Project Review chaired by Acting AA/AFR on May 29, 1981, the Project was recommended for authorization.

The FY 1981 Congressional Presentation Update indicated a FY 1981 obligation in the amount of \$3,535,000 (Grant) and a life-of-project cost of \$8,871,000. A Congressional Notification was submitted on August 12, 1981 and expired on August 26, 1981 advising the current \$11,771,000 life-of-project cost and a proposed FY 1981 obligation of loan funds of \$9,980,000. A Technical Notification submitted September 11, 1981 has advised Congress of the Agency's intention to fully loan fund the Project in FY 1981.

Statutory checklists have been satisfactorily completed and are included as Annex I to the Project Paper. Appropriate covenants for inclusion in the Project Loan Agreement

have been prepared. This Project was approved by the Department of State's Standing Committee on Human Rights in October 1980.

Approval of the following waivers is requested at the time of Project authorization. Justifications for these waivers are set forth in Annex G. of the Project Paper. (See Tab - Waivers.)

1. Source, origin and proprietary procurement waivers for twenty Landrover station wagons, ten Isuzu trucks, seventy-four Japanese motorcycles and spare parts having an approximate total value of \$900,000.
2. Source, origin and proprietary procurement waiver for four Gestetner manual mineograph machines and spare parts having an approximate total value of \$7,000.
3. Source and origin waiver for audio-visual equipment having an approximate value of \$40,000.

The responsible Mission Project Manager will be Paul Ehmer, Health and Human Resources Division, and the AFR/DR Project Officer will be Murl Baker.

Recommendation: The Africa Bureau Executive Committee for Project Review recommends that you sign the attached Project Authorization and thereby approve (1) the proposed loan of \$11,771,000 to be fully obligated in FY 81 for the implementation of Zanzibar Malaria Control Project and (2) the requested waivers.

Attachments:

1. Project Authorization
2. Environmental Examination and Determination
3. Project Paper

Clearances:

GC, J.R. Bolton KVA Date 9/17/81  
AAA/PPC/PDPR, J. Erickson JAE Date 9-16-81

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY  
AGENCY FOR INTERNATIONAL DEVELOPMENT  
WASHINGTON, D.C. 20523

PROJECT AUTHORIZATION

Name of Country : United Republic of Tanzania

Name of Project : Zanzibar Malaria Control

Number of Project: 621-0163

Number of Loan : 621-U-026

1. Pursuant to Section 104 of the Foreign Assistance Act of 1961, as amended (hereinafter referred to as "the Act"), I hereby authorize the Zanzibar Malaria Control Project for the United Republic of Tanzania (the "Cooperating Country") involving planned obligations of not to exceed Eleven Million Seven Hundred Seventy One Thousand United States Dollars (\$11,771,000) in loan funds over a one year period from the date of authorization, subject to the availability of funds in accordance with the A.I.D./OYB allotment process, to assist in financing certain foreign exchange and local currency costs for the Project.

2. The Project consists of financing technical assistance, commodities, training and operating costs to assist the Cooperating Country reduce the prevalence of malaria in Zanzibar to a level at which it no longer constitutes a major public health problem. To effect this reduction in malaria prevalence, the Project will support the following activities:

- a. To reduce morbidity, the Project will expand the prophylactic use of anti-malarial drugs such as chloroquine specifically targeting high risk population groups (infants, children and expectant mothers).
- b. To reduce mortality, the Project will expand and improve the curative treatment provided to all suspected cases of malaria by the existing health facilities.
- c. To reduce the mosquito population responsible for transmitting the disease, the project will:
  - (1) in areas of high human population density,
    - (a) drain and fill mosquito breeding areas,
    - (b) conduct space spraying,

(c) apply larvicides in mosquito breeding habitats:

(2) in peri-urban areas and rural areas having a high prevalence of malaria, spray houses with residual insecticides.

- d. To increase community participation in the malaria control program, the Project will develop a public health education campaign.
- e. To build a sound basis for longer term malaria control activities, the Project will continuously monitor the use of various control methods and document findings concerning, inter alia, the effectiveness and cost of such methods.

3. The Project Agreement which may be negotiated and executed by the Officer to whom such authority is delegated in accordance with A.I.D. Regulations and Delegations of Authority, shall be subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

a. Interest Rates and Terms of Repayment

The Cooperating Country shall repay the loan to A.I.D. in U.S. dollars within forty years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States dollars interest from the date of first disbursement of the loan at a rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Good and Services

Goods and services, including ocean shipping, financed by A.I.D. under the Project shall have their source and origin in the Cooperating Country and in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing.

. Covenants

The Cooperating Country shall covenant the following:

- (1) That the Project shall be implemented by the Zanzibar Ministry of Health and Social Welfare which shall be delegated all necessary authorities required to execute the Project.

- (2) That the Malaria Control Unit of the Ministry of Health shall be reorganized and staffed in accordance with the detailed Project Description (Part II, Section C) of the Project Paper or as A.I.D. may otherwise agree in writing.
- (3) That sufficient funds will be budgeted and made available throughout the project to finance (a) not less than its present level (1980/81) of procurement of antimalaria drugs and insecticides, and (b) salaries of current and projected malaria control program workers.
- (4) That an interministerial National Malaria Control Committee shall be established with representatives from the Ministry of Health and Social Welfare, the Ministry of Education, the Ministry of Agriculture, the Department of Road Works and other government agencies involved in the implementation of Zanzibar's antimalaria program; and shall be mandated to coordinate and monitor the execution of Zanzibar's malaria control program.
- (5) That special training, protective clothing and toxicity monitoring equipment and plans will be provided to all malaria control workers dealing with toxic insecticides.
- (6) That suitable housing for one A.I.D. long-term project technician will be provided to the Project by the Cooperating Country at no cost to A.I.D.
- (7) That suitable storage space for project equipment and supplies will be provided to the project by the Cooperating Country at no cost to A.I.D.

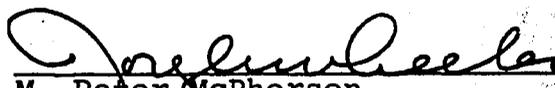
d. Waivers

Notwithstanding paragraph 3.b. above, and based upon the justification set forth in Annex G of the Project Paper, I hereby:

- (1) Approve a commodity origin waiver from A.I.D. Geographic Code 941 to Geographic Code 935 authorizing the procurement of (a) twenty Land-rover vehicles, four 3-1/2 ton Isuzu trucks, six one-ton Isuzu trucks and spare parts, the cost of which shall not exceed \$770,000, (b) seventy-four 90-125cc trail model motorcycles and spare parts, the cost of which shall not exceed \$150,000, (c) miscellaneous audio-visual and office equipment, the cost of which shall not exceed \$40,000, (d) four Gestetner manual mimeograph machines and spare parts, the cost of which shall not exceed \$7,000;

- (2) Approve a proprietary procurement waiver for the commodities identified in subparagraphs (1) (a) and (1) (d);
- (3) Find that special circumstances exist justifying a waiver of the requirements of section 636(i) of the Act with respect to the vehicles and motorcycles identified under subparagraphs (1) (a) and (1) (b); and
- (4) Certify that exclusion of procurement of the commodities described above from Free World countries other than the Cooperating Country and countries included in Code 941 would seriously impede attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

Sept 28, 1981  
Date

  
M. Peter McPherson  
Administrator

Clearances: *KCC for* **SEP 15 1981**  
 GC, J. Bolton *18A* Date 9-17-81  
 AA/AFR, F. Ruddy *18A* Date \_\_\_\_\_  
 A-AA/PPC, L. Smucker *B* Date 9-18-81

GC/AFR: T. ~~Boyle~~; og; 8/18/81x28219

**Tanzania**  
**Zanzibar Malaria Control Project**  
**(621-0163)**

**PID Submission Date: March 10, 1980**  
**PID Approval Date: May 8, 1980**  
**PP Submission Date: February 20, 1981**  
**PP Final Review Date: May 29, 1981**

PROJECT PAPER  
TANZANIA ZANZIBAR

ZANZIBAR MALARIA CONTROL PROJECT

December, 1980.

Project Design Team:

Zanzibar Ministry of Health and Social Welfare

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## Prologue

The technology of malaria control has become increasingly complex as malariologists have spent the past century studying the disease and attempting to eradicate or control it. It is not possible, within the scope of an AID Project Paper, to present a discussion of malaria which is both basic enough to give non-health workers a thorough understanding of the state of the art of malaria control, yet technical enough to give malaria specialists a clear understanding of the methods to be employed in the project and the reasons for their selection. We have attempted to include just enough basic information for those unfamiliar with malaria to follow the rationale behind the project design, yet have often cited techniques which are commonly understood by malaria experts without describing them in sufficient detail to be understood by novices in the field.

The selection of specific techniques and methodologies for this project has always been done by committee consensus with the committee including representatives of the Government of Zanzibar, WHO, USAID/T, AID/W and the Strategy Advisory Group recently employed by the AID Africa Bureau to formulate a strategy for providing assistance to anti-malaria activities in Africa. It is felt that this committee consensus approach to project design has been especially important in this case because the Zanzibar Malaria Control Project is expected to serve as a model for the international donor community which is preparing to re-address itself to the problem of malaria after having abandoned it over a decade ago when the going became too tough.

AGENCY FOR INTERNATIONAL DEVELOPMENT  
**PROJECT DATA SHEET**

1. TRANSAC CODE:  A = Amend,  C = Ch,  D = Delete  
 Amendment Number: \_\_\_\_\_  
 DOCUMENT CODE: **3**

2. COUNTRY/ENTITY: United Republic of Tanzania, Zanzibar  
 4. BUREAU/OFFICE: Africa AFR 06  
 5. PROJECT NUMBER: 621-0163  
 5. PROJECT TITLE (maximum 40 characters): Zanzibar Malaria Control

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM DD YY 09 30 86  
 7. ESTIMATED DATE OF OBLIGATION (Under 'B.' below, enter 1, 2, 3, or 4)  
 A. Initial FY 81 B. Quarter 3 C. Final FY 85

8. COSTS (\$000 OR EQUIVALENT \$1 = 8.17TSh)

A. FUNDING SOURCE	FIRST FY <u>81</u>			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	10042	1729	11,771	10042	1729	11,771
(Grant)	( )	( )	( )	( )	( )	( )
(Loan)	( 10042 )	( 1729 )	( 11,771 )	( 10042 )	( 1729 )	( 11,771 )
Other U.S.						
1. Host Country	95	223	318	1279	2980	4,259
2. Other Donor(s)						
<b>TOTALS</b>	<b>10137</b>	<b>1952</b>	<b>12,089</b>	<b>11311</b>	<b>4709</b>	<b>16,030</b>

9. SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) PH	510		542	-0-	-0-	-0-	11,771		11,771
(2)									
(3)									
(4)									
<b>TOTALS</b>							<b>11,771</b>		<b>11,771</b>

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each): 510 520 530 560  
 11. SECONDARY PURPOSE CODE: 600

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

A. Code	BR	DEL	ENV	PART	TECH	TNG
B. Amount	11,771	11,771	2000	11,771	11,771	1000

13. PROJECT PURPOSE (maximum 480 characters):  
 To reduce the prevalence of malaria on Zanzibar to a level at which it no longer constitutes a major public health problem, through adaptation of known control methods to local conditions in such a way that the Government of Zanzibar will be able to maintain effective control with its own resources.

14. SCHEDULED EVALUATIONS: Interim MM YY 08 82 MM YY 06 83 Final MM YY 06 85  
 15. SOURCE/ORIGIN OF GOODS AND SERVICES: See Project Authorization  
 000  941  Local  Other (Specify) \_\_\_\_\_

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a \_\_\_\_\_ page PP Amendment):  
 N.A.

17. APPROVED BY: James E. Williams  
 Title: Director, USAID/Tanzania  
 Date Signed: MM DD YY 09 30 86

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY 11 1 86

## I. Summary and Recommendations and Issues

### A. Grantee and Implementing Agency

The Grantee will be the Government of the United Republic of Tanzania in Zanzibar, and the primary executing agency for this five year malaria control project will be the Zanzibar Ministry of Health and Social Welfare. The principal implementing agency will be the Malaria Control Unit within the Ministry of Health and Social Welfare.

### B. Recommendations

1. That a grant to the Government of the United Republic of Tanzania in Zanzibar in the amount of \$11,771,000 be approved for the Zanzibar Malaria Control Project (621-0163).
2. That the source origin waivers for the purchase of 20 landrover type vehicles, 10 trucks, 74 motorcycles and spare parts of an approximate value of \$900,000 be approved. (Justifications contained in Annex G.)
3. That a source origin waiver for the purchase of audio visual equipment required by the project and having an approximate value of \$40,000 be approved. (See Annex G.)
4. That a source origin and proprietary procurement waiver for the purchase of Gestetner manual mimeograph machines and spare parts required by the project and having an approximate value of \$7,000 be approved. (See Annex G.).
5. That a source origin waiver for the purchase of the contract technical assistance services required by the project be approved to permit proposal submission by the centers with the best international reputations for anti-malaria work. (See Annex G.).

### C. Issues

The issues which were raised during the AID/W PID review process are presented and discussed in Annex E.

## II. PROJECT DESCRIPTION

### A. Background

In 1964 the island nation of Zanzibar and the mainland nation of Tanganyika were joined to become the United Republic of Tanzania. Since that time the islands and the mainland have had the same head of state, President Julius Nyerere, and the same vice president, Aboud Jumbe. However, with the exception of the ministries of foreign affairs and defense, Zanzibar is still served by its own, autonomous government. The Zanzibar Ministry of Health and Social Welfare, which asked AID for support in developing this project, operates independently of the mainland Ministry of Health.

Zanzibar is made up of two small islands in the Indian Ocean about 25 miles off the north-eastern coast of the Tanzanian mainland. According to the 1978 census, 57% of Zanzibar's population of 475,707 lives on the larger, southern island, Unguja, which covers 640 square miles. Nevertheless, the northern island of Pemba has a much higher population density because it covers only 380 square miles. Pemba's population density of 538 people per square mile and Unguja's of 423 are both remarkably higher than that of 49 for Tanzania as a whole.

The Zanzibar islands have a hot and humid tropical climate. There are two marked rainy seasons each year, a long one from April to June and shorter rains from October to December. Because the islands are fertile, most of the people are farmers raising cloves and coconuts as cash crops and cassava, bananas, maize and rice as food crops. There are also a few fishermen. The annual per capita GNP in Zanzibar was estimated in 1978 to be \$230.

The spectrum of health problems experienced in Zanzibar is similar to that seen throughout tropical Africa and is characterized by communicable diseases associated with poor hygiene and contaminated water and vector-borne and other parasitic diseases. Although infant and maternal mortality rates cannot be calculated from available data, health facility records show clearly that children under fifteen and pregnant women are high risk groups in Zanzibar, as they are in the rest of Africa. A review of Zanzibar's health sector was conducted by the Office of International Health of H.E.W. in 1979, and is appended to this paper as Annex K.

The Ministry of Health and Social Welfare of Zanzibar has a long established goal of providing primary health care to all of its citizens. The specific objectives for the attainment of this goal are stated in each successive three-year development plan and include, inter alia, the establishment of a hierarchical network of health facilities

staffed mostly by paramedical health workers. development of an informed citizenry who will be able to actively participate in safeguarding their own health through preventive means, and the elimination of the major diseases of the islands.

Malaria is considered to be the most serious disease in Zanzibar at this time. It is a parasitic disease in which man is infected by being bitten by a mosquito of the anophelene type carrying the malaria parasites. Once introduced into a human being, these parasites multiply in the liver and in the blood cells. As mosquitoes take their blood meals from human beings, they can serve as a vector of disease transmission from infected individuals to non-infected individuals. The disease itself is characterized by fevers and anemia, both due to the rupture of blood cells by the parasites, and is capable of causing death directly or by making individuals more vulnerable to other health problems. Those at highest risk of succumbing to the disease are children under five years of age and pregnant women.

The past 25 years has seen an impressive shift in strategies as the world has tried to deal with malaria. In 1955, the World Health Assembly launched the Global Malaria Eradication Program, and the next 13 years witnessed a remarkable decrease in malaria in countries in which the malaria eradication program was active and in countries with large scale malaria control operations. However, as the program spread to the developing world, implementation problems then made it clear that malaria eradication was not a feasible goal in nearly all developing countries, and the World Health Assembly of 1969 advocated shifting to a control strategy with planning and methodologies adapted to the resources constraints of each developing country. This discouraging end of the popular malaria eradication program resulted in a marked reduction in international and national support for antimalaria activities. During the ensuing decade, malaria struck back, and in most areas where the eradication program had reduced the prevalence of malaria to a point where it was no longer a major public health problem, the resurgence of the disease brought malaria to epidemic levels equal to or greater than those known before the program. Now, after a decade of avoiding dealing directly with the malaria problem, most donors are admitting that it still constitutes the major debilitating disease in most developing countries and many are willing to consider supporting antimalaria activities again.

The distinction between malaria control and malaria eradication is an important one, not only in terms of objectives, but in terms of operational complexity, and requirements for careful planning, efficient administration, detailed evaluation and adequate, assured financing. Malaria eradication is the permanent interruption of the transmission of malaria and the elimination of any reservoir of infection within the human population within a specific time frame, after which vigilance is maintained to prevent reintroduction of the disease. Because of

the virtual perfection in implementation required and the extraordinary costs of mounting malaria eradication programs, most donors are recommending a strategy of malaria control for Africa. Malaria control has the more limited objective of reducing the prevalence of malaria to a point where the disease no longer constitutes a major public health problem. Control programs are designed to reduce disease transmission in endemic areas and to prevent the spread of disease to new areas. Although control programs may be so successful that they may be subsequently changed to eradication programs, control programs must be designed with the expectation that they will have to be continued indefinitely. Table I presents an overview of the differences between a malaria control program and a malaria eradication program.

In 1979 the WHO developed a series of alternative approaches to malaria control which could be used in different settings. There are four basic alternatives which WHO refers to as "tactical variants," and these are described as follows:

Tactical Variant No. 1: Reduction and prevention of mortality due to malaria. This variant utilizes only chemoprophylaxis and chemotherapy and is intended for settings in which the disease prevalence is very high, but there is little organizational capacity for mounting a more complex program;

Tactical Variant No. 2: Reduction and prevention of mortality and morbidity, with special attention to reduction of morbidity in high-risk groups. This variant is possible when there is sufficient organizational development to target high risk groups and could include some vector control activities;

Tactical Variant No. 3: Same as No. 2 plus reduction in the prevalence of malaria. This variant becomes possible where there exists a sufficient number of trained personnel to conduct the surveillance necessary to evaluate the effectiveness of the malaria control measures used. It also requires governmental commitment to long-term support of control activities, intersectoral coordination, and community involvement; and

Tactical Variant No. 4: Countrywide malaria control with the ultimate objective of eradication. This variant must be reserved for settings where there has been a long experience with antimalaria programs, a growing professional technical and management capability, an expanding economic base, a firm political commitment, and a strong, stable level of public participation.

The application of these alternatives of malaria control to the situation prevailing in Zanzibar is presented later in Section II-C.

Table 1

Differences Between a Malaria Control Program and a Malaria Eradication Program

	<u>Control Program</u>	<u>Eradication Program</u>
<u>Objective</u>	The reduction of malaria to a prevalence where it is no longer a major public health problem	The ending of the transmission and the elimination of the reservoir of infective cases in a campaign limited in time
<u>Area of Operations</u>	Not necessarily covering all the area where malaria transmission takes place	Must cover all the area where malaria transmission takes place
<u>Minimum Standards</u>	Good	Perfect
<u>Duration of Operations</u>	Without limits	Program ends when certain requirements are met
<u>Cost</u>	Constantly recurring	Expenditure represents a capital investment and is not a permanently recurring cost
<u>Case-finding:</u>	Superfluous	Of paramount importance
<u>Epidemiological Investigation of Positive Cases</u>	Superfluous	Necessary in the late stages
<u>Epidemiological Evaluation of Results</u>	By usual malarionetric surveys	Proof of disappearance of indigenous new malaria cases
<u>Imported Cases</u>	Do not deserve particular attention	Important and dangerous when spraying has been withheld
<u>Total Coverage</u>	Unnecessary	Indispensable both for the spraying and the case-finding
<u>Administration of the Program</u>	May not be the best and still be sufficient	Must be fully efficient and speedy; if not, danger of failure

The above table is a modification of that appearing in WHO, ECM Sixth Report, p. 9 (1957).

As will be seen below, what has happened with malaria in Zanzibar is consistent with the experience throughout the developing world. In fact, the current epidemic has so distressed the Government of Zanzibar that an emergency survey was undertaken in July 1980, which showed 76% of those tested on the island of Pemba to have the disease. Specific information on the nature of malaria in Zanzibar is available in scattered reports, beginning with the work of Aders in 1917. Aders and his successors compiled valuable data on malaria prevalence, vector identification, infectivity rates, vector concentrations and distribution until 1957, when the World Health Organization (WHO) fielded a team of three malaria experts to perform parasite surveys, house numbering and insecticide susceptibility testing to prepare for a malaria control program. In 1958, the Zanzibar Government/WHO/UNICEF Malaria Control Program was launched, and in 1961 the program was upgraded to a Malaria Eradication Program. Presumably this change resulted from the encouraging results of the control program.

The Zanzibar Malaria Eradication Program resulted in a remarkable reduction in the prevalence of the disease through semi-annual residual insecticide spraying of the interior walls of all houses and the distribution of anti-malarial drugs to populations at risk. However, the program was stopped for political reasons before eradication was achieved, and the WHO program personnel were withdrawn in 1968. At the time of the termination of the eradication campaign, the percentages of blood smears showing parasites in suspected fever patients were only 7.8% on Unguja and 1.7% on Pemba, but the prevalence of malaria began to increase as soon as the campaign stopped. By 1972 the disease had become such a problem again that the Government of Zanzibar re-established the Malaria Service without external assistance. Distribution of antimalarial drugs was restarted in 1973 and residual spraying was resumed in 1975, but lack of resources has limited the frequency and coverage of both of these efforts, and the continued effects of irregular program activities and possible insecticide resistance have permitted continued resurgence of the disease until, by 1978, it had reached endemic levels at least as high as those seen before any control or eradication interventions had been made.

In 1978, the Government of Zanzibar asked WHO to resume its help in combatting malaria on the islands. WHO conducted a brief study of the problem and agreed it warranted prompt attention.

Following its mandate to help developing countries locate donor support for health programs, WHO brought the Government of Zanzibar Ministry of Health and Social Welfare and USAID/Tanzania together in 1979 to discuss the malaria problem. Subsequent discussions led to the submission of the Project Identification Document (PID) for the Zanzibar Malaria Control Project to be jointly undertaken by the Government of Zanzibar, WHO and AID.

At the same time that the PID was being drafted and approved and the Government of Zanzibar, WHO and AID were collaborating on the

final design of this project, the Africa Bureau of AID was conducting a series of workshops and field studies intended to lead to the formulation of a Bureau strategy for AID assistance to antimalaria activities in Africa. Several members of the design team for this project also served on the Strategy Advisory Group working with the African Bureau, and this paper draws heavily upon conclusions and recommendations of that group as presented in their draft report dated April 1980.

Although the Strategy Advisory Group suggests that selected coastal islands of Africa may offer situations in which it would be reasonable to undertake malaria eradication programs, the design team for this project found that the existing constraints in Zanzibar argue against designing more than a basic control program. Also, since similar constraints exist throughout Africa, and since this is AID's first major antimalaria project in connection with the development of its new strategy, it was decided that the Zanzibar Malaria Control Project should be designed to be able to serve as a model for the rest of the continent.

This project is designed to address the principal constraints operating against a successful antimalaria program in Zanzibar today and to develop an integrated, multi-disciplinary approach to malaria control which will reduce the prevalence of the disease by at least 33% during the first five year phase of the program. This would drop malaria prevalence from its current estimated level of 75% to below 50%.

#### B. Summary Project Description

The selection of appropriate antimalaria activities for Zanzibar is based upon the present epidemiologic situation, the local efficacy of methods proposed, the level of national political commitment and public cooperation, the current level of professional training, and the administrative, operational and financial feasibility of the overall program.

Through the Zanzibar Malaria Control Project, AID will provide assistance to the Government of Zanzibar to develop a Malaria Control Unit within the Ministry of Health and Social Welfare which is capable of initiating and sustaining the variety of integrated antimalarial activities which make up the comprehensive malaria control program described below. At a cost of \$11,771,000. AID will contribute two long-term technicians, short-term consultants, training, commodities and selected operating costs for a five-year period beginning during FY 1981. The project described herein can be considered Phase I of the long term malaria control program for Zanzibar that will continue beyond the initial five-year period. During this initial five years of the Zanzibar Malaria Control Program, the Malaria Control Unit will institute a control program based primarily upon the following activities:

1. Mosquito source reduction - to be undertaken in urban, peri-urban and selected rural areas of high endemicity.
  - a. engineering interventions to reduce vector breeding sites,
  - b. larviciding,
  - c. space spraying (Ultra Low Volume, ULV);
2. Residual spraying in the periurban fringe communities and selected rural areas of high endemicity;
3. Chemoprophylaxia through chloroquine distribution to the high-risk elements (children under 15 and pregnant women) of the population;
4. Chemotherapy of all suspect fever cases;
5. Health education/community motivation campaign; and
6. Operational research, as indicated to evaluate the effectiveness of the elements of the program.

This program will build upon the programs of the existing Malaria Unit of the Ministry of Health and Social Welfare and involve other organizations whose activities may affect the malaria control program, either favorably or negatively. The institutional development of the new Malaria Control Unit will address each of the principal shortcomings of the present Malaria Unit. These include a requirement for improved administration and management, basic and in-service training for all levels of malaria workers, procurement, distribution and maintenance of program equipment and materials, information collection and use, and more effective integration into Zanzibar's primary health care program as well as the activities of other ministries.

### C. Detailed Project Description

The Seventeenth Report of the WHO Expert Committee on Malaria sets forth a series of "tactical variants" which relate control tactics to the nature and extent of the malaria problem in a given country and to the level of control which the country selected can be expected to achieve. These variants are described in Section II A above. The program selected for Zanzibar corresponds most nearly to "Tactical Variant No. 3" and is designed to produce reduction and prevention of mortality and morbidity, with special attention to reduction of malaria prevalence. This selection derives from Zanzibar's high malaria prevalence, severe clinical illness and low socio-economic status; yet sufficient organizational nucleus, trained personnel and previous experience exist to build upon to learn to apply selected control methods and undertake the necessary epidemiologic evaluation of the results achieved. In addition, the Government of Zanzibar has demonstrated its commitment

to bearing the recurrent costs of a long-term program and to maintaining intersectoral coordination, particularly with agriculture and education. Although Zanzibar has a long history of dealing with malaria, there still persist too many constraints for it to be feasible to consider attempting malaria eradication at this time.

The present Malaria Unit in the Ministry of Health and Social Welfare of Zanzibar is under the Communicable Disease Control Division of the Department of Preventive Services and Health Education. This unit will be upgraded to the Malaria Control Unit. The present unit has a staff of 151 and is engaged in a marginally effective control program based upon irregular mass distribution of chloroquine for prophylaxis, residual spraying by volunteer spraymen using DDT, larviciding using Malariol, Dursban and Abate, and chemotherapy of fever cases presenting themselves to Zanzibar's health facilities. In spite of the present malaria control program, the prevalence of malaria has continued to increase on the islands since the termination of the malaria eradication program in 1968, as reflected by the increase in positive blood slides reported since 1973 in Table 2. This increase so concerned the people and the Government of Zanzibar in the summer of 1980, that an appeal to help study the problem was made to the mainland Ministry of Health. The ensuing study revealed that 76% of those randomly examined on Pemba had positive blood slides. This finding has confirmed the urgency of the situation with the recrudescence of malaria and has resulted in strengthening the resolve of the government to make their control program more effective.

The constraints affecting the effectiveness of the previous program are many including, inter alia:

1. poorly conceived initial planning without establishment of baseline data;
2. inattention to cost-effectiveness with respect to selection of control measures and maintenance;
3. structural inadequacy of the Malaria Unit; often due to
4. shortages of trained manpower;
5. over-dependence upon volunteer population participation without a strong health education campaign;
6. grossly inadequate maintenance of equipment;
7. poor supervision;
8. inadequate logistic support;
9. some vector resistance to insecticides;
10. incomplete knowledge of vector behavior;
11. inadequate maintenance of sanitary services;
12. inadequate training facilities and programs; and
13. inadequate resources coupled with the inflation of all program costs .

Table 2

RESULT OF MALARIA BLOOD SLIDES\*

Government of Zanzibar

Ministry of Health

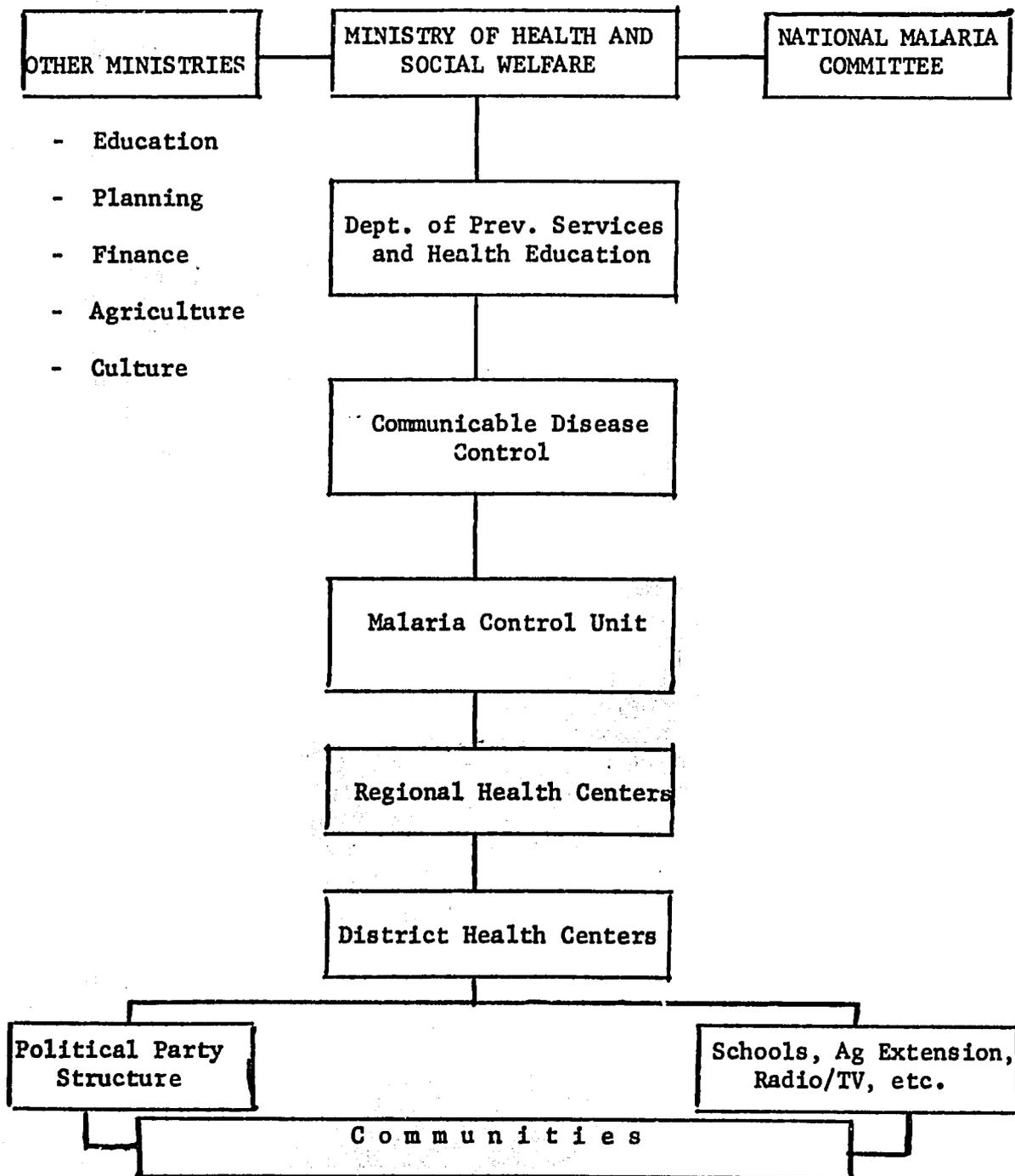
(1973 - 80)

<u>Year</u>	<u>UNGUJA</u>		<u>PEMBA</u>	
	<u>No. Exam.</u>	<u>+ %</u>	<u>No. Exam.</u>	<u>+ %</u>
1973	4279	54.0	351	7.7
1974	60381	5.4	5057	0.7
1975	23365	14.8	7519	6.2
1976	32449	21.1	23393	17.0
1977	38231	29.3	28905	16.3
1978	58728	36.8	21831	15.4
1979	50671	42.1	47416	38.6
1980 (up to July)	21767	32.8	20333	46.9

\* Results of passive case finding only, i.e., studies done on those patients with a fever who presented themselves to a health facility with a working laboratory.

The Government of Zanzibar has now recognized the significance of the problem and has established malaria control as one of its highest priorities. This project will launch a new Zanzibar Malaria Control Program to be undertaken under the direction of the new Malaria Control Unit and integrated into Zanzibar's primary health care program and overall development program. (See Figure 1.) The budget of the Zanzibar Government has already been altered to cover all new personnel costs associated with the project. In keeping with the recommendation of AID's Strategy Advisory Group, this project is designed to use long-term donor assistance in resolving the above constraints with particular attention to the following areas of support:

Figure 1

MANAGEMENT ORGANIZATION - ZANZIBAR MALARIA CONTROL

1. provision of technical expertise, particularly highly-specialized professionals such as malariologists, entomologists, engineers, trainers, health educators, management specialists, etc.;
2. essential supplies such as drugs, insecticides, larvicides, diagnostic and spray equipment, etc.;
3. training costs;
4. transport;
5. operational research; and
6. health education and public promotion.

This donor assistance has already begun as AID and WHO provided seven expatriate technicians who joined the core Zanzibar team of five professionals to collaborate on the design of this project.

The Zanzibar Malaria Control Program will begin with the reorganization of the present Malaria Unit, with its staff of 151, to the Malaria Control Unit, with a staff of 433. Although there will be some deviation from the basic plan to accommodate population concentration variations and the fact that project monitoring will result in certain interventions being carried on more intensively in some areas than others, the basic organization of the Malaria Control Unit is presented in Figure 2. Table 3 then presents a comparison between existing personnel levels and those required by the new organization. The training requirements of the project are determined by the overall staff size because, in addition to providing initial basic training to all new personnel, all present personnel will need in-service training to prepare for their roles in the new program. It is worth repeating several times in this paper that the Government of Zanzibar has already added sufficient funds to the Ministry of Health and Social Welfare budget to cover the salaries of the increased staff from the moment the new malaria workers are identified.

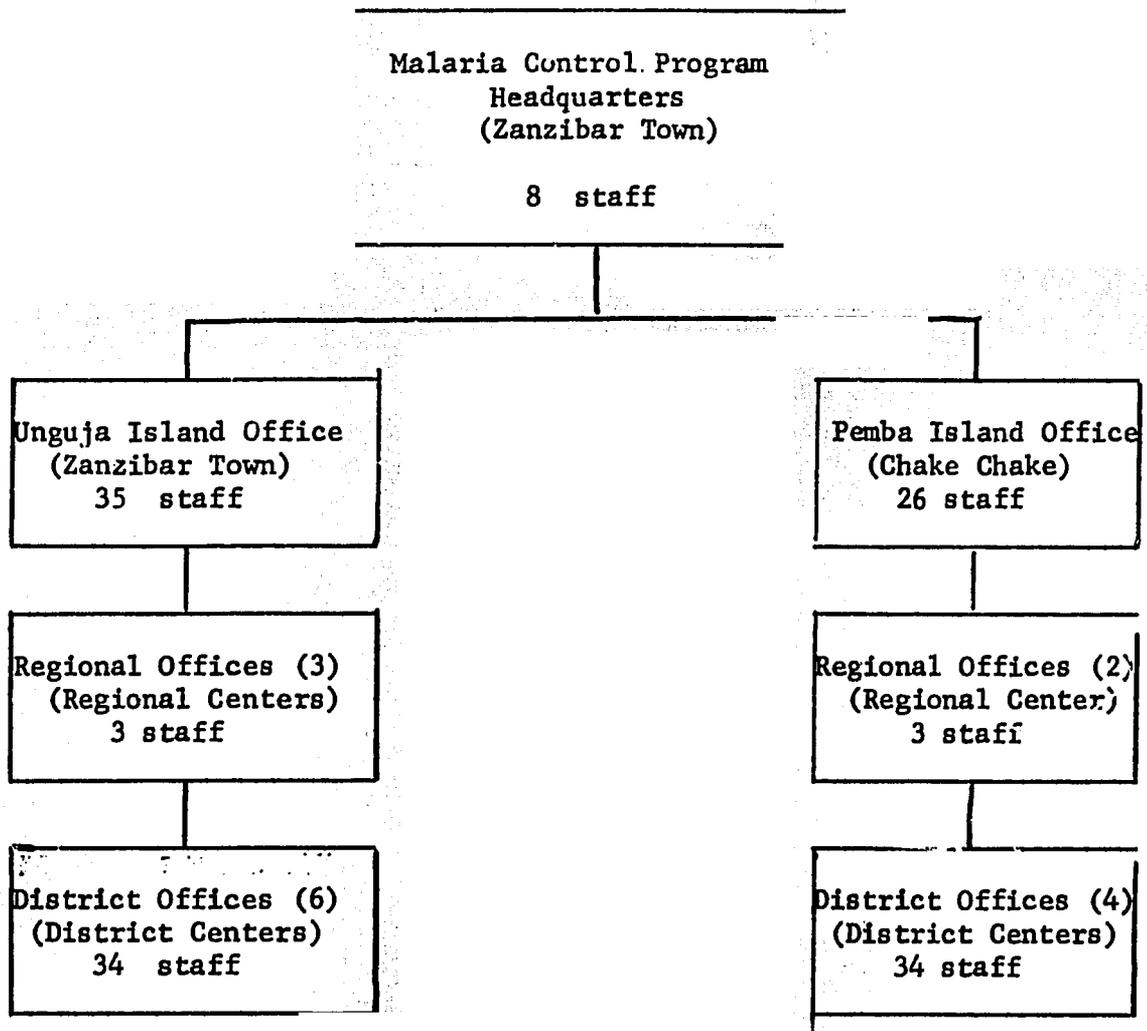
The Zanzibar Malaria Control Program has been considered from the initial planning stage as a dynamic process. The target level of achievement selected for this project corresponds to the designers' understanding of local epidemiological situations, quality of present organization and operating standards and the will of the Government of Zanzibar to commit itself to controlling malaria. It is expected that achievement targets will be modified continuously as experience indicates.

**PROJECT GOAL:** This project has the same goal as the other USAID/T-supported activities in the health sector, i.e., "...to help develop a health services system which can improve the health status of the people sufficiently for them to enjoy life, participate fully in community development activities, and contribute to the national goal of self-reliance."

**PROJECT PURPOSE:** "...to reduce the prevalence of malaria on Zanzibar to a level at which it no longer constitutes a major public health problem,

Figure 2

MALARIA CONTROL PROGRAM ORGANIZATION



See Table 3 for a listing of personnel for each level of program organization.

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Table 3

MALARIA CONTROL PROGRAM STAFFING

<u>Headquarters:</u>	<u>Present</u>	<u>Proposed</u>	<u>Increase</u>
1. Director (Malariaologist)	-	1	1
2. Chief Parasitologist/Entomologist	1	1	-
3. Chief Health Educator*	1	1	-
4. Chief Health Inspector	1	1	-
5. Program Controller	-	1	1
6. Secretary	-	2	2
7. Messenger/Driver	1	<u>1</u>	-
		8	
<u>Unguja Island Office:</u>			
1. Senior Health Inspector	1	1	-
2. Health Educator*	1	1	-
3. Sanitarian/Engineer	1	1	-
4. Pump Mechanic	-	1	1
5. Medical Recorder	-	1	1
6. Typist	1	1	-
7. Clerk	1	1	-
8. Office Keeper/Messenger	1	1	-
9. Storekeeper/Recorder	-	1	1
10. Storeman/Packer	1	2	1
11. Transport Officer	-	1	1
12. Drivers	1	5	4
13. Draftsman/Cartographer	-	1	1
14. Source Reduction Supervisor	-	2	2
15. Senior Laboratory Technician	1	1	-
16. Parasitology Assistant	1	1	-
17. Microscopists	8	8	-
18. Laboratory Cleaners/Washers	1	<u>5</u>	4
		35	
<u>Pemba Island Office</u>			
1. Senior Health Inspector	1	1	-
2. Health Educator	1	1	-
3. Sanitarian/Engineer	-	1	1
4. Pump Mechanic	-	1	1

\*On Unguja the Health Educators will work in the Health Education Unit of the Ministry of Health and Social Welfare.

<u>Pemba Island Office (cont.)</u>	<u>Present</u>	<u>Proposed</u>	<u>Increase</u>
5. Medical Recorder	-	1	1
6. Typist	-	1	1
7. Clerk	-	1	1
8. Office Keeper/Messenger	-	1	1
9. Storekeeper/Recorder	-	1	1
10. Storeman/Packer	1	2	1
11. Transport Officer	-	1	1
12. Drivers	-	2	2
13. Draftsman/Cartographer	-	1	1
14. Source Reduction Supervisor	-	2	2
15. Senior Laboratory Technician	1	1	-
16. Parasitology Assistant	1	1	-
17. Microscopist	4	4	-
18. Laboratory Cleaner/Washer	-	3	3
		<u>26</u>	
	<u>Present</u>	<u>Proposed</u>	<u>Total</u>
<u>Regional Offices (5 Regions):</u>	<u>Total</u>	<u>(per region)</u>	<u>Increase</u>
1. Regional Rural Health Assistant	5	1	-
2. Entomology Assistant	3	1	(2)
3. Driver	-	<u>1</u>	(5)
		3	
	<u>Present</u>	<u>Proposed</u>	<u>Total</u>
<u>District Offices (10 Districts):</u>	<u>Total</u>	<u>(per district)</u>	<u>Increase</u>
1. District Rural Health Assistant	10	1	-
2. Entomology Aide	-	1	(10)
3. Oilers	8	3	(24)
4. Source Reduction Laborer	-	4	(45)
5. Spraying Supervisor	-	1	(10)
6. Sprayers	-	6	(60)
7. Malaria Supervisors	12	3	(17)
8. Malaria Agents	81	<u>15</u>	(72)
		34	
<b>Totals</b>	<b>151</b>	<b>424*</b>	<b>282</b>

\* The differences between this figure and the figure of 433 cited earlier is due to the additional assignment of malaria agents, laborers and oilers to the district office covering the urban area of Zanzibar Town.

Figures in parentheses ( ) indicate training requirements for all regional or district offices.

through adaptation of control methods to local conditions in such a way that the Government of Zanzibar will be able to maintain effective control with its own resources." For the purposes of this project, "prevalence" is defined as the proportion of the entire population having malaria at a given time, irrespective of the length of time which has elapsed from the beginning of the illness to the particular time when prevalence is being measured. This index is often called point prevalence because it refers to a measurement made at a single point in time. As stated earlier, this purpose combines the goals and activities of WHO's first three "tactical variants" but stops short of Tactical Variant No. 4 in which the expectation is that the countrywide malaria control program will be able to move to the objective of eradication. This level of achievement has been selected because Zanzibar has had a long experience in dealing with malaria, has some of the necessary organization already in place, and has demonstrated strong political support; however, there is still a shortage of professional technical and managerial capability, a poor economic base, and a need to identify which technologies are most suited to Zanzibar through operational research.

The project will attempt to achieve its purpose of reduction of malaria prevalence through achieving six related objectives (sub-purposes):

1. reduction of vector density and disease transmission potential by source reduction in urban areas (40% of the population of Unguja and 13% on Pemba); larvaciding and space spraying will be added where malarimetric monitoring indicates the need;
2. reduction of vector density and disease transmission potential by intradomiciliary residual spraying of houses in the rural areas of highest malaria endemicity, in the peri-urban fringe area, and in selected foci of secondary importance;
3. reduction of morbidity through the prophylactic use of chloroquine distributed to those segments of the population at highest risk, i.e., infants, young children, school children and expectant mothers;
4. reduction of mortality through prompt treatment of suspected cases by distributing chloroquine for this purpose throughout the primary health care system and to selected community centers;
5. enhancement of community participation and community support for the malaria control program and its constituent activities through the development of an effective health education campaign; and
6. adaptation of the control methods cited above to the conditions present in Zanzibar through systematic, continuous monitoring of all project activities, i.e., operational research.

END OF PROJECT STATUS: The parameters by which the end of project status is to be evaluated reflect the project purpose and sub-purposes presented above. Some of these targets are changes in specified indices, and others are processes which are to have been established.

1. the reduction of malaria prevalence by at least 33% from levels determined at the beginning of the project;
2. the reduction of mapped urban mosquito breeding sites by at least 25%;
3. larviciding and/or space spraying going on in all urban areas and selected high endemicity areas where mosquito breeding continues;
4. 100% coverage of target households by the intradomiciliary spraying program;
5. vector density reduction of at least 80% in all urban and selected rural settings;
6. 80% coverage of target high-risk population by chemoprophylaxis program;
7. prompt chemotherapy of 80% suspect fever cases presented;
8. a reduction of morbidity, as indicated by passive case detection in health facilities, of at least 33%;
9. a high level of public awareness of and participation in the malaria control program; and
10. continuous modification of the program as a result of monitoring the information gained through operational research.

OUTPUTS: Each project output is described in more detail later in this section; however, they are presented in list form below:

1. the organization of the Malaria Control Program;
2. the establishment of an effective source reduction program through engineering;
3. the establishment of an active larviciding program;
4. the establishment of an active space spraying program;
5. the establishment of an active intradomiciliary spraying program;
6. the establishment of an effective chloroquine distribution program for prophylactic and therapeutic purposes;
7. the establishment of an effective health education and community motivation program;
8. the establishment of continuous malarimetric (epidemiologic, parasitologic, and entomologic) and operational surveillance necessary to permit perpetual, dynamic adaptation of control methodologies to the circumstances of Zanzibar;
9. the integration of other sector programs, as appropriate, into malaria control; and
10. the establishment of both basic and in-service training programs as necessary to develop and maintain all levels of malaria control workers.

These outputs are more comprehensive than might be expected in an antimalaria program which is not attempting eradication, particularly

in terms of surveillance and operational research; however, this is felt to be important to the design of the Zanzibar Malaria Control Project as a demonstration in the feasibility of adapting known malaria control technology to the African context.

INPUTS: To achieve the objectives of the Zanzibar Malaria Control Project, AID will contribute two expert technicians for the full five years of this first phase of the Malaria Control Program and will add sufficient short-term consultants, commodities, training and other goods and services as required. The specific character and quantity of these inputs are presented again later in the Financial Plan and Analysis, the Logical Framework, and the Detailed Budget. The total value of AID support to Phase I of the Zanzibar Malaria Control is \$11,771,000 and the Government of Zanzibar is contributing \$4,259,000, mostly in the form of personnel salaries, costs of insecticides, larvicides and drugs, and in-country training.

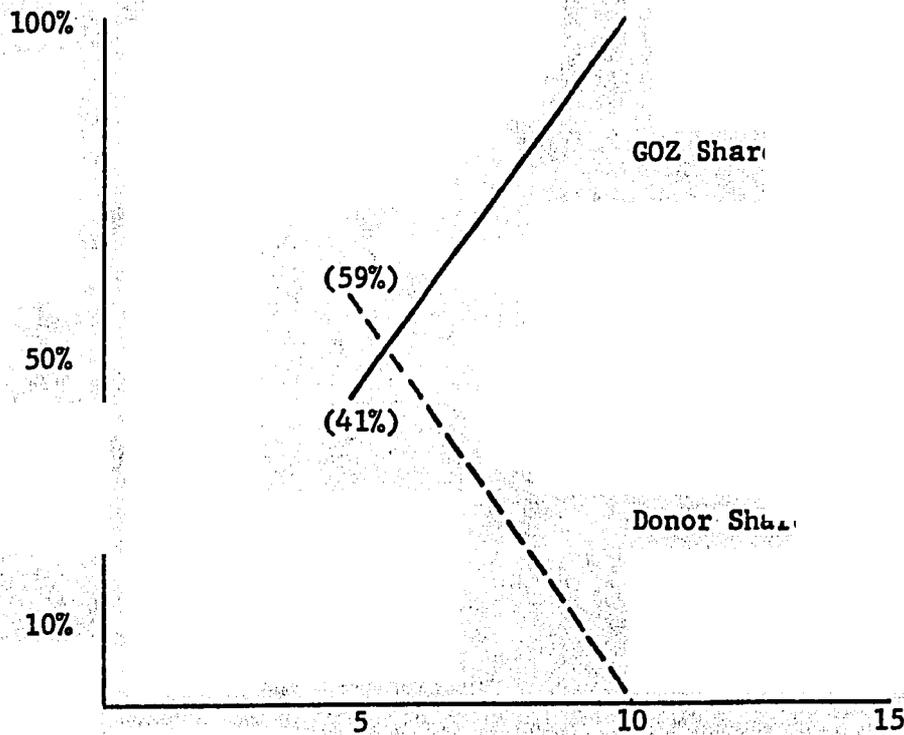
To help establish the new Malaria Control Program and initiate its control activities, AID will provide two long-term technicians. One will be a senior malariologist with broad malaria control experience who will serve as a homolog or colleague of the Director of the Malaria Control Program. He will be responsible for coordinating all AID inputs into the project and will collaborate in initiating, sustaining and monitoring all of the program's component activities as described above. The other long-term AID technician will be a senior vector control specialist with broad experience in all aspects of mosquito control. He will work as an advisor to the sanitary engineers in each of the island offices. In addition, engineers, health educators, training specialists, entomologists, parasitologists, epidemiologists, mass media specialists, and other experts as necessary will be brought in as short-term consultants to implement and evaluate the project.

Commodity support by AID includes chloroquine for both prevention and treatment, insecticides, larvicides, diagnostic equipment, equipment for residual spraying, larviciding, space spraying using the ultra-low volume (ULV) technique, monitoring equipment, health education and other promotional materials, training materials, vehicles and office equipment. Most training costs in the project will be borne by AID, and the operating costs will be shared between AID and the Government of Zanzibar, with each party bearing a constant share of the recurrent costs of the project throughout the first five years of the program which is covered by the Project Paper.

By the end of the first five-year phase of the Zanzibar Malaria Control Program, the Government of Zanzibar will be allocating \$1,182,000 to malaria control which will be equivalent to 41% of the program's projected recurrent costs. If the initial five-year period succeeds in demonstrating the effectiveness of the antimalaria methods selected, the Government of Zanzibar will ask AID and/or other donors to provide

additional assistance during the second five-year phase of the program as the Government of Zanzibar increases its share of program costs from 41% to 100%. At current projection levels a total of \$2,140,000 of donor funds would be required during Phase 2. See further discussion in Section III A, Economic Feasibility.

Figure 3: Phase 2 Financing



Although the several malaria control activities which are listed above as outputs of the first phase of the Zanzibar Malaria Control Program must be undertaken in an integrated fashion under the coordination of

the Malaria Control Program to achieve an effective demonstration of this control strategy, each activity will be discussed separately in this section to permit easier understanding.

ORGANIZATION OF THE MALARIA CONTROL PROGRAM: This new unit of the Ministry of Health and Social Welfare has been designed by the members of the design team for this project, and it is described in Figures 1 and 2 and Table 3. Its actual creation will take place once the project is approved and the necessary equipping and personnel training can begin. The Government of Zanzibar will bear all of the increased personnel costs for the unit. Candidates have been identified for all key positions.

ENGINEERING AIMED AT SOURCE REDUCTION: Of all of the activities which make up this malaria control program, it is those which are directed at reducing the mosquito population which will contribute most to the long-term solutions necessary to sustain malaria control. "Comprehensive mosquito control" is defined as the judicious selection and application of appropriate combinations of source reduction (drainage, filling, dyking, or other water management), biological (larvivorous fish) and chemical (larvicides and adulticides) measures for reduction of insect numbers to levels where they cannot sustain disease transmission or cause discomfort to man. This project will not attempt comprehensive mosquito control but will apply selected measures in both urban areas and rural areas of high disease transmission.

Source reduction will be undertaken initially in Zanzibar Town where 40% of the population of Unguja Island (110,000 population) is at risk. After one year of developing source reduction methods in Zanzibar Town, this area will be used as a training center for extending the measures to the other target areas on the island. Entomologic surveys will be conducted in Zanzibar Town to identify and define the distribution of anopheline mosquitoes. This will include identification and mapping of all breeding habitats. The area to be included in these surveys extends one mile beyond the area of high population density and will include approximately 16 square miles. The surveys will be conducted at regular intervals and are described in more detail under "Monitoring and Evaluation."

The engineering interventions to be undertaken in Zanzibar Town include simple ditching and filling to be undertaken by a team of laborers from the Malaria Control Program and more extensive leveling, draining and filling to be undertaken with the assistance of the Road Works Department of the Ministry of Communication and Transport. Areas not susceptible to drainage or filling will also be monitored for mosquito breeding, and where breeding exists, they will be subjected to larviciding.

Biological control measures will not be employed as a major component of the Zanzibar Malaria Control Program initially as there has been no previous experience in this area. However, the effectiveness

of larvivorous fish will be explored as a possibly feasible approach to dealing with mosquito breeding sites which cannot be eliminated through engineering interventions.

LARVICIDING: The control measure which will be routinely applied to target breeding sites which cannot be removed with engineering measures is larviciding. The larviciding program will employ unskilled laborers, "oilers," to regularly apply a larvicide to the surfaces of those remaining breeding sites in urban and rural endemic areas that have not been filled or drained.

The larvicide formula selected for the Zanzibar Malaria Control Program is:

- Triton-X 207 . . . . .3 pints
- Non-detergent Motor Oil (30 wt.) . 1 gallon
- Diesel Oil No. 2 . . . . .99 gallons

The program will use Hudson sprayers with cone nozzles, and the above larvicide will be applied at a rate of 3 to 6 gallons per acre (higher levels used in polluted water) in all freshwater breeding habitats. The specific timing and location of larvicide applications will be determined according to both weekly larval collections using simple dippers to locate continued breeding and weekly adult mosquito density data.

Existing stores of Malariol (which contains DDT) and Abate and Dursban (organophosphorous compounds) will be used until they are exhausted, but it is felt that the same insecticides should not be used as both larvicide and adulticide (for either ULV or residual spraying) because this would create a more favorable situation for the emergence of insecticide resistant mosquitoes. There is anecdotal evidence that some of the culicine vectors of filariasis are resistant to Abate and Dursban, and DDT resistant anophelines were identified on Pemba Island during the studies which accompanied this design (See Annex M).

Although other larvicides will be tested as part of the operational research carried on by the project, the above foundation will be initially employed. For each batch the Triton-X 207 should be first mixed with 15 gallons of diesel oil and agitated for 10 minutes before adding the motor oil and the balance of the diesel oil and agitating an additional five minutes. The motor oil is necessary to reduce the rate of evaporation after the larvicide mixture is applied to water surfaces.

SPACE SPRAYING: Until draining and filling activities are well advanced and an effective larviciding program is operational, additional measures will have to be employed to reduce the adult mosquito population, especially during the rainy seasons. Again the specific timing and locations for employing this control measure will be determined by regular monitoring of adult mosquito densities in the target areas.

Malathion is highly specific against mosquitoes and has low toxicity toward non-target organisms so it has been selected for the space spraying program. To minimize the rates of application employed, and to stay within the Environmental Protection Agency (EPA) approved levels for similar use in the United States, the new ultra-low volume (ULV) technology will be employed. The ULV application of adulticide requires special equipment producing extremely fine spray particles, any of which is lethal to an adult mosquito, and when used according to manufacturers' recommendations regarding meteorologic conditions such as rainfall and wind velocity, extremely small quantities of adulticides can be used to cover extensive areas.

In response to the monitoring of adult mosquito density and larval breeding, ULV applications of Malathion will be made in the urban areas and selected rural foci during and immediately following each rainy season. In no case should the period between applications during these seasons exceed 10 days which is the approximate incubation period of the malaria parasite in the mosquito. ULV spraying will be done at dusk and dawn when adult mosquitoes are at peak activity. Wind velocity should be less than seven miles per hour and the application of one to two ounces per acre of Malathion 5-E (Cythion for ULV) is recommended. Given the length of the rainy seasons in Zanzibar, it is estimated that 26 ULV applications will be required in each location annually.

INTRADOMICILIARY SPRAYING: Residual insecticide spraying of households will be employed as a mosquito control measure in the peri-urban fringe area to establish a barrier between the surrounding rural areas where mosquito breeding will continue unabated and the protected urban areas. In addition, residual spraying will be performed in those rural areas which demonstrate a high prevalence of malaria in the project's malariometric surveys. This is a departure from the previous programs in Zanzibar which attempted coverage of all houses on Unguja and Pemba with residual spraying.

This project will employ DDT as the insecticide of choice, endorsed by WHO and allowed by the EPA, in all areas where vector susceptibility to it permits. DDT was used extensively throughout Zanzibar during the 1961-68 eradication program and has been used in an irregular fashion ever since. Preliminary sensitivity tests conducted by the project design team did not reveal any evidence of DDT resistance on Unguja but did demonstrate DDT resistance in two locations on Pemba. In each location where DDT resistance was noted, susceptibility to Malathion was confirmed so the initial residual spraying program will utilize DDT on Unguja and either DDT or Malathion on Pemba. The selection of the insecticide for each location will be based upon the continuous monitoring of vector sensitivity using standard WHO testing kits. DDT and Malathion are expected to be the principal insecticides used in this activity.

Residual spraying will be conducted on a seasonal basis using trained, paid sprayers, as opposed to the volunteer sprayers whose unreliable performance has contributed to the ineffectiveness of the current program.

Spraying will be limited to a single application one to three months before each peak transmission period. This will mean that all target areas are sprayed before the heavy rainy season and a few foci will also require spraying before the short rainy season. Since Malathion's effectiveness is less enduring than DDT, in those areas where Malathion must be used, application should be restricted to no more than one month prior to the peak transmission periods. For purposes of budget calculations, it is assumed that half of the residual spraying undertaken during the first five years of the program will employ DDT while half will employ Malathion. Use of even more expensive insecticides should be minimal.

CHLOROQUINE DISTRIBUTION FOR PROPHYLAXIS: In the past the Zanzibar drug distribution program has involved having malaria surveillance agents make chloroquine deliveries every three months to the local representatives of the political party (balozi). The balozi, in turn, were responsible for drug distribution to the people. Although this procedure worked well for a brief initial period, the delivery of chloroquine to the balozi became erratic and the balozi lost their enthusiasm for having to actively contact an average of 35 people every two weeks. Records were not kept.

The drug distribution system to be employed by the Zanzibar Malaria Control Program will employ over 150 paid Malaria Agents who, as part of the permanent Malaria Control Program staff, will each be responsible for the drug distribution necessary to sustain the taking of prophylactic chloroquine once every two weeks by 1500-2000 people at high risk from the disease. Using Malaria Agents will permit them to be trained specifically for the tasks associated with their roles and will permit the establishment of a standardized system of recording and accountability as necessary to evaluate the effectiveness of this control activity.

The Malaria Agents will work out of the District Malaria Control Offices and will utilize several alternative approaches to reaching their target populations. These approaches will be designed to reach all children under 15 and pregnant women and will include, inter alia:

1. distribution to school children through the primary school system;
2. distribution to pregnant women and children at local health facilities, i.e. Maternal and Child Health Clinics, dispensaries; and
3. arranging for balozi to convene those not reachable through existing institutions.

The Malaria Agents will be responsible for personally delivering the prophylactic chloroquine to the target population in their respective assigned work areas and must employ a combination of the above approaches which assures total coverage. During the first year of the project chloroquine distribution coverage will be developed for 25% of the target population, and this activity will be extended to the remaining 75%

during the second year. Four areas of high endemicity, as demonstrated by active case finding, will be covered the first year--two on Unguja and two on Pemba--to provide a high enough level of control activities on each island to provide the experience needed as the organizational structure of the Malaria Control Prog. described earlier is developed.

When the chloroquine prophylaxis campaign is fully operational, it will be reaching approximately 280,000 at any moment:

Infants and children under 15	255,000
Expectant mothers (25% of women 15-45)	25,000

The following regimen, recommended by WHO for endemic areas of the Third World, will be employed to reduce malaria morbidity, malaria prevalence and the reservoir of malaria parasite in the community:

	<u>Age Group</u>	<u>Chloroquine Syrup</u> (10 mg/ml)	<u>Chloroquine Tablets</u> (150 mg/tablet)
Children:	0-1	5.0 ml	--
	2-3	7.5 ml	--
	4-5	10.0 ml	--
	6-8	---	1.0 tablets
	9-14	---	1.5 tablets
Pregnant Women	15-44	---	2.0 tablets

The Malaria Agents will play a major role in monitoring the coverage maintained by the chloroquine distribution program and the effectiveness of the drug in prophylaxis. This will require development of an appropriate record keeping and reporting system. In general, simpler systems maintained by the Malaria Agents will be employed, but the project will explore the popular incentive value of using small registration photo ID cards which can be punched to show chloroquine administration over a one-year period. Experience in Latin America has shown such cards significantly increased the level of coverage achieved.

CHLOROQUINE DISTRIBUTION FOR TREATMENT: It will be the responsibility of each Malaria Supervisor to assure that each Malaria Agent is supplied with sufficient chloroquine to sustain the prophylaxis program described above and that each health facility in his assigned work area has a sufficient supply of chloroquine to permit active treatment of all suspect fever cases with a curative dose of chloroquine. In addition the Malaria Supervisors, through their respective Malaria Agents, will assure that each balozi keeps on hand sufficient chloroquine to treat fever cases which present themselves during hours when the local health facilities

are closed. "Treatment" will be administered in a single dose to all fever cases according to the following regimen:

	<u>Age Group</u>	<u>Chloroquine Syrup</u> (10 mg/ml)	<u>Chloroquine Tablets</u> (150 mg/tablet)
Chi	0-1	5 ml	--
	2-3	10 ml	--
	4-5	20 ml	--
	6-8	--	2
	9-14	--	3
Adults:	15-44	--	4

Because a significant percentage of these fever cases will be due to malaria, this presumptive treatment will reduce the mortality associated with the disease. The extent of this reduction may be able to be extrapolated from the data produced by monitoring the blood slides done on all fever cases in health facilities and the outcome of each fever patient's illness.

HEALTH EDUCATION AND COMMUNITY MOTIVATION: Many malaria control projects in the past which have relied on chloroquine distribution as their principal antimalaria activity have fared poorly, but they have not maintained strong health education campaigns to sustain public support and participation. The goal of the health education component of the Zanzibar Malaria Control Program is to create a broader understanding of the role that malaria plays as a determinant of health and an appreciation of the measures which can be taken to avoid the disease, both through the program and as private individuals.

The control program will use a variety of vehicles for disseminating health education and promoting community participation. These include:

1. training all health workers to promote the program whenever they have the opportunity to discuss malaria with their patients and communities;
2. training all school teachers to instruct their students regarding the disease and the control program;
3. redeveloping the nearly defunct Health Education Unit of the Ministry of Health and Social Welfare to a point at which it will be able to both plan an effective health education strategy for the program and produce the educational and promotional materials needed for an active, sustained health education campaign; and

4. enlisting the national television and radio stations to participate in the campaign.

Most of these activities are already going on to some extent, and the control program will attempt to further develop them in the context of a carefully planned, integrated health education campaign. The planning will be partially based upon knowledge, attitudes and practices (KAP) surveys conducted by the program health educators at the beginning of the project. Zanzibar presents a favorable situation for launching an effective health education and community motivation campaign because the population has had a long exposure to antimalaria activities and has recently developed a high level of anxiety as a result of the resurgence of malaria to epidemic levels.

The campaign will have the following objectives at the community and individual levels:

1. create an appreciation of the crippling impact malaria has on health and productivity;
2. create an understanding of the basic features of malaria transmission and how the Malaria Control Program activities are designed to reduce the impact of the disease;
3. create an understanding of the need for high-risk members of the community to receive special protection and encourage their participation in the chemoprophylaxis program;
4. create an awareness of the need to seek prompt treatment in all cases of fever; and
5. encourage individual control activities such as removing breeding sources around their homes, and when their resources permit, using mosquito nets and screening.

In addition to the promotional and educational campaign aimed at communities and individuals, there will be a series of orientation programs for government officials and other institutional personnel. Initially seminars and workshops will be held for all organizational units of the Ministry of Health and Social Welfare to familiarize them with all aspects of the new malaria control program. At the same time similar orientation sessions will be held for key officials of other ministries and special groups, and the National Malaria Control Committee will be formed as an advisory body to periodically review the progress of the program and to assure assimilation of the goals of the program into the policies of other sectors, particularly agriculture, education and public works. Special groups which will be involved in the program include the women's branch of the political party (UWT), the Parents' Association, major industries, school teachers and the local political

leaders (balazi). Orientation sessions will be conducted for each of these groups to gain their support for the control program.

In Zanzibar both the radio and television stations are operated by the government. Nearly all radio programs and most television programs (70%-90%) are locally produced and constitute an important part of the government's development public information program.

It is estimated now that over 90% of the population of Zanzibar has access to a radio, and the Zanzibar radio station now allocates 15 minutes each week to the Ministry of Health and Social Welfare for its health education purposes. The station is eager to at least double this allocation, but the Health Education Unit has not been able to take advantage of this opportunity due to lack of trained personnel with programming experience. There were only two broadcasts concerning malaria in 1979; however, the recent concern has resulted in several malaria messages being broadcast in 1980.

The Ministry of Health and Social Welfare is one of the most active ministries using television as a medium for reaching the people. About 90% of the 5500 sets estimated to be on the two islands are in urban areas, yet the government does employ them for extension work and sets have been placed in the political party branch offices and some community centers. At present, health programming is scheduled only once a week in the evening. Spot surveys have shown health programming to be the least popular offerings of either the television or the radio stations. This project will provide media programming specialists as short term consultants to help utilize these communications resources more effectively for the Malaria Control Program.

**MONITORING AND EVALUATION:** This project is designed to demonstrate the feasibility of adapting known antimalaria activities to the African setting in an effective malaria control program. Both the initial selection of methods to be employed and the subsequent adaptation of these methods to the local situations require the careful, systematic studying of epidemiologic, parasitologic, entomologic, sociologic and selected other operational variables throughout the project. Some data has been assembled already, much of which appears in the annexes of this paper, and has guided the design of this project. During the first year of the project the monitoring activities will be put into motion which will complete the collection of baseline data and provide the continuous feedback of information needed during project implementation to permit adaptation of techniques and evaluation of program effectiveness.

Initial surveys will concentrate on the need to establish levels of reference for malaria prevalence, specific mosquito identification, habitats and densities, areas of high malaria endemicity, breeding sites and public knowledge and practices as needed to plan the activities

described above. Then continuous monitoring will be maintained on these indices and additional parameters such as vector and parasite susceptibilities, seasonal and meteorologic variations, residual spray durability, rate of mosquito infection, and the performance indices for the operational research on each of the above activities. The latter will include the maintenance of detailed cost information on each activity to permit careful evaluation of the feasibility of the control program methodology in the African economic context. Further monitoring and evaluation techniques are discussed in Section VI.

THE INTEGRATION OF MALARIA CONTROL INTO OTHER SECTORS' PROGRAMS: Using both the establishment of the National Malaria Control Committee and promotional efforts aimed at specific ministries, professions or industrial groups, the Malaria Control Program will involve many organizations outside the health sector in the national malaria control effort. This involvement will include participation in antimalaria activities and avoiding activities which might have a negative impact upon the Malaria Control program such as the inadvertent creation of new mosquito breeding sites. In addition to the governmental organizations which should be involved such as the ministries of agriculture, industry, road works and education, non-governmental groups will play a role in making the malaria control effort a success. Such groups include the women's branch of the political party (UWT), the Parents' Association and special clubs such as the Scouts and community music clubs. The formal integration of other sector groups into the National Malaria Control Committee will be done by the direction of the Malaria Control Programs, and the informal involving of other groups in providing support to the program will be an objective of the health education activity described earlier.

BASIC & IN-SERVICE TRAINING: From the presentation of the organization and staffing of the Malaria Control Program presented earlier, it is evident that basic training for a wide variety of malaria control workers must be one of the first concerns of this project. In addition to the training required by all of the Malaria Control Program staff shown on Table 3, the local balozi, school teachers and health workers all need training in order to be able to play their respective roles in the project. With respect to the staff shown on Table 3, there are several different types of training required by relatively small groups; however, for many of these groups there are already one or more health workers with some training. These trained or partially trained workers will be developed as trainers to help in the training of their colleagues.

There are over 20 different areas of special training called for in providing the initial or basic training for the Malaria Control Program personnel. The two AID-provided technicians, with the help of short-term training consultants as necessary, will help the Zanzibar Ministry of Health and Social Welfare conduct courses in the specialty areas listed below during the first six months of the project. Most of these initial courses can be delivered during short sessions lasting only a few days,

and some of them may have been delivered with the help of WHO during the period while final AID project approval is sought and contracting arranged.

Initial training will be aimed at program supervisors and those needed to perform the preliminary monitoring activities:

Senior laboratory technicians	2
Source reduction supervisors	4
Senior health inspectors	2
Regional rural health assistants	5
District rural health assistants	10
Spraying supervisors	10
Malaria supervisors	17
Health educators	2
Assistant parasitologists	2
Microscopists	12
Cartographers	2
Entomology assistants	5
Entomology aides	10

These staff members will receive an initial general training as a group regarding the objectives and organization of the program with special attention given to the interdependence of the various program activities and the responsibilities of each category of malaria control worker. The group will then be split up for a review/training session concerning the specific areas of expertise each group must have. In each case, senior Ministry of Health and Social Welfare officials will play a role in conducting the courses.

The above staff, once through their initial training, will become involved in collecting the baseline data needed to determine where project activities will begin and in training the additional members of the program staff, including:

Pump mechanics	2
Oilers	32
Sprayers	60
Malaria agents	72
Balozis	7000
School teachers	3000
Rural health workers	300

The latter three groups will receive in-service training in the form of seminars and workshops. Once the basic training objectives have been met for each category of malaria control program personnel, they too will be kept up to date regarding the program and encouraged to make their respective inputs into the evolution of the program through a series of regular in-service seminars and workshops.

Recognizing the delay in implementation inherent in the AID project approval and contracting processes, the Government of Zanzibar has requested WHO interim assistance to prepare for the launching of the Zanzibar Malaria Control Program. Specifically, WHO has been requested to provide refresher training for the 12 microscopists, to conduct random malariometric surveys among 2 to 9-year olds in May-June 1981 to identify areas of high malaria prevalence on both islands, to provide training for entomologic assistants, to conduct anopheline susceptibility testing for 4% DDT and 5% Malathion in the areas of high malaria prevalence, and to determine the duration of effectiveness of DDT and Malathion on the various types of residential walls found in Zanzibar. If WHO is able to meet these requests, a great deal of program time will be saved.

The first WHO expert has already arrived. He is an entomologist and will be spending three months training entomologic malaria control workers and conducting initial entomologic surveys. He will not be training the microscopists, but WHO has expressed its willingness to provide additional trainers during the interim period.

### III. PROJECT PREPARATION ANALYSES

#### A. Economic Feasibility

Like most AID projects in the health sector, the Zanzibar Malaria Control Project is not designed to generate any revenue. Its economic justification must be established on the basis of its being carefully costed out, less expensive than alternative approaches, suited to the financial capacity of the Government of Zanzibar to bear present and future recurrent costs of the program, directed at a sufficiently large number of beneficiaries, capable of generating significant financial savings through the reduction of costs associated with treating malaria, and capable of increasing individual productivity on the islands through the reduction of the debilitating effects the disease has upon the population.

##### 1. Reasonable Costs

The budget for the project is presented in Section IV and Annex B, and the project inputs have been individually costed out on the basis of established prices in September 1980. In most instances the Government of Zanzibar has collaborated in the establishment of cost estimates. Anticipating project implementation through a contract for all goods and services required for the delivery of AID support, an overhead rate of 100% has been included. A contingency factor of 10% has been applied, and a constant inflation rate of 12%, compounded annually from 1980, has been applied to all but personnel costs, for which 5% inflation was used.

##### 2. Least Expensive Alternative

The formulation of the strategy for the Zanzibar Malaria Control Program was described in the previous section. The selection of the combination of activities was made primarily on the ability of the Government of Zanzibar to administer the program. Cost considerations were important in selecting the methods employed in implementing each activity which makes up the overall program. Less aggressive strategies which employ only chloroquine distribution would be markedly less expensive than the program chosen; however, they could not be expected to result in a long-range solution to the malaria problem, and they would not fully use the capacity of the Government of Zanzibar to deal with the problem. On the other hand, the high level of investment necessary to complete an eradication program is manifestly beyond the capacity of the Government of Zanzibar, even with significant donor support. Each output activity will be discussed in terms of its methodology selection being economically feasible.

- a. Malaria Control Program Organization: The personnel levels identified for the Malaria Control Program represent the minimum number of malaria control workers which can be added to existing personnel at each level to achieve program objectives. It would be possible to include more specialized technicians during the start-up phase of the program, but the project is designed to provide most highly specialized technical input through short-term consultants and maintain the level of Zanzibari staff at what will be required for the long-term operation of the program. The Zanzibar Government has already committed itself to providing for all personnel costs for Zanzibari malaria control workers.
- b. Source Reduction through Engineering: Instead of being attempted throughout the islands, which would be a major, expensive civil engineering campaign, this project will concentrate its source reduction interventions in urban areas and will employ methods which can be accomplished with unskilled laborers with occasional assistance from the Road Works Department.
- c. Larviciding: To reduce costs a larvicide mixture consisting primarily of oil instead of expensive insecticides will be used, and larviciding will only be done in urban and selected rural areas of high prevalence when regular larval collections indicate the need.
- d. SPACE SPRAYING: The new ultra-low-volume (ULV) technique will be utilized to permit maximum coverage using a minimum amount of insecticide. Space spraying will not be conducted throughout Zanzibar all year but will be limited to the urban and selected rural areas described above and applied only during and immediately after the rainy season.
- e. Household Spraying: In contrast to past antimalaria programs on Zanzibar, this program will limit residual spraying to selected rural areas and the peri-urban fringe. The least expensive insecticide, DDT, will be used wherever susceptibility testing confirms its effectiveness; however, more expensive insecticides may have to be used from the beginning in some areas on Pemba Island. Spraying will be limited to a single application before each rainy season.
- f. Chloroquine Prophylaxis: Instead of distributing prophylactic chloroquine to the entire population of Zanzibar, it will only be given to high risk groups. The prophylactic dose will be administered every two weeks instead of weekly as WHO field testing has shown fortnightly chloroquine to be protective in LDC populations in endemic areas. Less frequent doses have not been protective.

g. Chloroquine Treatment: The alternative to presumptive treatment of all fever cases would be to require a confirmed diagnosis of malaria before giving chloroquine to fever patients. This would involve setting up a reliable diagnostic capacity in every health facility which the Government of Zanzibar could not afford at this time. Chloroquine treatment is relatively inexpensive and the demand for it will be reduced by 33% during the life of the project if the end-of-project-status goals are achieved.

h. Health Education and Promotional Activities: This program will be used to involve all existing personnel, institutions and mass media programs to enhance the effectiveness of the program. It will put to more effective use the existing health education, television and radio facilities and will utilize people outside the program, in their existing roles, to further the project rather than launch an expensive, free-standing community outreach campaign.

i. Monitoring and Evaluation: By virtue of this being a demonstration project for other parts of Africa, there will be a significant amount of monitoring or surveillance maintained throughout the project. It is, however, essentially operational research designed to point out how the application of control methods can be most appropriately adapted to the African context, including the economic context. Basic research in antimalaria technology, which is much more expensive than operational research, is not included in this project, but may be added by other donors as project experience indicates the opportunity or need for advancing the technology.

j. Involvement of Other Sectors: This activity is intended to assure full utilization of existing institutions and trained personnel outside the health sector to further the objectives of the program. This will greatly reduce the cost of setting up the health education and promotional outreach campaigns of the program and will help assure that the achievements of the control activities are not negated by the inadvertent creation of new mosquito breeding sites by other sectors' programs.

k. Basic & In-Service Training: The training costs of this project are minimized by almost exclusive use of in-country, competency-based, experiential training for all levels of malaria program workers. Maximum use of paramedical personnel will be utilized, both as malaria control workers and as trainers. The balance between basic training and continuing education will favor the latter, with only a short, intensive

period of initial training to be followed by regular participatory in-service training workshops. These workshops will be used in connection with the need to keep earlier training from fading, the need to introduce new techniques and methods as they are found to be more effective, and the need to get feedback from all malaria control program workers to carry on the operational research necessary for the adaptation of malaria control methods to the Zanzibar situation. As Table 3 indicates, all positions in the Malaria Control Units are filled by workers from Zanzibar, permitting limited use of expensive, long-term and short-term expatriate staff.

### 3. Annual Recurrent Costs Projection (based on FY 86 costs)

The Zanzibar Government has demonstrated its political and economic commitment to the project by planning to pay all of the salary costs of the Malaria Control Program and a significant share of the costs of drugs and insecticides. As can be seen in the detailed budget in Annex B, the operating costs are initially high but then level off and even decline as the reduction in malaria prevalence is reflected in decreased need for chloroquine as a therapeutic measure. The recurrent cost burden for Phase II and beyond of the Zanzibar Malaria Control Program is defined primarily by the costs of personnel salaries, chloroquine, transportation, insecticides and in-service training. By the beginning of Phase II these should be at the levels indicated below. (Worksheet: Annex P)

	<u>FY 86</u> <u>(\$000)</u>
Salaries	396
Training	115
Chloroquine	394
Insecticides	158
Transport	385
Utilities, Rent	<u>26</u>
Subtotal	2895

Zanzibar's FY 86 Malaria Control budget: 1182  
= 41% of recurrent costs

Projected recurrent costs are \$5.79 per capita, however only \$2.95 of this is based upon projections of today's prices. The rest is based upon having contingency funds available and there being considerable inflation each year. The latter could also affect the clove market price which would help dampen the impact of this inflation on Zanzibar.

The percentage of the running costs or recurrent costs which donors and the Government of Zanzibar share, respectively, is indicated below for each year of both Phase I and Phase II:-

<u>Phase I:</u>	<u>FY 81</u>	<u>FY 82</u>	<u>FY 83</u>	<u>FY 84</u>	<u>FY 85</u>	<u>FY 86</u>
GOZ	43%	42%	39%	38%	38%	41%
AID	57%	58%	61%	62%	62%	59%

<u>Phase II:</u>	<u>FY 86</u>	<u>FY 87</u>	<u>FY 88</u>	<u>FY 89</u>	<u>FY 90</u>	<u>FY 91</u>
GOZ	41%	53%	65%	77%	89%	100%
DONOR	59%	47%	35%	23%	11%	0%

By 1986, when recurrent costs are calculated as above, leaving out the costs of expatriate technicians and consultants, the Government of Zanzibar is already contributing at a rate of \$1,182,000 per year which is equal to 41% of the projected recurrent costs. If the first phase of the program is successful, the Government of Zanzibar hopes to be able to negotiate continued donor support from AID or other sources which could help finance a second phase of project activities during which the Government of Zanzibar would continue to increase its financial responsibility for the program until it was wholly supported by the host country.

Zanzibar has been shown in Annex K to have an unusually high percentage of its recurrent budget devoted to health (15.7% in 1978/79). This results in an atypically high per capita investment in the health sector (\$13.32 in 1978/79 for both operating and development costs in health). For the Government of Zanzibar to gradually take over the full cost of the Malaria Control Program during a second phase of the project will only require it to increase expenditures by \$3.43 per capita beyond what it will be paying in 1986, an increase of 26% only.

#### 4. Number of Beneficiaries

This project is designed to include the entire population of the island of Zanzibar as direct beneficiaries, high-risk groups because they will receive preventive medication, and the rest of the population because disease transmission will be reduced through the combination of source reduction, chemoprophylaxis and chemotherapy. During the initial five-year phase when the Zanzibar Malaria Control Program is being established, the program cost per beneficiary is calculated at \$6.24 per person per year; however, the annual cost per person during subsequent program maintenance phases is expected to be only \$5.79. The Government of Zanzibar will assume full responsibility for bearing these program costs during the second five-year phase of the program.

If the percentage of the population currently infected with malaria is 50% instead of the 76% recently reported on Pemba Island, a reduction in malaria prevalence of 33% will mean that at any point in time after that goal is achieved, there will be 82,500 new malaria-free people. Most of the people thus protected from malaria will be children under 15 and pregnant women because they will have received special prophylactic care due to their high-risk status. The reduction in the number of people seeking treatment for malaria will be much less than 82,500 because only a fraction of malaria cases ever report for treatment.

## 5. Net Return to Society

### Summary and Conclusions

This economic analysis appraises a malaria control project in Zanzibar in terms of whether the project is worthwhile from an economic standpoint.

Project economic costs are estimated at U.S.\$ 17.2 million equivalent, utilizing a foreign exchange rate of U.S.\$ 1.00 = T.Shs 8.2.

The project will produce substantial direct and indirect benefits. This analysis has quantified only those expenditures and losses avoided that can be valued in monetary terms. The avoided expenditures and losses during ten years of the control program are as follows: U.S.\$ 18.2 million equivalent in loss of earnings; U.S.\$ 6.3 million equivalent in medical treatment; and U.S. \$ 1.5 million equivalent in drugs.

Current estimates indicate that the economic rate of return on health projects lies somewhere between 8 percent and 12 percent; we have used a 10 percent discount factor.

The project was subjected to three of the most commonly used primary tests of value. The benefit-cost ratio is 1.1 indicating that the project is acceptable in terms of generating benefits in excess of the costs (i.e., for every \$1.00 spent on malaria control, the project will recover \$1.10 in benefits). The net present worth is U.S.\$ 1.1 million equivalent when discounted with an opportunity cost of capital of 10 percent (i.e., \$1.1 million equivalent will be generated over the 10 years of the program after all economic costs are covered, including the opportunity cost of capital). Finally, the internal economic rate of return to the project is 11 percent, which compares very favorably to the average rate of return accruing to alternative investments.

On the basis of this economic analysis, the project is economically feasible and merits U.S. AID support.

### Methodology

The essence of this economic analysis is the comparison of what the Zanzibar economy's expenditures and losses would be without the project to what they would be with the project. The difference between the two, minus the project economic costs, enables us to identify the benefits derived as a result of the malaria control project.

Because of the existence of underemployment of the labor force, this economic analysis has shadow priced the cost of labor at 50 percent the minimum wage.

The monetary values of costs and benefits have been calculated for a period of ten years and appropriately discounted over time to yield present values.

### Project Economic Costs

All the resources, both physical and human, that will go into the initiation and operation of the project have been identified and quantified.

Project economic costs are based on current costs but include a 5 percent physical contingency factor and a 12 percent inflation factor.

The total economic cost of the program over ten years is estimated at U.S.\$ 17.2 million equivalent.

### Projected Costs Without the Project

In the absence of a malaria control project the Zanzibar economy would be faced with additional expenditures of U.S.\$ 6.3 million for medical treatment of patients requiring hospitalization, U.S.\$ 1.5 million for the importation of drugs, and the economy would lose U.S.\$ 18.2 million in personal income earnings.

### Benefits

The project direct gross benefits are the expenditures avoided in medical treatment, drug imports, and loss of earnings.

To arrive at the net benefit, we have subtracted from the gross benefits the costs incurred in the initiation and operation of the project, and the expenditures and losses due to malaria during the ten years of the program.

Besides the direct benefits that lend themselves to quantification, we have encountered an equal or greater number of benefits whose impact cannot be assessed directly in economic terms. The most significant ones being:

- strengthening of the general health delivery system;
- decrease of the incidence of other diseases; and
- an indirect contribution to agricultural production and labor productivity.

## 6. Increased Productivity

A thorough cost-benefit analysis of a malaria control effort, which is not feasible at this stage of this project, would have to place a value on the productivity currently being lost as a result of malaria. This loss has many components, each of which would have to be quantified and monitored, including the labor time lost because of premature death -- sometimes even before birth -- and labor efficiency lost due to the debilitating aspects of the disease and its sequela. The loss of efficiency of production can be due to inability to perform well or inability to learn well or both. Although this project will not attempt a comprehensive analysis of the increases in productivity resulting from malaria control because of the cost of doing such a study, it will monitor selected indicators of this phenomenon such as absences from school or work because of fever in order to attempt to demonstrate that there is at least a correlation between program investment and fever-related work losses.

In addition a random sample of the population will be carefully monitored throughout the project and variations in individual allocations of labor time will be noted. One phenomenon that should become evident as the project progresses is that less time will be required for caring for those with malaria. This should result in the possibility for women to have more labor time to invest in more productive activities.

## B. Social Soundness Analysis

In the 1980 Tanzania Health Sector Strategy, USAID/Tanzania expressed the high priority it places upon health projects which help communities understand their own health problems and how to deal with them. The Zanzibar Malaria Control Project is such a project, and it addresses a problem about which there is such a high level of anxiety that the people of Zanzibar are demanding action from their government.

### 1. Socio-Cultural Feasibility

Zanzibar's population of 500,000 exhibits much less variety of religious and ethnic origins than is found on the mainland. Well over 90% of the population is Muslim. The respective roles of men and women in Muslim society are more defined by tradition than by innovations from the outside. Although the overthrow of sultan rule resulted in a mass exodus of the predominantly Arabic population of the urban areas, the current population is still a blend of Bantu and Asian origins. The population is about half rural on Unguja Island and over three-quarters rural on Pemba Island.

There exists a strong one-party government on Zanzibar, as throughout Tanzania, which is organized with volunteer leaders for each ten-cell unit. A ten-cell unit is a collection of ten households with ten to twenty families. The volunteer leaders are called balozi. Each village has or is developing its own institutions such as schools and dispensaries.

This project is designed to respond to the uniformly high level of community concern about malaria. It takes advantage of the fact that nearly all adults in Zanzibar have had previous experience with antimalaria activities, and it will utilize existing political, governmental and religious institutions to mobilize the community to better understand the problem and to participate in the activities taken to control malaria.

The current antimalaria activities at the village level have been compromised by the unreliability of volunteer workers as sprayers and as chloroquine distributors. This project will also involve some volunteers, such as the balozi, to help motivate and mobilize the people to participate in the program, but every major malaria control activity will be undertaken by specially trained, paid workers.

The health education and community motivation campaign will be developed and adapted to reflect the cultural settings in Zanzibar through the use of periodic knowledge, attitudes and practices surveys conducted on the islands.

## 2. Spread Effects: The Diffusion of Innovation

The Zanzibar Malaria Control Program is designed to reduce the prevalence of malaria by at least 33% for all of Zanzibar. Therefore, even though the target population for certain activities is limited and not even all of the target population will benefit during the first year, the project is designed so that everyone on the islands will benefit by the end of the first five-year phase of the control effort, after which malaria should no longer constitute a major public health threat.

The most significant spread effects, therefore, will be those which result in the diffusion of malaria control innovations beyond Zanzibar. By virtue of being undertaken at a time when the world's donor community is seriously considering recommitting itself to fighting malaria, this project can lead the way in demonstrating how known malaria control technology can be adapted to fit the conditions found in Zanzibar -- which are very similar to conditions found in most of sub-Saharan Africa.

The operational research or monitoring activities of the project will be conducted in such a way that the mechanisms of adaptation are documented and can be applied in other areas where malaria control is attempted. Similarly, this project will demonstrate the diffusion of innovation into Zanzibar as control methods which have been developed in other parts of the world are tested in Zanzibar.

## 3. Social Consequences and Benefit Incidence

Since this project is designed to reach all of the people of Zanzibar, it should not affect different groups in different ways, except for the fact that it favors high-risk groups with chemoprophylaxis. Since the benefits accruing from the program are understanding how to deliver an integrated malaria control program and relief from malaria, it is not easy to see how these could be misappropriated. Project services delivery will be monitored to assure that they are undertaken in the spirit of free government services in a socialist context.

The project will have a significant impact upon access to resources and opportunities inasmuch as it will reduce one of the main disease constraints to full use of educational facilities and production opportunities. It is not expected that rural displacement, migration or urbanization rates will be affected; however, the latter could increase if the malaria source reduction activities which are concentrated in urban areas result in the urban prevalence of malaria being lowered much more drastically than the rural levels.

During the review of the Project Identification Document for the Zanzibar Malaria Control Project, a special concern for the impact of the project upon the role of women in Zanzibar was expressed. This concern has been kept in mind during project design. Because women and children under their immediate care are at highest risk from malaria,

the chemoprophylactic activity of the malaria control program is aimed at them. Consequently, the health education and community motivation campaign will address itself to the need to make the entire population aware of the special risk malaria poses to pregnant women and children. The health education program will also help women understand the objectives of the malaria control program so they can fulfill their key responsibilities in bringing themselves and their children for regular chemoprophylaxis, and treatment if necessary.

As the program achieves its goal of reducing the prevalence of malaria, women will be partially relieved of the considerable burdens of caring for sick family members, enduring the hardship of miscarriage, and having to carry on with the family work while debilitated from the disease. Although this project will bring considerable benefits to women, it would not be reasonable to expect it to alter their traditional status in the Muslim society of Zanzibar.

In summary, it appears that the Zanzibar Malaria Control Program is socially sound. This is primarily due, not to the project design having been modified to account for cultural idiosyncrasies in Zanzibar, but to the fact that the people of Zanzibar are uniformly concerned about the present malaria epidemic, and they have had a long exposure to antimalaria activities.

### C. Technical Feasibility

The basic premise underlying this section is that the technology required for a successful malaria control program has existed for decades. The challenge is to adapt this antimalaria technology to local conditions in such a way that it becomes feasible for the host country to maintain the resultant control program with its own resources. The greatest technologic challenges of this project are not related to the technologies of malaria control but to the technologies of adaptation, i.e., operational research. The next greatest technological challenges are also not related specifically to antimalarial activities but are the technologies of management, training, community motivation and dissemination of results. Finally, even the technologies specific to malaria control will have to be modified and refined as field experience is gained. The blend of these three categories of technologic requirements is discussed below in the context of each of the project outputs.

#### 1. Malaria Control Program Organization

This output is discussed in the next section under Administrative Feasibility.

#### 2. Source Reduction Through Engineering

This project will employ standard techniques for identifying mosquito breeding sites and removing them through filling or draining. These include regular larval collection and identification and the use of both manual and heavy equipment labor. The latter will involve the Zanzibar Road Works. This output will also depend upon the technology required to identify which rural areas of Zanzibar have the highest prevalence of malaria. Active case finding will be conducted with random sampling throughout Zanzibar. Diagnosis will depend upon simple microscopic examination of blood slides using both thick and thin smear techniques. Source reduction effectiveness will be evaluated using standard vector density survey techniques including use of household resting stations and human bait night biting stations.

#### 3. Larviciding

The selection of sites for larviciding will be made on the basis of larval collections and vector density surveillance as described above. The larviciding procedure is described in Section II. Hudson sprayers with cone nozzles have been recommended for larviciding with Triton-X 207 for all freshwater breeding sites. Effectiveness will be monitored using the same technique described above and other aquatic fish and plant life will be monitored to evaluate the environmental impact of this activity which is not expected to have any damaging effects.

#### 4. Space Spraying

Space spraying is the application of contact insecticides to vectors in space. It is effective in bringing about a short-term reduction in vector density but lacks the long-term effect of residual house spraying. Recent development of the ultra-low-volume (ULV) technique, which is the dispersal of fine liquid particles of pesticide concentrates containing 90 percent or more active ingredients at application rates of one liter or less per hectare, has reduced formulation costs, equipment operating time and the probability of community intoxication to a level where space spraying can be effectively added to a malaria control program to complement residual spraying activities by combatting vectors which have adapted to outdoor resting places, and to achieve an initial reduction in adult mosquito density in areas where long-term reduction will be attempted through environmental engineering and larviciding techniques.

Site selection for space spraying and evaluation of its effectiveness will depend upon monitoring of adult mosquito densities. To reduce the likelihood of insecticide resistance emerging, different insecticides will be used for space spraying and residual household spraying. The WHO recommended insecticide for space spraying, Malathion, will be used for this activity, and LECO Model HD ULV dischargers were recommended by the design team.

#### 5. Household Spraying

Ever since the 1939 discovery that DDT has a long-term insecticidal effect, spraying of residual insecticides in houses has been the most common method employed in malaria control throughout the world. It is effective against all mosquitoes which are endophilic, i.e., which rest on inside walls, ceilings or other surfaces after their blood meals on humans. Depending upon the local situation in terms of vector susceptibility and available finances, residual insecticides are selected from three groups: the chlorinated hydrocarbons such as DDT, the organophosphates such as Malathion, and the carbamates such as propoxur (in order of increasing cost).

The feasibility of DDT spraying is well established, and DDT accounts for over 90% of the insecticides currently in use against malaria vectors. DDT house spraying is done with easily transportable water dispersible powder. The spraying equipment and procedures have been standardized by WHO, and the methods necessary for safe, effective spraying can be taught to uneducated personnel in a day. DDT is the least expensive of the residual insecticides and remains active for six to twelve months after application so it is the insecticide of choice wherever mosquitoes are susceptible. There have been no reports of acute human or animal intoxication from DDT except in circumstances not encountered in malaria control campaigns, and the WHO Expert Committee on Insecticides, the National Academy of Sciences and the U.S. Environmental Protection Agency have all taken positions supporting the continued supervised use of DDT in public health programs.

DDT will initially be used in all residual spraying activities in Zanzibar in order to evaluate its effectiveness. Where it is found to be ineffective, and DDT resistance has been found in one area of Pemba Island, alternative insecticides will be utilized. The organophosphate Malathion has been recommended by WHO for use in areas of vector resistance to DDT and will be the first alternative insecticide employed. It is about five times as expensive and effective for only half as long as DDT, and it requires special measures to avoid human intoxication.

#### 6. Chloroquine Prophylaxis

This activity is dependent upon "soft" technology for its success such as the establishment of an effective logistics system to maintain adequate drug distribution and an effective health education campaign to assure utilization. Knowledge, attitudes and practices (KAP) surveys will be periodically employed in this regard. The use of chloroquine in prophylaxis and treatment is a well-developed technology, yet careful monitoring will be required to keep Zanzibar on the alert for the possible emergence of chloroquine-resistant malaria. Short-term consultation from the U.S. Center for Disease Control (CDC) in Atlanta, Georgia, will be used to train health workers in Zanzibar to be on the lookout for possible cases of drug resistance, and the Reichman test will be used initially to investigate suspect chloroquine resistance. To date, no such resistance has been encountered on Zanzibar.

#### 7. Chloroquine Treatment

This requires essentially the same technology as chemoprophylaxis described above, plus the continued use of passive case detection applied to those patients presenting with fevers at health centers where blood slides can be prepared. Passive case detection technology is simple and will permit monitoring of decreasing service costs as a result of reduced disease transmission as well as possible identification of chloroquine resistant parasites.

#### 8. Health Education and Community Motivation

This activity will make full use of existing public relations and educational technology in employing KAP surveys, mass media and non-formal education.

#### 9. Operational Research

The technologies required for this activity have been largely discussed above; they are the principal technologies of adaptation. Sociologic, epidemiologic, parasitologic, entomologic, administrative and financial monitoring will be applied to the malaria control activities employed to determine their effectiveness and compare them with alternative measures. This monitoring will utilize levels of technology which are within the means of Zanzibar to continue and will be performed in Zanzibar, with the possible exception of special studies required to investigate suspected chloroquine resistance.

#### 10. Involvement of Other Sectors

This activity poses little technologic challenge as it involves the application of known malariologic techniques to analyze the potential malaria-promoting activities of other sector programs, such as a rice irrigation scheme, and the application of known malaria control technology to minimize the malaria-promoting effects of such programs.

#### 11. Basic and In-Service Training

Competency-based training techniques will be used for all training activities of this project. These techniques require careful job description, task analyses for each job defined, curriculum development to provide the knowledge and skills required for each task, experiential training, and frequent in-service participatory workshops as described earlier.

In addition to the technologic requirements of the component parts of the program, there is a need to apply systematic monitoring to evaluate the management of the program. Administrative, logistic and financial management will be monitored through the holding of quarterly project review meetings and the conducting of comprehensive external evaluations during the second and fourth years of this phase of the program.

The program is technically feasible as it is currently designed and should become even more so as the process of adaptation proceeds.

### C. Technical Feasibility (Continued)

There are many specific malaria control technologies which have not been selected for this project. Some of them have been de-selected because of their high recurrent costs and some of them due to peculiarities of the Zanzibar setting. Others may be studied as methods which might be added to the program in a later phase. Among the latter group are the various technologies of biologic mosquito control including the use of larvivorous fish, invertibrate predators, genetic control, parasitic nematodes, protozoans and fungi, pathogenic bacteria, insect growth hormones and pherones and larvicidal plants. Larvivorous fish is the most promising of these techniques and will be studied in the program.

Although the use of chloroquine medicated salt for malaria prophylaxis has been suggested for Zanzibar, the design team found that there are so many small, indigenous salt-producing sites along the shores of the islands that there is no feasible way of controlling the incorporation of chloroquine into the salt before it is used. Furthermore, medicated salt trials on the mainland in 1966 showed that there was inadequate intake of salt by infants and small children to give protection from malaria, and an irregular low intake of chloroquine by the population of Zanzibar could set the stage for the emergence of a chloroquine-resistant parasite strain.

Another suggestion which the design team has considered on technical grounds is that the Zanzibar Malaria Control Program be designed to attempt filariasis surveillance since the latter mosquito-borne disease is also a problem on the islands. This suggestion is complicated by the fact that filariasis is transmitted by a different group of vector mosquitoes from malaria, with different habits, breeding sites and insecticide susceptibilities. Furthermore, blood surveys for Bancroftian filaria would have to be made after 10:00 p.m., requiring a special surveillance program to be set up to monitor the impact of the program on filariasis. However, such a surveillance system will be established on a small scale in the urban areas of Zanzibar because there are several ways in which the malaria control activities might have a beneficial impact upon filariasis. These include the fact that Culicine mosquitoes are susceptible to Malathion and Friton-X 207 and should be reduced where they co-exist with Anopheline mosquitoes being attacked through the larviciding, space spraying and household spraying activities using these insecticides. Mosquito density surveillance will indicate whether the mosquito control techniques aimed at reducing the malaria vectors are having a similar impact upon the filariasis vectors.

#### D. Administrative Feasibility

The Zanzibar Malaria Control Project will be implemented within the existing administrative framework of the Government of Zanzibar which has engaged formally in antimalaria activities of one form or another for over 25 years. The executing agency for the project will be the Ministry of Health and Social Welfare, and the existing Malaria Unit within the Ministry will be reorganized as the Malaria Control Program. Figures 1 and 2 presented earlier indicate the location of the Malaria Control Program within the administrative organization of the Ministry and the internal organization of the program, respectively.

It is proposed that the present program staff of 151 be increased to 433 over the period of the first year of the project and that within the increased staffing pattern shown in Table 3 the organizational and management relationships be restructured to provide adequate supervision of the increased numbers of field workers involved. Each of the major project activities is staffed with an adequate number of field personnel who are supported by supervisors and technical advisors. The two long-term technical assistants to be provided by AID are not intended to occupy permanent positions in the administrative organization. Instead they are to serve as advisors or catalysts to project development during the first five-year phase of the control program. The AID-provided technicians will have government counterparts as described in Section II, but they are expected to work at all levels of the project.

Because the Zanzibar Malaria Control Program is important to the integrated rural development program of the Government of Zanzibar, and because it is important that other sectors be involved in the administration of the project, a National Committee on Malaria Control will be established with representation from the Ministries of Health and Social Welfare, Education, Agriculture, Industry, Planning, Finance, Road Works, Culture and Information and Communication. This committee will be chaired by the Ministry of Health and Social Welfare and will meet at least quarterly to monitor program progress and advise on program administration.

The administrative framework of the project is compatible with that which the health sector is currently using. The hierarchy of levels of the malaria control program corresponds to that of the rest of the health system and the malaria control program workers will be based at health facilities. The line of authority within the malaria control program runs through the directors of each level of the program from the headquarters to the island offices, to the regional offices, and to the district offices as presented in Figure 2.

Administrative and management shortcomings have been partially responsible for the lack of effectiveness of the existing Malaria Unit. Short-term project consultants will be utilized early in the project

to provide project management training to all project administrators, as part of their orientation and in-service training, and this will be reinforced by the presence of the long-term technical assistants throughout the life of the project. The administrative and management ability of the program staff will be further strengthened by the project's support of ten training years of participant training for senior staff in the areas of health sciences administration, epidemiology, entomology, vector control and health education.

One specific administrative shortcoming of the former program which has been addressed in the design of the project relates to the use of volunteers for village-level drug distribution and house spraying. In the past it proved impossible to sustain sufficient volunteer interest to be able to carry on a long-term activity. All such activities in this project will be carried out by permanent paid malaria control workers, and volunteers will be used only to help motivate communities to participate in the program and to hold medications for emergency after-hours distribution to fever cases.

The provision of technical services and procurement of commodities for the project will be arranged through a standard services procurement contract negotiated between AID and a suitable contractor chosen through normal AID contractor selection procedures with the Government of Zanzibar and USAID/Tanzania participating in final contractor selection. Because of the highly specialized nature of malaria control technical assistance, it is desirable to solicit proposals from prospective contractors with rich previous experience. Hence, it may be necessary to consider allowing bids from contractors outside the United States in order to guarantee a sufficient number of technically sound proposals to permit competitive selection of the best alternative.

The Malaria Control Program workers will use existing health facilities as their base of operation in the regions and districts and will use the offices, laboratories and storage areas currently at the disposal of the Malaria Service. In addition, the project will provide additional space for offices and laboratories by taking over the lease on the former American Consulate building and its three small outbuildings. The project will also provide housing for one of the two long-term technicians by taking over the lease on the former home of one of the consulate staff. The Zanzibar Government will provide housing for the other long-term technician.

Other donors are not formally included in this project at the request of the Government of Zanzibar; however, other donors can be involved in the Malaria Control Program by being engaged in activities which are complementary to the project. For example, WHO played an active role in project design and has been requested to provide selected interim assistance as AID and the Government of Zanzibar await project

approval and contracting to take place. Such interim assistance has been described earlier. Other donors may be asked to contribute to specific corollary activities such as local medication production, biological malaria control research and investigation of drug resistance. Donor activities in other aspects of the health sector in Zanzibar are described in Annex K.

By virtue of the combination of using the existing health system's administrative organization, giving additional administrative training to malaria control program workers, and providing technical assistance, the design team feels that the Zanzibar Malaria Control Project is administratively feasible. This conclusion is reinforced by the observation that the project also meets the "prerequisites for assistance" requirements described in the draft report of the Africa Bureau's Malaria Strategy Advisory Group as follows:

1. Malaria does constitute a major barrier to socio-economic development on Zanzibar;
2. The control program has been carefully planned and is technically feasible; and
3. There is a strong demonstration of government commitment to malaria control.

### E. Environmental Concerns

An Initial Environmental Examination (IEE) recommending a negative determination was submitted with the Project Identification Document (PID), and a negative determination for the project was granted at the time of PID approval and transmitted in the PID approval cable (Annex E).

Because the low levels of insecticide use associated with antimalarial programs have been repeatedly judged to be environmentally acceptable by a variety of national and international bodies, including the National Academy of Sciences, the U.S. Environmental Protection Agency (EPA) and the World Health Organization; DS/HEA is seeking a programmatic IEE negative determination to cover all malaria control programs. This blanket environmental clearance for malaria programs is expected to be granted soon.

In commenting on the absence of ecological consequences to humans and animals from supervised DDT spraying, the WHO Expert Committee on Insecticide has stated:

In vector control programmes DDT has been in use for over 20 years. Very large quantities continue to be used and no reports of any harmful effects have been recorded among the thousands of people who use it daily in malaria eradication campaigns. Furthermore, DDT remains the insecticide of choice where the vector is susceptible to its action.

The concern that has been expressed in recent years about contamination of the environment by this very stable and persistent insecticide should not, in the opinion of the Committee, be considered sufficient reason for substituting other insecticides for indoor residual spraying against mosquitoes.

Indoor spraying of DDT in routine antimalaria operations does not involve a significant risk to man or to wildlife. The withdrawal of DDT from malaria programs would be fraught with great danger and is unjustifiable in the light of present knowledge.

The EPA ban on DDT use applies to its use for agricultural purposes, and its use in public health programs is specifically encouraged.

Malathion has been recommended by WHO for use in areas where vector resistance to DDT is encountered. No toxic effects on the population have been noted under ordinary spraying conditions; however, insecticide handlers who are exposed daily can be at risk unless they are carefully trained in the safe handling of the chemical and are provided with protective clothing. This project is designed to provide such training and clothing and will conduct weekly tests of cholinesterase levels in Malathion handlers to make sure that they are not being adversely affected by the insecticide.

The carbamate insecticides are less toxic than the organophosphorous compounds and have been judged safe for malaria control programs when simple safety precautions are taken. Regardless of the insecticide used, all human and animals will be evacuated from the houses during actual spraying and all foodstuffs and cooking and eating utensils will be either covered or removed.

The source reduction engineering activities will result in a direct improvement in the environment because there will be a resultant decrease in available mosquito breeding places. Similarly, collaboration with other sectors' program development will help keep the environment from being spoiled through the creation of new breeding sites. Larviciding and space spraying will use insecticides which are highly specific against mosquitoes and have low toxicity toward non-target organisms. Nevertheless, the project will monitor the effect of insecticides on aquatic life throughout the project. The use of DDT is restricted to the spraying of homes in selected periurban and rural areas and at levels recommended by the World Health Organization.

The other project activities are not expected to have any impact upon the environment except for the health education activity which will promote "premise sanitation" whereby individuals work to remove the small mosquito breeding sites to be found on their own premises. Therefore, the design committee concurs with the negative environmental impact determination made at the time of PID approval.

#### IV. FINANCIAL PLAN

Since the analyses of the budget in terms of relative cost, recurrent cost implications and return to society are presented in the Economic Feasibility section, this section will simply be a presentation of Tables 4, 5 and 6 which present the Summary Cost Estimate and Financial Plan, The Projection of Expenditures by Fiscal Year and The Projection of Obligations by Fiscal Year, respectively.

TABLE 4: SUMMARY COST ESTIMATE AND FINANCIAL PLAN  
(U.S. \$000)

Zanzibar Malaria Control Project (621-0163) Project Paper

USE \ SOURCE	AID		ZANZIBAR		OTHER		TOTALS
	FX	LC	FX	LC	FX	LC	
Technical Assistance							
Long Term	900			1980			2880
Short Term	413						413
Training							
Long Term	220						220
Short Term	100	411		145			656
Commodities	2915		830				3745
Other Costs		1318		30			1348
Overhead (100% of U.S. salaries)	1313						1313
Contingency (AID:10%) (GOZ: 5%)	759		42	101			909
Inflation (5% Staff and 12% Compounded)	3422		407	71			4546
Sub-Totals	10042	1729	1279	2980			
TOTALS		11,771		4,259		-0-	16030

TABLE 5: PROJECTION OF EXPENDITURES BY FISCAL YEAR  
(U.S. \$000)

Zanzibar Malaria Control Project (621-0163) Project Paper

FISCAL YEAR	SOURCE		ZANZIBAR		OTHER	TOTALS
	AID	**	**	**		
FY 81*+	1324	(1859)	284	(318)		1608
FY 82	1005	(1638)	597	(717)		1602
FY 83	1055	(1832)	597	(771)		1652
FY 84	1383	(2926)	597	(872)		1980
FY 85	975	(2136)	597	(990)		1572
FY 86*	535	(1380)	313	(591)		848
Overhead ( 100% of US salaries)	1313					1313
Contingency (AID:10%)(GOZ:5%)	759		150			909
Inflation (5%, 12% Compounded)	3422		1124			4546
TOTALS	11771		4259		-0-	16030

\* FY 81 and FY 86 will each have only one half year of project activities.

\*\* FY expenditures including overhead, contingency and inflation factors.

+ Expenditures in FY 81 may be reduced secondary to project development process delays.

TABLE 6: PROJECTION OF AID OBLIGATIONS VS. EXPENDITURES  
(U.S. \$000)

Zanzibar Malaria Control Project (621-0103) Project Paper

Fiscal Year	Obligations	Expenditures	Pipeline
FY 81	3535	1859+	1676
FY 82	2500	1638	2538
FY 83	2500	1832	3206
FY 84	2500	2926	2780
FY 85	736	2136	1380
FY 86	0	1380	0
TOTALS	11,771	11,771	0

+ Expenditures in FY 81 may be reduced secondary to project development process delays.

## V. IMPLEMENTATION SCHEDULE

Upon completion of project design by the Government of Zanzibar and USAID/Tanzania, the Project Paper will be submitted to AID in Washington for approval. This approval will require approval of project design, approval of the requested grant, approval of the source/origin waivers requested, and issuance of a Congressional Notification. The latter is required because the project budget is 30 % greater than that described in the PID although the level of activity is unchanged. The following is the proposed implementation schedule to follow project approval.

<u>Date</u>	<u>Activity</u>	<u>Action Agent(s)</u>
1. Mar. 81	PP approved	AID/W
2. Mar. 81	ProAg signed	USAID/T & ZanGov
3. Apr. 81	PIO/'s signed	USAID/T & ZanGov
4. Apr. 81	RFTP published or mailed	USAID/T & REDSO
5. Apr. 81	Vehicles ordered	ZanGov
6. July 81	Contractor Selected	USAID/T, ZanGov, REDSO
7. Aug. 81	Technician Swahili Training	Contractor
8. Aug. 81	Contract negotiated and signed	REDSO, Contractor
9. Sep. 81	ETA of long-term technicians	Contractor
10. Oct. 81	- Arrival of short-term consultants (Health educator, Entomologist, Medical Laboratory Specialist)	Contractor
	- Entomologists trained for survey work	Contractor, ZanGov
	- Entomological survey of Zanzibar town initiated to identify breeding sites	Contractor, ZanGov
	- Vector susceptibility tests initiated (periodic, every 6 months)	Contractor, ZanGov
	- Microscopists trained	Contractor, ZanGov
	- Analysis of existing blood survey data undertaken to identify possible high endemicity areas	Contractor, ZanGov
	- Training seminars held for MOH staff and supervisory Malaria Unit staff	Contractor, ZanGov
	- Recruitment of additional personnel for new Malaria Control Unit begins	Contractor, ZanGov
	- Formation of National Malaria Control Committee	Contractor, ZanGov
	- Launching of orientation meetings for government officials	Contractor ZanGov
11. Nov. 81	- Train source reduction personnel, Zanzibar town	Contractor, ZanGov

<u>Date</u>	<u>Activity</u>	<u>Action Agent(s)</u>
Nov. 80	- Source reduction activities begin, Zanzibar town	Contractor, ZanGov
	- Design drug distribution system-- record keeping and logistics	Contractor, ZanGov
	- Initiate blood surveys to confirm areas of high endemicity to choose two areas on Unguja and two on Pemba for initial drug distribution	Contractor, ZanGov
	- Prepare training manuals for drug distribution	Contractor, ZanGov
	- Design public information campaign	Contractor, ZanGov
	- Select population sample for long-term monitoring throughout the project, gather baseline	Contractor, ZanGov
	- First annual workplan due	Contractor
	12. Dec. 81	- Train spray personnel for ULV use
- Begin ULV adulticiding in response to vector density data - urban Zanzibar town (through Dec.)		Contractor, ZanGov
- Identify 4 areas, 2 on Unguja, 2 on Pemba with high endemicity for initial drug distribution system		Contractor, ZanGov
- Train malaria supervisors and agents for these areas identified above		Contractor, ZanGov
- KAP surveys undertaken in 4 identified areas		Contractor, ZanGov
13. Jan. 82		- Prepare training manuals for residual spraying
	- Train Bolozi, teachers, health workers in four identified areas for drug distribution	Contractor, ZanGov
	- Initiate drug distribution system in these 4 areas (should cover approximately 25% of target groups)	Contractor, ZanGov
	- Finalize network of larval and adult sampling stations for entomological surveys	Contractor, ZanGov
	14. Feb. 82	- Train spray supervisors
- Initiate random blood surveys in other areas		Contractor, ZanGov

Date	<u>Activity</u>	<u>Action Agent(s)</u>
15. Mar. 82	<ul style="list-style-type: none"> <li>- Prepare catalogue of locations for all temporary and permanent breeding sites -- Zanzibar town</li> <li>- Train spraymen</li> </ul>	<p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p>
16. Apr. 82	<ul style="list-style-type: none"> <li>- Finalize long-term plan for engineering interventions to reduce number of breeding sites previously identified</li> <li>- Finalize permanent larviciding schedules</li> <li>- Initiate residual spraying in rural sections of the four high endemicity areas already identified</li> <li>- Perform random blood survey of four areas</li> </ul>	<p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p>
17. May 82	<ul style="list-style-type: none"> <li>- Train source reduction personnel -- Pemba</li> <li>- Initiate residual spraying in foci identified from Dec. blood samples</li> <li>- Begin monthly tests of sample of sprayed houses to determine length of effectiveness of residual spray</li> </ul>	<p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p>
18. June 82	<ul style="list-style-type: none"> <li>- Initiate source reduction in urban areas of Pemba (Witi, Chake Chake, Mkoani)</li> <li>- Begin ULV spraying in urban Zanzibar town (through June)</li> <li>- Train remaining drug distribution personnel</li> </ul>	<p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p>
19. Jul. 82	<ul style="list-style-type: none"> <li>- Random blood surveys -- 4 selected areas (repeat at long intervals)</li> <li>- Extend drug distribution system -- Unguja</li> </ul>	<p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p>
20. Aug. 82	<ul style="list-style-type: none"> <li>- Extend drug distribution system -- Pemba</li> <li>- Finalize revision of malaria curriculum for schools with Ministry of Education</li> </ul>	<p>Contractor, ZanGov</p> <p>Contractor, ZanGov</p>

<u>Date</u>	<u>Description</u>	<u>Action Agent(s)</u>
21. Aug. 82	- First annual report due - First retraining of drug distribution, parasitology, entomology, source reduction personnel to take place semi-annually through rest of project	Contractor Contractor, ZanGov
22. Nov. 82	- 2nd annual work plan due (yearly hereafter)	Contractor
23. Jan. 83	- Repeat random blood survey in 4 original areas and extend to others according to passive case detection data	Contractor, ZanGov
24. Feb. 83	- Retraining of residual spray teams prior to spraying cycle; to be repeated annually prior to each spray period	Contractor, ZanGov
25. June. 83	- External evaluation by outside evaluation team and USAID/T representative	Contractor, USAID, Outside Team
26. Sep.83	- Second annual report (due yearly hereafter)	Contractor
27. Nov.. 83	- Third annual work plan due	Contractor
28. Jan. 84	- In-house evaluation (USAID/T, contractor)	Contractor, USAID
29. Sep. 84	- Third annual report due	Contractor
30. Nov. 84	- Fourth annual work plan	Contractor
31. Jan. 85	- In-House evaluation (USAID, contractor)	Contractor, USAID
32. June. 85	- Final external evaluation	Contractor, USAID Outside Team
33. Sep. 85	- Fourth annual report	Contractor
34. Nov. 85	- Fifth annual work plan	Contractor
35. Sep. 86	- Final project report due	Contractor

Commodities procurement responsibilities will be shared between AID/W, USAID/T, the Government of Zanzibar and the contractor. AID regulations require all malaria control equipment, drugs and insecticides to be purchased through AID/W. ZanGov will purchase the vehicles and spare parts to insure timely arrival. The Government of Zanzibar will procure the commodities they are funding. And the contractor will be assigned all additional goods and services procurement responsibilities. A detailed procurement plan is presented in Annex N.

## VI. EVALUATION PLAN

The evaluation plan for this project is of particular importance because the Zanzibar Malaria Control Project represents AID's first major support to anti-malaria activities in Africa since the shift in malaria strategy to a program of disease control instead of eradication. The project will be an important demonstration of the adaptation of known malaria control techniques to local conditions in Zanzibar. Because operational research is an integral part of adaptive technology, monitoring and evaluation have already been discussed as one of the major project activities. Nearly every program activity will require a baseline survey to aid in the selection of malaria control techniques or educational methodologies, and there will have to be repeated subsequent surveys to judge the effectiveness of project activities and to guide their adaptation. Hence, evaluation will be a continuous feature of the Zanzibar Malaria Control Project. In addition there will be three special project evaluations scheduled to provide an overall evaluation of all aspects of the project and to permit dissemination of the lessons learned in the project to other countries trying to deal with malaria. These evaluations will be held at the end of the first, second and fourth years of implemented project activities, and the latter will provide the basis for planning the next phase of the program. The first will be an in-house AID evaluation, while the second and last will be major evaluations using teams of AID and Zanzibar personnel and outside experts.

For many of the continuous monitoring requirements of the project, a single random sample of the population will be studied twice a year at the time of peak disease transmission throughout the life of the project. This will involve identifying an appropriate size sample of households using the random cluster sampling technique and clusters of 30 households and monitoring their knowledge, attitudes and practices with respect to malaria, their levels of productivity and income, and their health status with particular attention to fevers, parasitemia and participation in the malaria control program. This study will help in the initial identification of those rural areas with the highest malaria prevalence and should demonstrate the impact of the project on the health of the population and on the level of productivity which depends upon that health. Of particular interest will be the relationship between the fluctuations in malaria prevalence and the seasonal variations in agricultural labor inputs required to achieve maximum productivity. The project will provide short-term consultants to help design and field test this survey.

Many of the other monitoring studies have been mentioned earlier in connection with specific project activities. There will be continuous monitoring of mosquito life on the islands, concentrated in urban areas and rural areas with high malaria prevalence where the antimosquito activities will be concentrated. Mosquito species will be identified,

their habits described, their breeding places located, their susceptibility to insecticides measured, their parasite-carrying rates determined and their densities monitored as an important part of the permanent monitoring activity of the control program.

Operational research will be carried out for each of the major project activities to permit the continued refinement of methodologies required to fully adapt malaria control technology to Zanzibar and to evaluate the cost effectiveness of each activity.

**ANNEX B.**

**BUDGET**

## VIII. ANNEXES

- A. Logical Framework
- B. Detailed Budget Estimate
- C. Job Descriptions
- D. Government of Zanzibar Requests
- E. PID Approval Cable, Issues and Responses
- F. 611(a)
- G. Waiver Justifications
- H. Congressional Notification
- I. Statutory Checklists
- J. Maps
- K. Initial Environmental Examination (IEE)
- L. Cost Preparation Worksheets
- M. Insecticide Sensitivity Testing
- N. Commodity Procurement Plan
- O. Recommended References

**ANNEX A**  
**LOGICAL FRAMEWORK**

## ANNEX A

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project 5 years  
 From FY 81 to FY 86  
 Total U.S. Funding \$11,771,000  
 Date Prepared March 1981

Project Title & Number Zanzibar Malaria Control Project 621-0163

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Sector Goal</u></p> <p>To help Zanzibar develop a health services system which can improve the health status of the people sufficiently for them to enjoy life, participate fully in community development activities and contribute to the goal of self-reliance</p>	<p>Increase individual engagement in production activities.</p>	<p>Longitudinal monitoring of random sample of population.</p>	<ol style="list-style-type: none"> <li>1. That malaria is sufficiently responsible for people's poor health; that its control will result in more enjoyable and productive life.</li> <li>2. That time and energy gained through malaria control will be applied to productive activities.</li> </ol>
<p><u>Project Purpose:</u></p> <p>To reduce the prevalence of malaria on Zanzibar to a level at which it no longer constitutes a major public health problem, through adaptation of known control methods to local conditions in such a way that the Government of Zanzibar will be able to maintain effective control with its own resources.</p>	<p><u>EOPS</u></p> <ol style="list-style-type: none"> <li>1. 33% reduction in malaria prevalence.</li> <li>2. 25% reduction in mosquito breeding sites.</li> <li>3. Larviciding and/or space spraying in all urban areas with continual breeding.</li> <li>4. 100% coverage of target households with spraying.</li> <li>5. 80% vector density reduction in houses in residual spraying in target areas.</li> <li>6. 80% coverage of target pop. with chemoprophylaxis.</li> <li>7. 80% chemotherapy of suspect fever cases.</li> <li>8. 33% reduction in reported morbidity.</li> <li>9. Good public participation in program</li> <li>10. Continuous adaptation of technologies</li> </ol>	<ol style="list-style-type: none"> <li>1. Active case finding surveys.</li> <li>2. Entomologic monitoring.</li> <li>3. Program activity records.</li> <li>4. Program activity records.</li> <li>5. Entomologic monitoring.</li> <li>6. Chloroquine distribution records.</li> <li>7. Health facility records.</li> <li>8. Health facility records.</li> <li>9. KAP survey</li> <li>10. Program activity records.</li> </ol>	<ol style="list-style-type: none"> <li>1. That known malaria control technology can be adapted to Zanzibar</li> <li>2. That selected control activities will result in a significant decline in malaria.</li> <li>3. That the population will support the program.</li> <li>4. That Zanzibar will be able to bear the recurrent costs once the program is stable.</li> <li>5. That the Government and the people continue to place a high priority on controlling malaria.</li> </ol>

ANNEX A (page 2)

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project 5 years  
From FY 81 to FY 86  
Total U.S. Funding \$11,771,000  
Date Prepared March 1981

Project Title & Number Zanzibar Malaria Control Project 621-0163

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>Outputs:</u></p> <ol style="list-style-type: none"> <li>1. Malaria Control Program organization.</li> <li>2. Engineering source reduction program.</li> <li>3. Larviciding source reduction program.</li> <li>4. Space spraying source reduction program.</li> <li>5. Interdomiciliary spraying program.</li> <li>6. Chloroquine prophylaxis and treatment program.</li> <li>7. Health education and community motivation program.</li> <li>8. Monitoring and evaluation program.</li> <li>9. Integration of other sectors into program.</li> <li>10. Basic and in-service training program.</li> </ol>	<ol style="list-style-type: none"> <li>1. Organizational structure established.</li> <li>2. Engineering teams operating in all urban areas.</li> <li>3. Larviciding teams operating in all urban areas.</li> <li>4. Space spraying teams operating in all urban areas.</li> <li>5. Spraying teams operating in all target areas.</li> <li>6. Chloroquine distribution to all villages and health facilities.</li> <li>7. Health education going on in all communities and through all appropriate institutions.</li> <li>8. All program activities under continuous evaluation.</li> <li>9. National Malaria Control Committee established.</li> <li>10. 433 malaria control workers trained and receiving continuing education and over 10,000 government officials oriented to project.</li> </ol>	<p>Program records</p>	<ol style="list-style-type: none"> <li>1. That the individual's identified for program positions will be reliable and able to perform their job.</li> <li>2. That AID and the Zanzibar Government deliver their inputs in a timely fashion.</li> <li>3. That the project is not disrupted by war, political upheaval or other externalities.</li> <li>4. That there will be a continued availability of funds and commodities.</li> </ol>

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project 5 years  
 From FY 81 to FY 86  
 Total U.S. Funding 611,771,000  
 Date Prepared March 1981

Project Title & Number Zanzibar Malaria Control Project 621-0163

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS		MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>Inputs*</u>				
<u>AID</u>	(\$000)			
<u>Technical Assistance</u>			AID Project records, PIO/s,	
2 Long-term technicians	120 w/m @ \$7,500	900	PIIs, etc.	
Short-term consultants	24 w/m @ \$12,500	300		
3 Evaluations	9 w/m @ \$12,500	113		
Local hire	180 w/m @ \$322	58		
<u>Training</u>				
5 long-term participants	10 T/Y @ \$22,000	220		
In-country	36185 t/d @ \$11.63	421		
International conference visits	22.5 @ \$4,000	90		
<u>Commodities</u>				
Vehicles			914	
Drugs and Insecticides			1720	
Equipment and Furniture			281	
<u>Other Costs</u>			1260	
<u>Overhead</u>	100%	1313		
<u>Contingency</u>	10%	759		
<u>Inflation</u>	5% and 12% compounded	3422		
	<u>AID sub-total</u>		11,771	
<u>ZANZIBAR</u>				
Government Salaries			1980	Zanzibar Government Records
Training			145	
Drugs and Insecticides			830	
Rent, Contingency (5%) & Inflation	12%	1304		
	<u>Zanzibar Sub-Total</u>		4,259	
<u>PROJECT TOTAL</u>			<u>16,030</u>	

\* See Annex B for Detailed Budget

## ANNEX B

## DETAILED EXPENDITURES BUDGET

## Zanzibar Malaria Project 621-0163 Project Paper

Fiscal Year	(81)*+	82	83	84	85	(86)*	Totals	Remarks	
<b>AID</b>									
<b>Technical Assistance</b>									
1 Malariaologist	75	75	75	75	75	75	450	*FY 81 and FY 86 figures are for 6 mos of project activities	
1 Vector Control Spec.	75	75	75	75	75	75	450		
Short term Consultants	75	105	45	30	30	15	300		120 mo @ \$7,500 ave
Evaluations		13	50		50		113		24 mo @ \$12,500 9 mo @ \$12,500
<b>Local Hire</b>									
1 Admin Asst	3	5	5	5	5	3	26		
1 Secretary	2	3	3	3	3	2	16		
1 Driver	2	3	3	3	3	2	16		
<b>Training</b>									
Long Term		110	110				220	10 yr @ \$22,000	
<b>Short Term</b>									
a. 249 x 15 @ 125/=	60						60	3 weeks basic training (ave) all technicians	
b. 433 x 5 x 2 @ 125/=	33	65	65	65	65	33	326	In-service training	
c. 7000 x 1 @ 20/=	20						20	Balozi orientation	
d. 3000 x 1 @ 20/=	8						8	School teachers orientation	
e. 300 x 1 @ 20/=	1						1	Health workers orientation	
f. 50 x 1 x 2 @ 50/=	1	1	1	1	1	1	6	Government Officials conferences	
g. 5 x 1 @ \$4000		20	20	20	20	10	90	Participation in International Conference	
<b>Commodities</b>									
<b>Vehicles</b>									
10 Landrovers @ 18	180			180			360	Vehicle replacement every 4 year	
2 Trucks (31/4T) @ 25	50			50			100		
3 Trucks (1T) @ 15	45			45			90		
37 Scooters @ 1.5	56			56			112		
223 Bicycles @ .2	45			45			90		
Spare parts @ 20%	76			76			152		
Toyota spares	5			5			10		

\*FY 81 and FY 86 are for six months only.

+ Expenditures in FY 81 may be reduced secondary to project development process delays.

ANNEX B CONTINUED

	(81)†	82	83	84	85	(86)*	Totals	Remarks
<b>Commodities</b>								
Chloroquine	54	176	249	294	294	142	1209	*FY 81 and FY 86 figures cover 6 mos activities
Insecticides	51	102	102	103	102	51	511	
Control Equipment	200						200	
Office Equipment	35						35	
Furniture & Appliances	46						46	
<b>Other Costs</b>								2 Households plus offices
POL & Maint.	111	222	222	222	222	111	1110	
Utilities & Rent	10	20	20	20	20	10	100	
In-country travel	5	10	10	10	10	5	50	
<b>Overhead</b>	225	268	245	180	230	165	1313	
<b>AID Subtotals</b>	1549	1273	1300	1563	1205	700	7590	100% of Expatriate Contractor Costs
Contingency (10%)	155	127	130	156	121	70	759	
Inflation (5%, 12%)	155	238	402	1207	810	610	3422	5% for personnel costs, otherwise 12% compounded annually from 1980
<b>AID Totals</b>	1859	1638	1832	2926	2136	1380	11771	
<b>Zanzibar:</b>								
Salaries	198	396	396	396	396	198	1980	433 control program staff Balozi, teachers & health workers
Training		29	29	29	29	29	145	
Chloroquine	55	110	110	110	110	55	550	
Insecticides	28	56	56	56	56	28	280	
Rent	3	6	6	6	6	3	30	
<b>Zanzibar Subtotals</b>	284	597	597	597	597	313	2985	
Contingency (5%)	14	30	30	30	30	16	150	
Inflation (5%, 12%)	20	90	144	245	363	262	1124	
<b>Zanzibar Totals</b>	318	717	771	872	990	591	4259	5% for salaries, otherwise 12% compounded annually from 1980 27% of Total Project Cost
<b>Project Total</b>							16,030	

\*FY 81 and FY 86 Figures are for six months only.

+ Expenditures in FY 81 may be reduced secondary to project development process delays.

## ANNEX C

## SELECTED JOB DESCRIPTIONS

I. Long Term Project TechniciansA. Senior Malariologist - Chief of Party

The senior technician will be responsible for the administration of AID provided goods and services for the project. He or she will serve as an advisor to the Director of the Malaria Control Program and will collaborate in the management, technical support and monitoring of all project activities. The specific responsibilities of this technician will include, inter alia:

1. Provides administrative and technical supervision of project long-term and short-term field personnel;
2. Coordinates AID inputs into the project and into each specific project activity;
3. Has responsibility for collaborating with the director of the Malaria Control Program in the preparation of annual workplans;
4. Assumes major responsibility for designing and conducting the surveillance and operational research surveys necessary for the selection and refinement of malaria control methods;
5. Collaborates in the preparation of the training curricula and teaching materials for all categories of malaria control workers and participates in both the basic and in-service training activities of the project; and
6. Prepares regular program reports as required by AID, the Government of Zanzibar and other contractual agreements.

The person selected for the position of Chief of Party must have had previous field experience in either malaria eradication or malaria control work in a developing country setting, ideally in Africa. He or she should have either a doctoral level or masters degree in malariology, entomology or parasitology and have demonstrable administrative ability based upon recent program leadership experience. Resourcefulness, flexibility, patience and commitment will be required to succeed in the somewhat isolated island setting of Zanzibar. An ability to speak Kiswahili at the Foreign Service Institute level of S-2 is required to begin this job, and what training is necessary must be provided prior to arrival as an authorized contract expense.

## B. Vector Control Specialist

The other long term technician will be responsible to the Chief of Party and whenever necessary can act in his behalf. This person is responsible for all of the mosquito control activities of the project which requires both a wealth of varied experience and training. He or she will collaborate most closely with the Chief Parasitologist/Entomologist and the source reduction engineers and will have the following specific responsibilities, inter alia:

1. Helps design and conduct the surveys necessary to determine where antimosquito activities are required;
2. Helps plan and execute all project breeding site reduction, larviciding, space spraying and household spraying activities including training all of the personnel involved in these activities;
3. Carries on the surveillance necessary to evaluate the effectiveness of the above activities; and
4. Prepares reports as required by the Chief of Party.

This technician must have extensive field experience in mosquito control work in a leadership capacity. He or she should have at least masters' degree level training and have sufficient expertise in source reduction engineering and entomology to be able to train, supervise and evaluate all the personnel required for antimosquito work. An FSI S-2 level of Kiswahili proficiency is also required for this position.

The project will have the capacity to bring in additional short-term technical consultants whenever a special area of expertise outside the scope of the long term technicians is required by a specific project activity.

## II. Permanent Program Personnel

### A. Headquarters Personnel:

1. Director: this person should be an MD or doctoral level malariologist with sufficient management expertise and experience to administer all aspects of the program. It is likely that the Zanzibari physician who has been identified for this position will be provided with participant training in program management during the second and/or third years of project activities. This person, and the Malaria Control Program, shall be responsible to the Director of Preventive Diseases and Health Education in the Ministry of Health and Social Welfare.

2. Chief Parasitologist/Entomologist: this person will serve as deputy to the Director and be prepared to assume program direction whenever necessary. The specific responsibility of this position is the design, implementation and evaluation of all anti-mosquito activities including source reduction through engineering, larviciding, space spraying and household spraying.
3. Chief Health Educator: this person is responsible for development of the full health education and community motivation campaign including the design and execution of community KAP surveys, preparation of promotional materials and maintaining an active liason with other government and non-government organizations.
4. Chief Health Inspector: this member of the headquarters staff will be primarily responsible for organizing and managing the chloroquine distribution program for both prophylaxis and treatment and monitoring the effectiveness of this activity.
5. Program Controller: this person will be responsible for maintaining all program accounts and supplies inventories and supplies maintenance records.

#### B. Island Offices

1. Senior Health Inspector: this person shall serve as Director of the island Malaria Control Program Office and will be responsible for coordinating all program activities on the island. (This position is much more important in the Pemba Island office where there will not be the headquarters staff close at hand).
2. Senior Laboratory Technician: this person will be responsible for setting up and supervising the malaria control laboratory on the island and for working with health facilities to introduce quality control into their malaria diagnostic activities.

#### Regional Offices

1. Regional Rural Health Assistant: for administrative and logistics support purposes, this person will serve as an intermediary coordinator between the island office and the districts for all program activities carried on in the districts.

District Offices

1. District Rural Health Assistant: this person is responsible for supervising all program activities at the district level.
  2. Malaria Supervisor: this person is responsible for all chloroquine distribution, prophylaxis and treatment in his or her area - approximately the same area as that of the local political party branch office. This involves maintaining logistics support to all health facilities, schools and Malaria Agents under his or her supervision, preparing work schedules for Malaria Agents and maintaining the records required by the program.
- Malaria Agents: this person is responsible for making sure that every member of the target prophylaxis population in the area is covered by one or another of the drug distribution systems and that every suspect fever case is receiving chloroquine treatment. This is the "grass roots" agent upon whom much of the success of the program will rest. He or she must maintain chloroquine distribution and must work with balozi, school teachers and health workers to ensure full coverage. This person is also responsible for carrying out community level health education and program promotion and must maintain the treatment and prophylaxis records for the area.

The nature of the jobs of the other permanent members of the Malaria Control Program staff is implicit in the job titles. All members of the program staff will aid in the surveys, monitoring and operational research that goes on in their respective areas.

III. Community Level Personnel

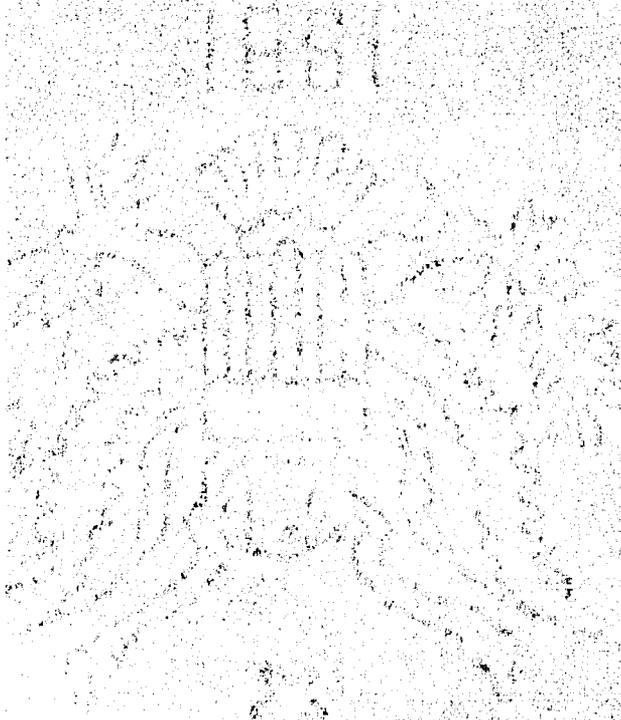
- A. Balozi: these local party representatives will aid the Malaria Agents by:
1. encouraging community participation in the program;
  2. calling together, once every two weeks, all members of the target population who are not receiving chloroquine prophylaxis through a health facility or school in order to receive their medications from the Malaria Agent;
  3. providing single dose presumptive treatment of all fever cases who require treatment during the hours when the health facilities are closed; and

4. helping the Malaria Agent maintain the program records for the area.
- B. School Teachers: all primary school teachers will be responsible for providing chloroquine prophylaxis to their students and presumptive treatment to anyone who presents with a fever in school. They will play a very important role in health education in the schools and will be responsible for maintaining records showing prophylaxis coverage, treatment, and absences due to fever.
- C. Local Health Workers: these people will be responsible for offering chloroquine prophylaxis on a regularly fortnightly basis to all those who wish to use the local health facility for this purpose, providing presumptive treatment to all suspect fever cases, maintaining an active health education effort to promote local participation in the malaria control program, and maintaining the records necessary to evaluate the effectiveness of the chemoprophylaxis and treatment campaigns.

**ANNEXE**  
**JOB DESCRIPTION**

ANNEX D

REQUEST FOR PROJECTS



## ZANZIBAR GOVERNMENT REQUEST

Tel. No. 2911 or 2163

Telex: HEALTHIM.

Ministry of Health & Social Welfare,  
P.O. Box 236,  
Zanzibar,  
TANZANIA.

Ref. No. AU/7/1 Vol.II

22nd September, 1980

The United State's Agency,  
for International Development,  
P.O. Box 9130,  
Dar-Es-Salaam,  
TANZANIA.

Att. Dr. Albert E. Henn

Dear Sir,

ZANZIBAR/USAID CO-OPERATION  
IN MALARIA CONTROL PROGRAMME.

Please refer to my letter Ref. AU/7/1 Vol.II of  
29th August, 1979.

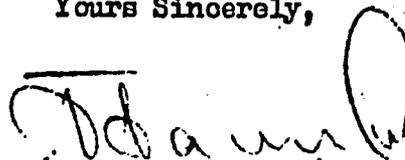
I would like to inform you that Malaria still  
constitutes the most serious public health problem in  
Zanzibar.

A special Malaria control programme has been  
listed among the top priorities in our first three years  
development plan 1978/79 to 1980/81 and now it has further  
been listed in our next five years plan 1981/82 to 1985/86.

I would like to express our gratitude for USAID  
in giving consideration on this matter. I am instructed  
again to request your good office to consider extending  
financial and professional assistance in this regard.

Please accept the assurances of my highest  
consideration.

Yours Sincerely,



(Jumbe S. Ibrahim)  
ASSISTANT MINISTER,

MINISTRY OF HEALTH AND SOCIAL WELFARE  
ZANZIBAR

NAM. YA SIMU: 2826

WAKATI WA KUJIBU

DNESHA NAMBARI .....



S M Z

WIZARA YA ELIMU  
IDARA YA ELIMU YA JUU NA UFUNDI  
SANDUKU LA POSTA 394,  
ZANZIBAR.

P33/6/32/Vol.11/219

19 Septemba, 1980.

Msaidizi Waziri,  
Wizara ya Afya na Ustawi wa Jamii,  
Zanzibar.



Kuh: DISCUSSION DRAFT PROJECT PAPER  
(MALARIA CONTROL PROGRAMME)  
1981-1986

Tafadhali rejea barua yako ya tarehe 12/9/80  
yenye mada hiyo hapo juu.

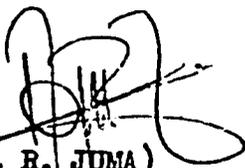
Wizara imeangalia na kutafakari maelekezo  
yaliyotolewa pamoja na mswada ulioletwa.

Wizara, kwanza imefurahi kuona kuwa sasa kuna  
mpango maalum wa kinga ya maradhi. Jambo hili  
ni mojawapo katika mambo yaliyojadiliwa sana  
katika vikao vya ukaguzi wa Mitaala kwa skuli za  
msingi, na pia lilitiliwa mkazo sana katika vikao  
vya Baraza la Elimu la Zanzibar.

Kwa hivyo wizara inawafiki sana kipengee cha  
kuanzisha Elimu ya Afya katika maskuli. Ingawaje  
haijaingizwa rasmi katika mitaala yetu hata hivyo  
uko uwezekano wa kuingiza katika shughuli za nje  
ya masomo.

Pia Wizara itaendelea kutoa msaada unaowezekana  
katika shughuli zote zilizotajwa katika kipengee  
cha 'Epidemiological activities'

Tunawatakieni mafanikio.

  
(A. R. JUMA)  
MSAIDIZI WAZIRI  
WIZARA YA ELIMU  
ZANZIBAR

**ANNEX E**  
**PID APPROVAL**

AGENCY FOR INTERNATIONAL DEVELOPMENT  
PROJECT IDENTIFICATION DOCUMENT  
FACESHEET (PID)

1. TRANSACTION CODE C A = Add  
C = Change  
D = Delete

Revision No. 1

DOCUMENT CODE 1

2. COUNTRY/ENTITY  
United Republic of Tanzania, Zanzibar

3. PROJECT NUMBER  
621-0163

4. BUREAU/OFFICE  
Africa

A. Symbol **AFR** B. Code 06

5. PROJECT TITLE (maximum 40 characters)  
Zanzibar Malaria Control

6. ESTIMATED FY OF AUTHORIZATION/OBLIGATION/COMPLETION

A. Initial FY 8 | 1

B. Final FY 8 | 5

C. PACD 8 | 6

7. ESTIMATED COSTS (\$000 OR EQUIVALENT, \$1 = 8.17 TSh)

FUNDING SOURCE		LIFE OF PROJECT
A. AID		11,771
B. Other U.S.	1.	
	2.	
C. Host Country		4,259
D. Other Donor(s)		
<b>TOTAL</b>		<b>16,030</b>

8. PROPOSED BUDGET AID FUNDS (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. 1ST FY <u>81</u>		E. LIFE OF PROJECT	
		1. Grant	2. Loan	1. Grant	2. Loan	1. Grant	2. Loan
(1) PH	510	542		3535		11,771	
(2)							
(3)							
(4)							
<b>TOTALS</b>				<b>3535</b>		<b>11,771</b>	

9. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)  
510    520    530    560

10. SECONDARY PURPOSE CODE  
600

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

A. Code	BR	DEL	ENV	PART	TECH	TNG
B. Amount	11,771	11,771	2000	11,771	11,771	1000

12. PROJECT PURPOSE (maximum 480 characters)

To reduce the prevalence of malaria on Zanzibar to a level at which it no longer constitutes a major public health problem, through adaptation of known control methods to local conditions in such a way that the Government of Zanzibar will be able to maintain effective control with its own resources.

13. RESOURCES REQUIRED FOR PROJECT DEVELOPMENT

Staff: 4 design team members: Malariologist  
Vector Control Specialist  
Health Educator  
Design Officer

Funds \$75,000 PDS

14. ORIGINATING OFFICE CLEARANCE	Signature James E. Williams <i>James Williams</i>	15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION  MM DD YY
	Title Director, USAID/Tanzania	
	Date Signed MM DD YY 0   2   2   0   8   1	

16. PROJECT DOCUMENT ACTION TAKEN <input type="checkbox"/> S = Suspended <input type="checkbox"/> A = Approved <input type="checkbox"/> D = Disapproved CA = Conditionally Approved DD = Decision Deferred	17. COMMENTS
---	--------------

18. ACTION APPROVED Signature Title	19. ACTION REFERENCE	20. ACTION DATE
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PID Approval Issues and PP Responses

SAID DISTR: (5/9/80)

ACTION: HNP

INFO: PRM

# TELEGRAM

PROJ: 621-0163(PID)

ACTION: RF CHROM

DE RUE HC £1781 1291600

UNCLASSIFIED  
Classification

STATE 121781

ZNR UUUUU ZZH

H 081519Z MAY 80

FM SECSTATE WASHDC

TO RUE HNS/AMEMBASSY DAR ES SA'LAAM - - 2784

MAY 9, 1980

INFO RUQMNI/AMEMBASSY NA

0845 hrs

BT

UNCLAS STATE 121781

AIDAC NAIROBI FOR REDSO

E.O. 12065: N/A

TAGS:

SUBJECT: ZANZIBAR MALARIA CONTROL (621-0163) PID

1. SUBJECT-PID HAS BEEN APPROVED BY AA/AFR FOR PROJECT DESIGN IN LINE WITH THE GUIDANCE BELOW.
2. A ID/W PROJECT COMMITTEE MET MARCH 17, 1980, TO REVIEW SUBJECT PID.
3. CONCERNS TO BE ADDRESSED DURING PROJECT DESIGN:
  - A. THE SURVEILLANCE SYSTEM TO BE DEVELOPED FOR MALARIA SHOULD ALSO PROVIDE FOR FILARIASIS, SINCE THE TWO DISEASES ARE FREQUENTLY FOUND IN THE SAME SET OF CONDITION AND CAN EASILY BE MEASURED TOGETHER.
  - B. THE PP SHOULD BE CONSISTENT WITH THE GENERAL POLICY GUIDANCE TO RESULT FROM THE UPCOMING AFRICA-WIDE WORKSHOP ON MALARIA.
  - C. CAREFUL ATTENTION TO THE DEVELOPMENT OF THE MOST EFFECTIVE ADMINISTRATIVE AND FUNDING RELATIONS WITH WHO IS REQUIRED DURING PP PREPARATION.
  - D. THE PP IS TO ADDRESS THE RECURRENT COST IMPLICATIONS OF THE PROJECT, WITH SPECIFIC ATTENTION TO KEEPING SUCH COST AS LOW AS POSSIBLE.
  - E. THE PP IS TO SPECIFICALLY ADDRESS THE IMPACT OF THIS PROJECT ON THE ROLE OF WOMEN.

4. AA/AFR CONCURS IN THE RECOMMENDED NEGATIVE DETERMINATION OF THE IEE FOR THIS PROJECT. CHRISTOPHER

BT

UNCLASSIFIED

ACTION COPY  
 NO ACTION NECESSARY  
 REPLIED BY: *[Signature]*  
 \_\_\_\_\_  
*[Signature]*  
 Initials

## PID Approval Issues and PP Responses

The PID approval cable dated 8 May, 1980, expressed five specific areas of concern as follows:

1. The project should consider adding filariasis surveillance;
2. The project should be consistent with African Bureau malaria policy;
3. The role of WHO in the project must be carefully defined;
4. Recurrent costs must be kept as low as possible; and
5. The impact of the project upon the role of women must be addressed.

Filariasis: The project will include surveillance of the impact of project activities on both filariasis and upon the vectors of this disease. See Section III. C.

Bureau Malaria Policy: The project has been designed in complete accordance with the guidance contained in the report of the malaria Strategy Advisory Group working with the Africa Bureau to help define a malaria policy. See Section II.

Role of WHO: At the time of PID submission it was anticipated that both AID and the Government of Zanzibar would want to have WHO serve as the principal manager of the donor inputs to the project. This posed certain administrative problems with AID in terms of requiring careful definition of the administrative and funding relationships among the three partners. In the course of doing the administrative planning for the project, the design team presented the Government of Zanzibar a number of alternative approaches that could be taken to project implementation, including the option of having WHO manage all donor inputs as stated in the PID. After having an interministerial ad hoc committee consider the options, the Government of Zanzibar chose to use the routine AID procedure of sending out a request for competitive proposals and selecting a contractor on the basis of merit. WHO has made a valuable input into project development (See Section I), is expected to provide additional assistance during the interim between PP submission and the initiation of project activities (See Section II) and will continue to contribute advisors as requested by the Government of Zanzibar throughout the control program.

Recurrent Costs: The project has been carefully designed to minimize long-range recurrent costs. By the end of the first five-year phase of the malaria control program, the projected recurrent costs will only be \$5.79 per capita each year.\* An analysis of the project's recurrent costs relative to Zanzibar's ability to bear them is presented in Section III. A.

Impact on Women: The project is designed to relieve the population of Zanzibar of the debilitating effects of malaria. Women in Zanzibar bear almost the entire responsibility for making sure that sick members of the family are cared for, hence, a significant reduction in the prevalence of such an epidemic disease as malaria will mean a marked increase in women's time and energy to be devoted to other pursuits. The impact of the project on the role of women is discussed in Section III. B.

\* Based on \$2.95 in costs based on 1980 prices plus \$2.84 in inflation and contingency requirements.

ANNEX F

611 A

**611(a) Planning Activities  
for Zanzibar Malaria Control Project (621-0163)**

Planning activities including cost estimates, technical feasibility, financial and economic analyses have been completed as required by section 611(a) of the Foreign Assistance Act and support the recommendation that AID funds in the amount of \$11,771,000 be authorized and obligated for the Life of Project. The project preparation analyses are presented in Section III, the project design process and the resultant project are discussed in Section II, and the materials pertaining to the financial planning can be reviewed in Section IV and Annexes B and L.

ANNEX G

Waiver Justifications

- I. Vehicle
- II. Audio-visual Equipment
- III. Duplicating Machines

--

I. Motor Vehicles

Problem: A request for commodity procurement source origin waiver from Geographic Code 000 (U.S. only) to Geographic Code 935 (Special Free World) follows:

- a) Cooperating Country : United Republic of Tanzania, Zanzibar
- b) Authorizing Documents : Project Paper
- c) Project : Zanzibar Malaria Control Project (621-0163)
- d) Nature of Funding : Grant
- e) Description of Commodities :
- a) 20 right-hand drive, 4 wheel drive, 4 wheel landrover station wagons.
  - b) 4 right-hand drive 3½ ton Isuzu trucks.
  - c) 6 one ton right hand drive Isuzu trucks.
  - d) 74 90-125cc motorcycles - Yamaha or Honda or Suzuki.
  - e) Spares at 20% C.I.F. cost of vehicles.
  - f) Spares for 2 toyota trucks presently in use
- f) Approximate Value :
- |                               |     |
|-------------------------------|-----|
| a) Landrovers                 | 390 |
| b) 3½ ton Isuzu trucks        | 110 |
| c) 1 ton Isuzu pick-up trucks | 100 |
| d) Motorcycles                | 125 |
| e) Spares                     | 175 |
|                               | 900 |
- g) Procurement Origin : Code 935 countries
- h) Probable Procurement Source : Australia, Kenya and/or Tanzania, Japan, or England

Discussion: Section 636(i) of the Foreign Assistance Act of 1961, as amended, provides that none of the funds made available to carry out the Act shall be used to purchase motor vehicles unless such motor vehicles are manufactured in the United States. Section 636(i) provides further that when special circumstances exist, the President is authorized to waive the provisions of this section in order to carry out the provisions of the Act. In the Conference Report on the Foreign Assistance Act of 1967 (which added Section 636(i) to the Act), it was reported that the committee of conference was in agreement that motor vehicles manufactured in the United States should be procured except when there are emergency or special

situations, such as a need for right-hand drive or other types of vehicles not produced in the United States. (House Report No.892 dated November 7, 1967). The waiver authority provided in Section 636(i) has been delegated to the Assistant Administrator by Executive Order No.10973 and State Department Delegation of Authority No.104.

Further, AID Handbook 1, Supplement B, Section 4(b) states that procurement source/origin waivers may be based on unavailability of a commodity from countries included in the authorized geographic codes (Section 4(b) (2) ) and on such other circumstance as are determined to be critical to the success of the project objectives (Section 4(b) (7) ).

Justification: The purpose of the project is to initiate a malaria control program on Zanzibar which will lower the prevalence of malaria to a point where it no longer constitutes a major public health problem. Project activities will include the following: 1) source reduction measures involving engineering interventions to remove permanent mosquito breeding sites; 2) larvaciding; 3) space spraying; 4) residual spraying; 5) prophylactic and therapeutic chloroquine distribution; b) health education to promote community involvement; and 7) careful epidemiological, entomological, and sociological monitoring of all project activities. To effectively carry out this program throughout the islands of Zanzibar and Pemba will require appropriate transport for project personnel. Personnel must be mobile to reach all target areas. Even though both islands are relatively small, which should work to the Project's advantage, weather conditions, especially rain during the two rainy seasons and poor road conditions make travel difficult at times of the year. It is during these times that it is especially important that all project activities function optimally, because during the rains mosquito populations and malaria transmission increase unless control measures are being taken.

With regard to the vehicles that will be necessary to implement Project activities, as discussed above, the Government of Tanzania has recently made a decision to standardize their vehicle fleets. This will better enable them to maintain sufficient spare parts availability and maintenance capacity to be able to service their vehicles and keep them on the road. The vehicles they have chosen for this purpose are Landrovers for general transport requirements and Isuzu trucks for heavier work requirements. Project vehicles, which are purchased for use by the Government, titled by the government, and will revert to Government control upon completion of the Project, should conform to this Government policy. Even outside of specific government maintenance capabilities through the motor pool, these are the types of vehicles which can be repaired most easily in the rural areas of Zanzibar because of spare parts availability and mechanics familiar with their operation. This will be very important in this Project because the vehicles will be on the road constantly.

AID/W (CCM/ALI) investigated the road conditions, spare parts availability, and repair facilities in remote areas for all kinds of vehicles during an extensive field visit in Tanzania during April and May 1979. The trip report of this visit emphasizes the necessity of right hand drive vehicles in Tanzania and states that, "The only two U.S. manufactured right hand drive vehicles are not acceptably represented in Tanzania-in effect, there is no U.S. vehicle representation in Tanzania at all." Regarding spare parts and maintenance, the report observes that there is "no maintenance or spare parts support in country except for limited maintenance in a few projects which are maintaining Jeep Wagoneers (L/H drive)".

The Landrovers will be used for transport of administrative personnel, delivery of drugs and insecticides to the rural areas, and for monitoring activities. The 3½ ton Isuzu trucks will be used for support of the source reduction engineering activities to eliminate mosquito breeding sites, while the one ton Isuzu trucks will be used to mount the ultra low volume (ULV) spraying apparatus that will be used in urban areas for the control of adult mosquito populations. (See budget worksheets - Annex L for detailed vehicle requirements).

In addition it will be necessary for supervisory personnel in the drug distribution system, entomological monitoring and source reduction systems and health educators in the peripheral district areas to be mobile to accomplish their work. This work can be most economically and practically met by providing these personnel with motorcycles. The type of motorcycle needed in Zanzibar is a single cylinder 90-125cc "trail" model. There are no light weight motorcycles in this range made in the U.S. There are no distributors for American or any Code 941 mode motorcycles in Tanzania. Motorcycles from Japan (Yamaha, Honda, and Suzuki) are imported in large numbers through distributors in Tanzania, spare parts are available for these bikes and mechanics are familiar with these engines. The spare parts needed for the two Toyota trucks presently in use are not generally available from Code 941 sources.

In summary, successful implementation of this Project requires right hand drive vehicles and motorcycles for which spare parts and competent repair facilities are available in remote areas. In addition the Tanzanian Government has standardized its vehicle fleet to Landrovers and Isuzus. The types of vehicles needed in Tanzania are not available from U.S. manufacturers.

Recommendation: Based upon the above discussion, it has been found that 1) exclusion of procurement of the project vehicles from countries included in AID Geographic Code 935 would seriously impede attainment of United States foreign policy objectives and the objectives of the Foreign Assistance Program, 2) that special circumstances exist which justify waiver of the requirements of Section 636(i) of the Foreign Assistance Act of 1961, as amended.

This waiver will permit procurement, at an approximate total cost of \$900,000 of twenty Landrover vehicles, four 3½ton Isuzu trucks, six one-ton Isuzu trucks, seventy-four 90-125cc motorcycles and spare parts as set forth above.

Drafter: HNPO:PGEhmer

Clearance: AD:BRiley [Signature]  
PRM:RBonner [Signature]  
SMA:SKlaus [Signature]  
CON:IPeterson [Signature]  
HNPO:AHenn [Signature]

## II. Audio-visual Equipment

Problem: A request for a source/origin waiver from Geographic code 000 to Geographic code 935 for procurement of audio-visual equipment (including manual typewriters) and photocopy machines follows:

- a) Cooperating Country : United Republic of Tanzania, Zanzibar
- b) Authorizing Document : Project Paper
- c) Project : Zanzibar Malaria Control Project
- d) Project number : 621-0163
- e) Description of Commodities : 2 35mm camera and lenses  
1 enlarger; darkroom equipment  
2 overhead projectors  
22 manual typewriters  
6 photocopy machines (220V, 50 Hertz)
- f) Approximate value : \$40,000
- g) Probable Procurement Source : United States or other Code 935 country.
- h) Probable Procurement Origin : Japan or other Code 935 country

Discussion: The Zanzibar Malaria Control Project may encompass the following activities: 1) engineering interventions designed to permanently remove mosquito breeding places (this may take place on a large scale through public works type filling and levelling and on a small scale in and around individual households); 2) larviciding; 3) space spraying; 4) residual spraying; 5) prophylactic chloroquine distribution; 6) health education; 7) monitoring. As a result of experience with previous campaigns that were unsuccessful in reaching their goals partly because of poor public understanding and acceptance of the program, the present Project has planned a heavy health education component. This public information campaign will be coordinated through the Zanzibar Health Education Unit, which presently is inadequate for the job due to severe shortages of essential equipment for carrying out mass educational campaigns. The Project has therefore included provisions for the procurement of this essential equipment to put the Health Education Unit back on its feet again.

Justification: Audio-visual and photocopy equipment, particularly those items utilizing lenses or operating on 220V, 50 Hertz power sources, such as overhead projectors, movie projectors, cameras, and photo enlargers are not generally manufactured in the U.S., and those manufactured in the U.S. cannot be serviced locally. Also, manual typewriters are no longer manufactured in the U.S. Therefore it will be necessary to procure these items from other than U.S. origin, probably Japanese or German for the equipment with lenses and from U.K. for the photo-copy equipment.

Recommendation: It is recommended that you therefore conclude that exclusion of procurement of the above specified project equipment from countries included in AID Geographic Code 935 would seriously impede attainment of United States foreign policy objectives of the foreign assistance program.

Drafter:HNPO:PGEhmer:12/3/80

Clearances: AD:BRiley PA  
PRM:MBonner(in draft)  
SMA:SKlaus (in draft)  
CON:IPeterson IP  
HNPO:AHenn (in draft)

### III. Duplicating Machines

Problem: A source/origin waiver from Geographic Code 941 to Geographic Code 935 and proprietary procurement from the manufacturer or supplier of Gestetner Brand manual mimeograph machine is requested.

- a) Cooperating Country : United Republic of Tanzania, Zanzibar
- b) Authorizing Document : Project Paper and Authorization
- c) Project : Zanzibar Malaria Control (621-0163)
- d) Description of Commodities : Four (4) Gestetner Manual Mimeograph machines and 10% spare parts
- e) Approximate value : \$7,000
- f) Probable Procurement source : U.S. , Great Britain, Tanzania, Kenya or West Germany
- g) Probable Procurement origin : Great Britain

Discussion: The Zanzibar Malaria Control Project will involve a number of activities intended to lower the prevalence of malaria on Zanzibar. One important aspect of the Project is a health education campaign intended to seek public understanding and support of the Project. Without this, it is not expected that the control program can be successful because all aspects require cooperation at the individual household level. This health education emphasis was not present in previous programs which attacked the malaria problem and malaria has always come back following these efforts.

In addition, the Project will be greatly increasing the numbers of staff for the Malaria Control Program at all levels with the attendant necessity of staff training programs and ongoing continuing education for all these staff.

The public health education portion of the program will be coordinated through the Zanzibar Health Education Unit which is presently inadequate for the job due to severe shortages of essential equipment, including duplicating machines, for carrying out mass education campaigns. The essential technical staff training will be coordinated through the Malaria Control Program itself, which also is presently in need of duplicating machines to carry out this function. The Project has therefore included provisions for the procurement of this equipment to insure that these functions are carried out.

Justification: In Tanzania there are presently no U.S. source duplicating machines that have sales and service capabilities in country. Gestetner brand machines are by far the most widely used in Tanzania and there are service and repair facilities available. Spare parts for most other types of mimeograph machines are periodically in short supply, while Gestetner parts are more readily available on the market.

Recommendation: Based on the above discussion, it is recommended that you:

- 1) conclude that exclusion of procurement of the above specified project equipment from countries included in AID Geographic Code 935 would seriously impede attainment of United States foreign policy objectives and the objectives of the Foreign Assistance Program;
- 2) conclude that special circumstances exist which justify waiver of the requirements of Section 636(i) of the Foreign Assistance Act of 1961, as amended;
- 3) approve procurement from AID Geographic Code 935 of the commodities as described above pursuant to the waiver authority reserved for the Administrator in Handbook I, Supplement B Chapter 5 and 12. By this action you are also approving proprietary procurement in favor of Gestetner.

Drafter: HNPO: PGEhmer: ek: 2/17/81

Clearances: HRD: AHenn AK  
SMA: SKlaus SK  
CON: IPeterson (in draft)  
PRM: MBonner (in draft)  
AD: BRiley BR

ANNEX H  
CONGRESSIONAL NOTIFICATION

**AGENCY FOR INTERNATIONAL DEVELOPMENT**

**TECHNICAL NOTIFICATION**

<u>Project Title and Number</u>	<u>Data Base Reference</u>	<u>Country or Central Program</u>	<u>Appopr. Account</u>	<u>Obligation Amount in Data Base</u>	<u>Amount Now Required</u>	<u>Amount of Increase</u>	<u>Reason for Notification</u>
Malaria Control Zanzibar 621-0163	Page 162	Tanzania	Health	\$10,000,000 (Loan)	\$11,771,000 (Loan)	\$1,771,000	Increase in FY' funding

Clearances: DAA/AFR, W H North WHS  
 AAA/AFR.DP, I Coker WHS  
 AFR/EA, H Johnson WHS  
 AFR/EA, J VanDenBos WHS

**ANNEX I**  
**STATUTORY CHECKLIST**

## ANNEX I

I. STATUTORY COUNTRY CHECKLIST FOR FY 1981A. General Criteria for Country Eligibility

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in a consistent pattern of gross-violations of internationally recognized human rights?

Project activities in Tanzania focus on providing goods and services to the villages of Tanzania. The CDSS and other program documents have argued the needy people of Tanzania are the rural villagers.

2. FAA Sec. 481. Has it been determined that the government of the recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?

No.

3. FAA Sec. 620 (b). If assistance is to a government, has the Secretary of State determined that it is not dominated or controlled by the international Communist movement?

No determination that Tanzania is controlled by the international Communist movement has been made.

4. FAA Sec. 620 (c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government?

Payments to a U.S. Contractor for work completed in 1973 have been delayed. The U.S. citizen has still not exhausted available legal remedies. The Government of Tanzania is providing regular and timely payments on loans provided by the U.S.

5. FAA Sec. 620 (e) (1). If assistance is to a government, has it (including government agencies or subdivision) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

The TanGov nationalized a coffee estate (1973) and a Caltex gasoline station and adjacent buildings (1972). The former has been settled through payments in foreign exchange, which have been held up in some cases. The latter settlement is progressing, and Caltex has not yet exhausted all legal remedies. In summary, there are a small number of pending claims that are taking time to resolve, but complainant parties and the TanGov are working on steps to resolve the issues.

6. FAA Sec. 620 (a), 620 (f), 620 (d); FY 80 App. Act. Sec. [511, 512 and 513]. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos or Vietnam? Will assistance be provided to Afghanistan or Mozambique without a waiver?

No, the recipient country is not a Communist country. Tanzania is usually a recipient of foreign aid and does not provide assistance to Communist countries.

7. FAA Sec. 620 (i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?

Tanzania is not involved in or planning subversive activities against the U.S.

8. FAA Sec. 620 (j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?

No.

9. FAA Sec. 620 (1). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID administrator within the past year considered denying assistance to such government for this reason?

No.

10. FAA Sec. 620 (0); Fishermen's Protective Act of 1967, as amended, Sec. . If country has seized, or imposed any penalty or sanction against any U.S. fishing activities in international waters,

a. has any deduction required by the Fishermen's Protective Act been made?

b. has complete denial of assistance been considered by AID Administrator?

The TanGov has neither seized nor imposed any penalty or sanction against U.S. fishing activities in international waters.

11. FAA Sec. 620; FY 80 App. Act. Sec. [518] (a) Is the government of the recipient country in default for more than six months on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriate funds?

The TanGov has not defaulted on any U.S. loan.

12. FAA Sec. 620 (s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military equipment and the amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo "Yes, taken into account by the Administrator at time of approval of Agency OYB." This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

No assistance from the Economic Support Fund is anticipated this fiscal year.

13. FAA Sec. 620 (t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

The TanGov has not severed diplomatic relations with the United States.

14. FAA Sec. 620 (u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

The UNDP representative in Dar es Salaam reports Tanzania's contributions to the U.N. are current and that there are no arrearages.

15. FAA Sec. 620 A; FY 80 App. Act, Sec. [521.] Has the country granted sanctuary from proscription to any individual or group which has committed an act of international terrorism? Has the country granted sanctuary from prosecution to any individual or group which has committed a war crime?

The Palestine Liberation Organization maintains an office in Dar es Salaam which enjoys diplomatic status. To our knowledge Tanzania has not provided sanctuary to individuals convicted or wanted for terrorist actions.

16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?

No such objections have been raised. Resident visas for USAID employees are easily obtained.

17. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon State" under the non-proliferation treaty?

No nuclear material has been delivered or received without specified safeguards. No nuclear testing has been undertaken in Tanzania.

B. Funding Source Criteria for Country Eligibility

1. Development Assistance Country Criteria

- a. FAA Sc. 102 (b) (4). Have criteria been established and taken into account to assess commitment progress of country in effectively involving the poor in development, on such indexes as: (1) increase in agricultural productivity through small farm labor intensive agriculture, (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy.

Yes. See Dar FY 81 102 (b) submission.

- b. FAA Sec. 104 (d) (1); IDC Act of 1979. If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, assistance to urban poor through community-based development programs which give recognition to people motivated to limit the size of their family?

b. (cont.)

This activity's objective is to decrease malaria prevalence. Other Mission and Tanzanian government activities support family planning and population control.

## II. STRATEGY PROJECT CHECKLIST

### A. General Criteria for Project

1. FY 81 App. Act. Unnumbered; FAA Sec. 634A; Sec. 653 (b);  
 (a) Describe how authorizing and appropriations Committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that figure)?  
  
 (a) Project described in FY 81 CP.  
  
 (b) Budget increased by 33% \$2,900,000; CN will be submitted (Annex H).
2. FAA Sec. 611 (a) (1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?  
  
 Yes, see Annex F.
3. FAA Sec. 611 (a) (2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?  
  
 N.A.
4. FAA Sec. 611 (b); FY 80 App. Act. Sec. [501] If for water or water related land resource construction, has project met the standards and criteria as per the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973?  
  
 N.A.
5. FAA Sec. 611 (e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed \$1 million,, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability effectively to maintain and utilize the project?

N.A.

6. FAA Sec. 209. Is project susceptible of execution as part of regional or multilateral project? If so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs.

WHO has collaborated on project development. The Zanzibar Government has requested straight bilateral assistance in preference to multilateral (See Annex E).

7. FAA Sec. 601 (a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

N.A.

8. FAA Sec. 601 (b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

N.A.

9. FAA Sec. 612 (b); Sec. 636 (h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

Given the current foreign exchange crisis in Tanzania, the host country commitment to this project is remarkable. See both Section III. A. and Annex B.

10. FAA Sec. 612 (d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release?

No.

11. FAA Sec. 601 (e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?

Yes.

12. FY 81 App. Act Sec. 521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?

N.A.

B. Funding Criteria for Project

1. Development Assistance Project Criteria

a. FAA Sec. 102 (b); 111; 113; 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions; (c) support the self-help efforts of developing countries; (d) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (e) utilize and encourage regional cooperation by developing countries?

Project will make more labor time of the poor available for development activities (Sec. III. A.). Project will be of particular benefit to women (See both Sec. III. B. and Annex E.) Project will serve as a demonstration for rest of Africa.

b. FAA Sec. 103. Is assistance being made available for agriculture, rural development or nutrition; if so, (a) extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, full account shall be taken of the needs of small farmers, and extensive use of field testing to adapt basic research to local conditions shall be made; (b) extent to which assistance is used in coordination with programs carried out under Sec. 104 to help improve nutrition of the people of developing countries through encouragement of increased production of crops with greater nutritional value, improvement of planning, research, and education with respect to nutrition, particularly with reference to improvement and expanded use of indigenously produced foodstuffs; and the undertaking of pilot or demonstration programs explicitly addressing the problem of

malnutrition of poor and vulnerable people; and (c) extent to which activity increases national food security by improving food policies and management and by strengthening national food reserves, with particular concern for the needs of the poor, through measures encouraging domestic production, building national food reserves, expanding available storage facilities, reducing post harvest food losses, and improving food distribution.

The project has been designed to address each of these concerns. See Sec. II.

c. [107]. Is appropriate effort placed on use of appropriate technology? (relatively smaller, cost-saving, labor using technologies that are generally most appropriate for the small farms, small businesses and small incomes of the poor.)

Yes, See Sec. II and III. C.

d. FAA Sec. 110 (a) Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least developed" country)?

Yes. Zanzibar contribution amounts to 28% of the project. See Annex B.

e. FAA Sec. 110 (b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"?

Yes, Tanzania is a relatively least developed country.

f. FAA Sec. 281 (b). Describe extent to which program recognizes the particular needs, desires and capacities of the people in the country; utilizes the country's intellectual resources to encourage institutional development; and supports civil education and training in skills required for effective participation in governmental processes essential to self-government.

See PP Section II to understand how project is designed to answer these issues.

g. FAA Sec. 122 (b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?

Yes.

III. STANDARD ITEM CHECKLIST

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?

The Government of Zanzibar has selected a list of preferable contractors with international reputation for good work in the malaria field. See Annex G.

2. FAA Sec. 604 (a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under the delegation from him?

See waivers requested per Annex G.

3. FAA Sec. 604 (d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?

Yes.

4. FAA 604 (e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?

N.A.

5. FAA Sec. 608 (a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?

Yes.

6. FAA Sec. 603 (a) Compliance with requirement in section 901 (b) of the Merchant Marine Act of 1936, as amended, that at least 50 percentum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.

U.S.-flag commercial vessels shall be used to the extent practicable.

7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis?

Yes.

If the facilities or other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise and made available without undue interference with domestic programs?

Yes.

8. International Air Transport. Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

Yes.

9. FY 81 App. Act. Sec. 105. Does the contract for procurement contain a provision authorizing the termination of such contract for the convenience of the United States?

The PIO/T will specify that such a clause be included in the contract.

B. Construction

1. FAA Sec. 601 (d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?

N.A.

2. FAA Sec. 611 (c) If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?

N.A.

3. FAA Sec. 620 (k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed \$100 million?

N.A.

C. Other Restrictions

1. FAA Sec. 122(e). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?

N.A.

f. FY 80 App. Act. Sec. [506.] To pay UN assessments?

Yes.

g. FY 80 App. Act. Sec. [507.] To carry out provisions of FAA section 209 (d) (Transfer of FAA funds to multi-lateral organizations for lending.)

Yes.

h. FY 80 App. Act. Sec. [511.] To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?

Yes.

i. FY 80 App. Act. Sec. [515.] To be used for publicity or propaganda purposes within U.S. not authorized by Congress?

Yes.

2. FAA Sec. 301 (d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights?

N.A.

3. FAA Sec. 620 (h). Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries?

Yes.

4. FAA Sec. 636 (i). Is financing not permitted to be used, without waiver, for purchase, sale, long-term lease exchange or guaranty of motor vehicles manufactured outside the U.S.?

Yes. See Annex G.

5. Will arrangement preclude use of financing:

- a. FAA Sec. 104 (f). To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortion; to pay for performance of involuntary sterilization as a method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization?

Yes.

- b. FAA Sec. 620 (g). To compensate owners of expropriated nationalized property?

Yes.

- c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs?

Yes.

- d. FAA Sec. 662. For CIA activities?

Yes.

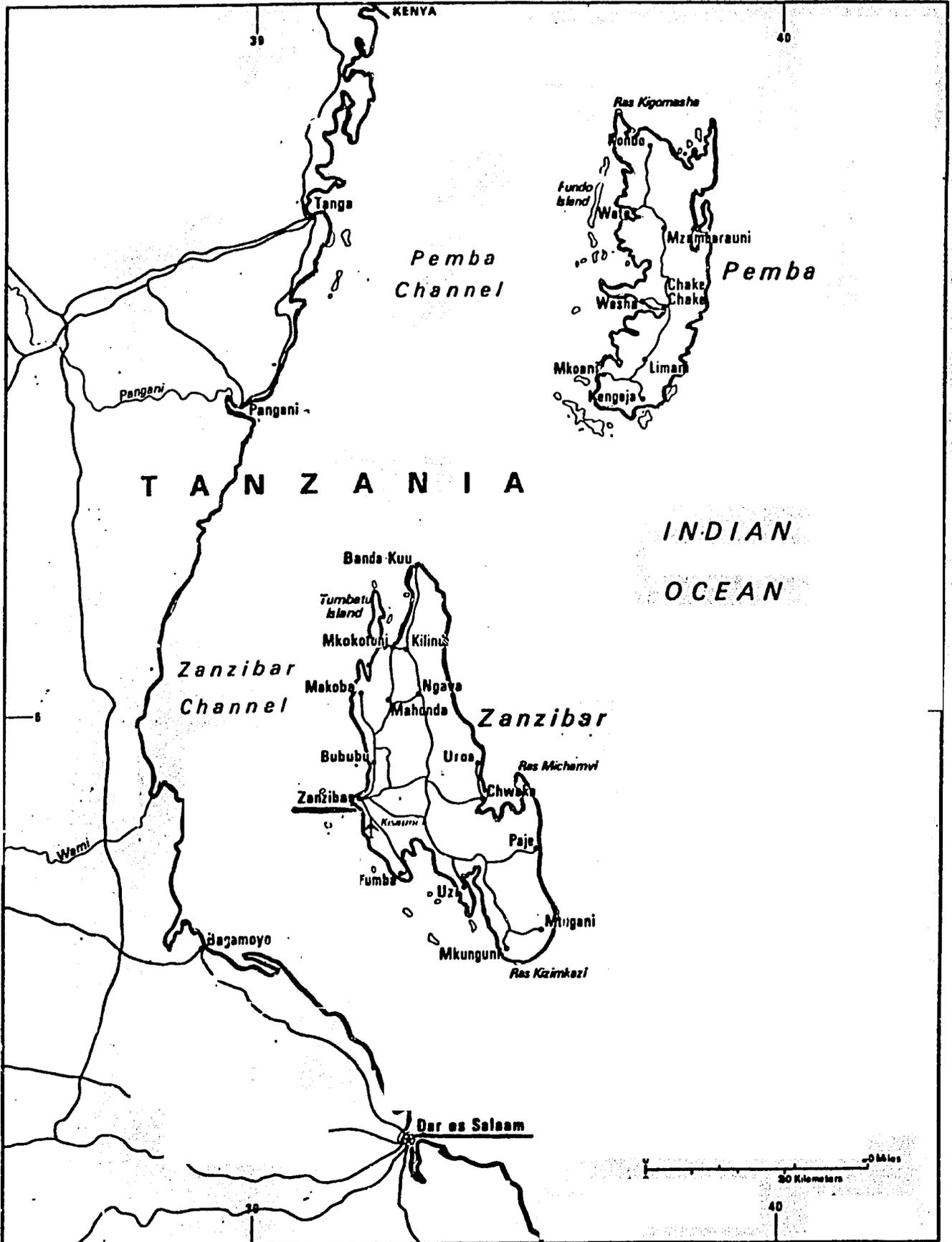
- e. FY 80 App. Act. Sec. [504]. To pay pensions, etc. for military personnel?

Yes.

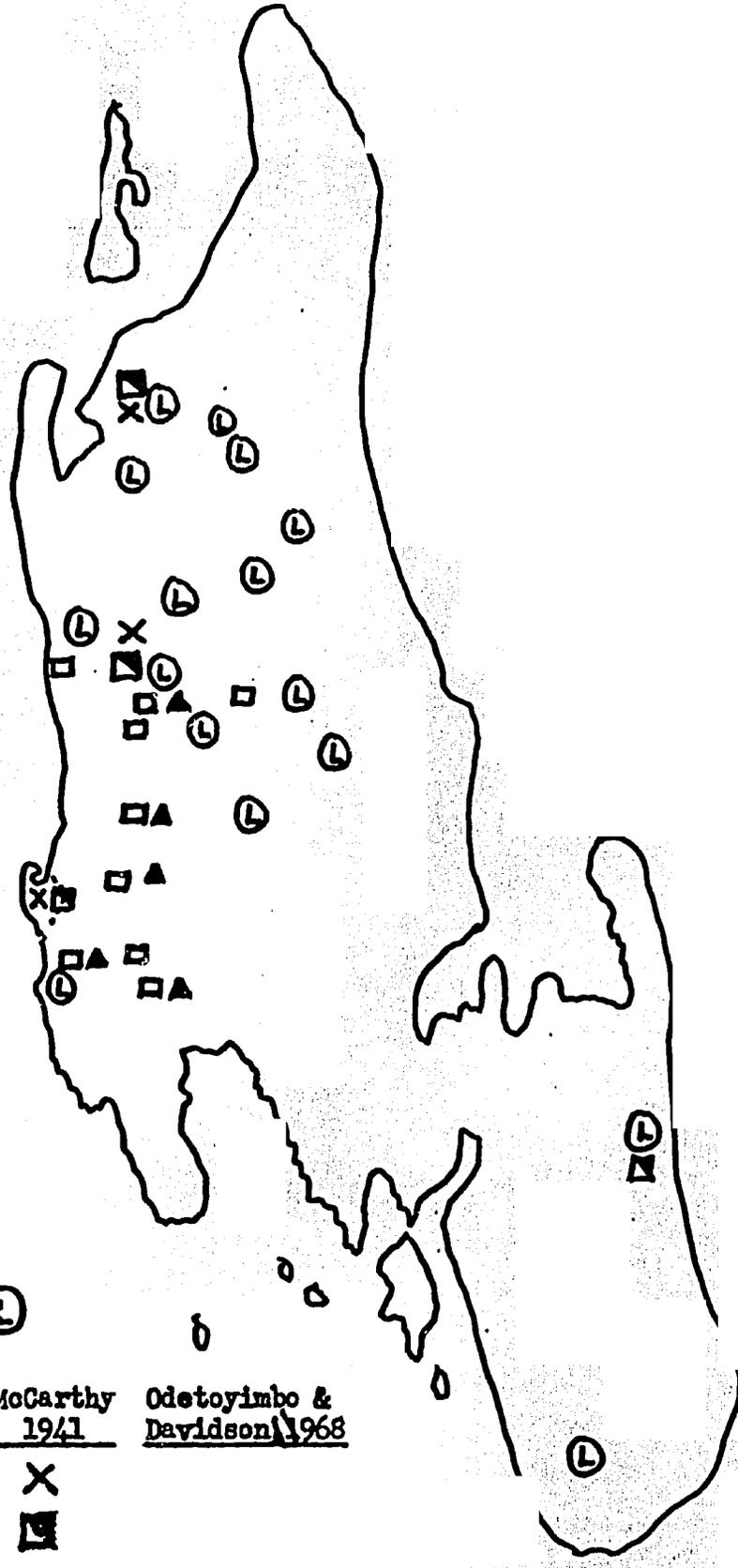
**ANNEX J**  
**MAPS**

# Zanzibar

280



ANOPHELE DISTRIBUTION ON UNGUJA  
ZANZIBAR



Larval anophelines:  
(Malaria Unit Data)



Adult anophelines:

McCarthy  
1941

Odetoyimbo &  
Davidson 1968

An. funestus



An. gambiae s.l.



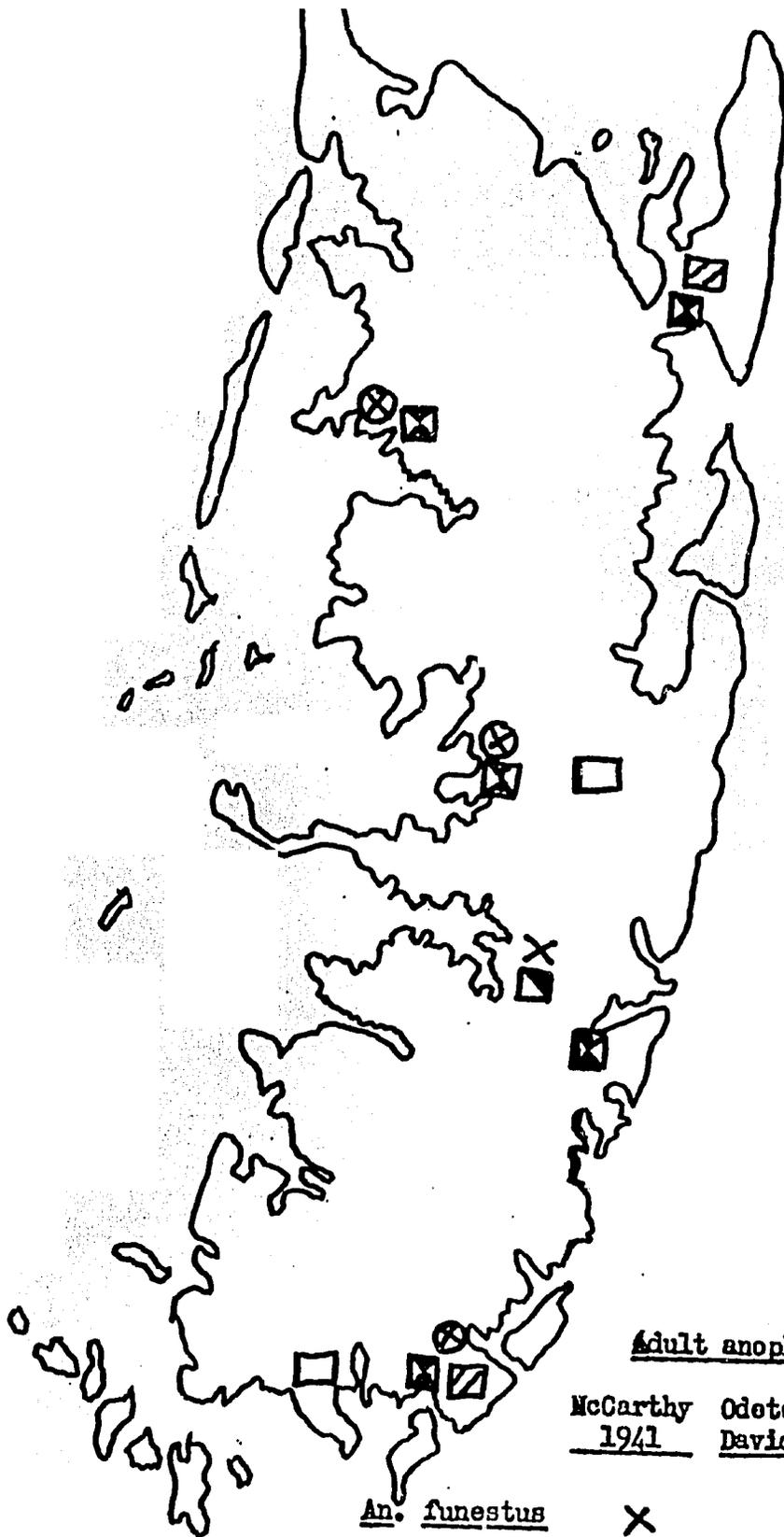
An. gambiae B



An. gambiae C



ZANZIBAR



Adult anophelines

McCarthy  
1941

Odetoymbo &  
Davidson:1968

Chingwile  
1975

An. funestus



An. gambiae s.l.



An. gambiae B.



An. merus

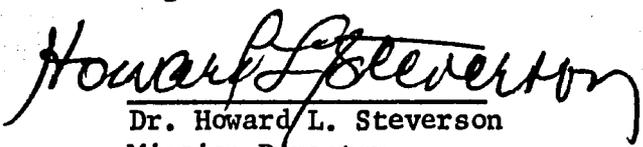


AN

**Initial Environmental Examination**



VIII. INITIAL ENVIRONMENTAL EXAMINATION

Project Location:	Zanzibar, United Republic of Tanzania
Project Title:	Zanzibar Malaria Control Project (621-0163)
Funding:	\$8,871,000
Life of Project:	FY 81 - FY 85
IEE Prepared by:	USAID/Tanzania
Date:	February 1980
Environmental Action Recommended	Negative Determination
Concurrence and Certification	 Dr. Howard L. Steverson Mission Director

A. Project Description

The Zanzibar Malaria Control Project contains the following elements: 1) provision of long and short term technicians; 2) training of malaria unit personnel; 3) public education campaign; 4) provision of chloroquin as preventive and curative measures; and 5) anti-mosquito activities undertaken (larvaciding, residual house spraying, source reduction). This project will combine the above elements to strengthen the Malaria Unit within the Zanzibar Ministry of Health and Social Welfare and will implement a Zanzibar-wide malaria control program that will drastically reduce the prevalence of malaria to the point where it is no longer a major public health problem.

B. Evaluation of Impact

One component of the project includes a number of activities designed to combat the mosquitoes that carry malaria. The residual house spraying activities will involve the use of DDT which can potentially be harmful to the environment. Similar programs have been undertaken in other countries over periods of many years so that experience has been gained in proper application techniques that minimize the environmental impact. Sprayer training programs will emphasize precautions to be taken for the protection of the sprayers themselves, householders, and the household environment from harmful contact with potentially toxic chemicals. Similarly, larvaciding activities have the potential of introducing toxic materials into the environment, but again the training programs will be designed to make use of field-tested techniques from similar programs to



IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Identification and Evaluation 2/

Impact Areas and Sub-areas 1/

A. LAND USE

- 1. Changing the character of the land through:
  - a. Increasing the population ----- U
  - b. Extracting natural resources ----- N
  - c. Land clearing ----- M
  - d. Changing soil character ----- N
- 2. Altering natural defenses ----- N
- 3. Foreclosing important uses ----- N
- 4. Jeopardizing man or his works ----- N
- 5. Other factors ----- N
- N
- N

B. WATER QUALITY

- 1. Physical state of water ----- N
- 2. Chemical and biological states ----- N
- 3. Ecological balance ----- M
- 4. Other factors ----- N
- N
- N

1/ See Explanatory Notes for this form.

2/ Use the following symbols:

- N - No environmental impact
- L - Little environmental impact
- M - Moderate environmental impact
- H - High environmental impact
- U - Unknown environmental impact

C. ATMOSPHERIC

- 1. Air additives ----- N
- 2. Air pollution ----- N
- 3. Noise pollution ----- N
- 4. Other factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

D. NATURAL RESOURCES

- 1. Diversion, altered use of water ----- U
- 2. Irreversible, inefficient commitments ----- N
- 3. Other factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

E. CULTURAL

- 1. Altering physical symbols ----- U
- 2. Dilution of cultural traditions ----- U
- 3. Other factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

F. SOCIOECONOMIC

- 1. Changes in economic/employment patterns ----- N
- 2. Changes in population ----- N
- 3. Changes in cultural patterns ----- N
- 4. Other factors
- \_\_\_\_\_ N
- \_\_\_\_\_ N

IMPACT IDENTIFICATION AND EVALUATION FORM

G. HEALTH

1. Changing a natural environment \_\_\_\_\_ H

2. Eliminating an ecosystem element \_\_\_\_\_ L

3. Other factors

DDT Spraying \_\_\_\_\_ L

Larvaciding \_\_\_\_\_ L

H. GENERAL

1. International impacts \_\_\_\_\_ U

2. Controversial impacts \_\_\_\_\_ L

3. Larger program impacts \_\_\_\_\_ U

4. Other factors

\_\_\_\_\_ N

\_\_\_\_\_ N

I. OTHER POSSIBLE IMPACTS (not listed above)

\_\_\_\_\_ N

\_\_\_\_\_ N

**ANNEX L**

**COST PREPARATION WORKSHEETS**

## ANNEX L

## COST PREPARATION WORKSHEETS

I. Vehicles: Allocation and Costs

## A. Landrovers:

- 3: for headquarters office to be shared by 4 senior Zanzibari professionals and 2 contract technicians
- 4: two for each island office: one for drug distribution program and one for monitoring program
- 3: one for each of the three regions where there is no island office for monitoring program.

10 @ \$18,000

\$180,000

## B. 3-1/4 Ton Trucks:

- 2: one for each island office for support of source reduction programs

2 @ \$25,000

\$50,000

## C. 1-Ton Trucks:

- 5: one for each regional office for support of the adulticiding (space spraying) activities

5 @ \$15,000

\$75,000

## D. Motorscooters:

- 4: two for each island office for source reduction supervision
- 2: one for each island office for the sanitarian/engineer
- 2: one for each island office for the health educator
- 29: three for each district to be used by malaria supervisors

37 @ \$1,500

\$56,000

## E. Bicycles:

- 153: one for each malaria agent
- 10: one for each sprayer supervisor
- 60: one for each sprayer

223 @ \$200.

\$45,000

F. Spare parts for new vehicles @ 20%	\$81,000
G. Spare parts for 2 old MOH Toyotas @ \$2500	<u>5,000</u>

\$492,000

II. Petrol, Oil and Maintenance

A. Landrovers: 10 @ \$6,000 per year	\$60,000
B. Trucks 7 @ \$10,000 per year	70,000
C. Motorscooters 37 @ \$2,000 per year	74,000
D. Bicycles 223 @ \$25 per year	6,000
E. Toyotas (old) 2 @ \$6,000 per year	<u>12,000</u>

\$222,000

III. Control Equipment

A. <u>Source Reduction Engineering</u>		
1. Water pumps (2.5 hp) 10 @ \$2200		\$22,000
2. Shovels 50 @ \$10		500
3. Picks 25 @ \$10		250
4. Wheelbarrows 10 @ \$120		1,250
5. Drain plastic piping		<u>6,000</u>

\$30,000

B. <u>Larviciding</u>		
1. Hudson sprayers 150 @ \$100		\$15,000
2. Sprayer spare parts		<u>2,100</u>

\$17,100

C. <u>Space Spraying</u>		
1. Lecto-ULV HD units 5 @ \$6,000		\$30,000

D. <u>Household Spraying</u>		
1. Hudson sprayers 350 @ \$100		\$35,000
2. Sprayer spare parts		<u>4,900</u>

\$39,900

E. <u>Monitoring Equipment</u>		
1. New Jersey light traps (220V) 30 @ \$200		\$6,000
2. Compound binocular microscope 12 @ \$1800		22,000
3. Dissecting stereo microscope 3 @ \$1200		4,000
4. Misc. (slides, lancets, dyes, cover slips, etc.)		<u>20,000</u>

\$52,000

F. <u>Basic Malaria Library</u>	\$1,000
G. <u>Health Education*</u>	
1. Darkroom equipment	\$3,000
2. Art office equipment	19,000
3. Colors, screen and tape	3,000
4. Drawing tools	3,000
5. Miscellaneous	<u>5,000</u>
	\$30,000
	<hr/>
	\$200,000

#### IV. Anti Mosquito Agents

A. <u>Residual spraying:</u> Although it is anticipated that most household spraying will be undertaken with DDT, in order to budget for the possibility of having to resort to the more expensive organophosphates and carbamides, residual insecticide costs are calculated on the basis of doing half of the spraying with DDT and half with Malathion.	
1. DDT: 16,000 households twice a year at 2 grams per square meter (\$1.20 per spraying).	\$192,000
2. Malathion: 8000 households <u>four</u> times a year at 2 grams per sq. meter (\$1.50 per spraying)	\$240,000
B. <u>Space Spraying:</u> Malathion will be used at the recommended ULV ground application rate of 1.5 fluid ounces per minute. Approximately 20 fluid ounces per acre for 584 acres sprayed bi-weekly at \$2.70 per acre.	\$205,000
C. <u>Larviciding:</u> Using motor oil, diesel oil and Triton X-207 mixture at \$360 per ton, 428 acres with weekly application of 1 gallon per acre.	<u>\$154,000</u>
	\$791,000

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\* See Procurement Plan for detailed breakdown, Annex N.

## V. Chloroquine

- A. Prophylaxis: Calculations are based upon the project reaching 25% of the target population by the end of the first year of project activities and 100% by the end of the second year, the target population is equal to 50% of the full population, FY 81 would only have 6 months of project activities, and Government of Zanzibar population projections (approx. 3% annual growth). Chloroquine syrup cost is based on \$22.00/gallon and tablets cost on \$30 per 1000 tablets.

The basic formula for calculating the cost of prophylaxis for a particular age group for a given fiscal year is:

FY Cost = Population X Percent Covered X No. Doses X Dose Volume X Cost. For example, for 0-4 year olds in FY 81:

FY 81 Cost = 100,000 X 12.5% X 26 X .0075 liters X \$5/liter  
 FY 81 Cost - \$12,187, but there will be only six months of project activities for FY 81 so the cost is put at \$6,000.

Using the formula above, the following costs are derived for chemoprophylaxis:(\$000)

<u>Age Group</u> FY:	<u>81</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>	<u>Total</u>
0-4	6	35	75	95	100	50	361
5-14	11	66	141	175	180	90	663
Pregnant Women*	<u>3</u>	<u>10</u>	<u>19</u>	<u>21</u>	<u>23</u>	<u>12</u>	<u>88</u>
<b>TOTAL</b>	<b>20</b>	<b>111</b>	<b>235</b>	<b>291</b>	<b>303</b>	<b>152</b>	<b>1112</b>

- B. Treatment: The methodology for calculating the costs each year for treatment for each age group is similar to the above except that the entire population is used as the base, protection of the target population is factored in as they are covered by the chemoprophylaxis program, a decline in malaria prevalence by 33% is applied over the last three years of the project, and the treatment dosages are those presented in Section II with the assumption that each unprotected person in Zanzibar will require two treatments per year.

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\* For calculation purposes it is assumed that 25% of the women age 15-44 will be pregnant in any year and will receive 5 months of prophylaxis during pregnancy and 2 months afterward.

The basic formula for calculating the cost of treatment for a given age group for a fiscal year is:

$$\text{FY Cost} = \text{Population} \times \text{Percent Unprotected} \times \text{No. Doses} \times \text{Dose Volume} \times \text{Cost}$$

For example for 0-4 year olds for FY 81:

$$\text{FY 81 Cost} = 100,000 \times 87.5\% \times 2 \times .010 \text{ liters} \times \$5/\text{liter}$$

FY 81 Cost = \$8750, but as only six months of FY 81 will have project activities the cost is approximated at \$5,000.

Using the formula above and superimposing complete protection of the target population after the second project year and a decline in disease prevalence, the following treatment costs are derived:(\$000)

<u>Age Group</u>	<u>FY: 81</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>	<u>Total</u>
0-4	5	9	0	0	0	0	14
5-14	14	25	0	0	0	0	39
15 and over	<u>70</u>	<u>141</u>	<u>124</u>	<u>113</u>	<u>101</u>	<u>45</u>	<u>594</u>
TOTALS	89	175	124	113	101	45	647

Note: Treatment calculations for FY 81 and FY 82 include giving each individual in the target population a treatment course before they begin their regular prophylactic regime.

C. Total Chloroquine Cost (Borne by AID and Government of Zanzibar)  
(\$000)

	<u>FY: 81</u>	<u>82</u>	<u>83</u>	<u>84</u>	<u>85</u>	<u>86</u>	<u>Total</u>
1. Prophylaxis	20	111	235	291	303	152	1112
2. Treatment	<u>89</u>	<u>175</u>	<u>124</u>	<u>113</u>	<u>101</u>	<u>45</u>	<u>647</u>
TOTALS	109	286	359	404	404	197	1759
Zanzibar	55	110	110	110	110	55	550
AID	<u>54</u>	<u>176</u>	<u>249</u>	<u>294</u>	<u>294</u>	<u>152</u>	<u>1209</u>
TOTALS	109	286	359	404	404	197	1759

**ANNEX M**  
**INSECTICIDE SENSITIVITY TESTING**

## ANNEX M

## Insecticide Sensitivity Testing

Because vector susceptibility to insecticides is so crucial to the selection of effective mosquito control agents, and because the different agents have such markedly different cost implications, the design team for the Zanzibar Malaria Control Project undertook Anopheline susceptibility testing to both DDT and Malathion on the islands of Unguja and Pemba. The standard WHO kit for testing susceptibility of adult mosquitoes to insecticides was used following the standard protocol of "controls" and mosquitoes exposed to 4% DDT and 5% Malathion impregnated papers for one and two hours followed by a 24 hour observation period to determine mortality.

On Unguja Island all Anophelines tested were tentatively identified as Anopheles gambiae S.l. and they showed 100% susceptibility to DDT and to Malathion. This was very encouraging because it meant that the residual spraying activities on Unguja Island could initially depend upon the much cheaper DDT. However, the results on Pemba Island were not as favorable. There too the mosquitoes tested were tentatively identified as Anopheles gambiae S.l., but they demonstrated a high level of resistance to DDT in the vicinity of Bopwe village near Wete. These mosquitoes were 100% susceptible to Malathion.

Formal reports of these studies have been submitted to WHO and are on file with the Malaria Control Unit on Zanzibar. The findings of these field studies led the design team to provide for use of the more expensive Malathion in half of the household sprayings undertaken during the life of the project. Nevertheless, since Malathion can cost five times as much as DDT, and others such as propoxur can run as high as 20 times as expensive as DDT, DDT will be used initially in almost all areas of Zanzibar. Since the objective is control as opposed to eradication, and because of the financial implications of using alternative insecticides, the Project may elect to live with resistance in the case of DDT. This decision will depend upon the overall effectiveness of DDT as revealed through operational research.

**ANNEX N**  
**PROCUREMENT**

Procurement Plan

The following procurement schedule sets out a listing of the various commodities that will be purchased with portions of the grant funds under this Project as further delineated in the Detailed Budget (Annex B). As previously stated, this Project will be implemented through the Government of Zanzibar Ministry of Health and Social Welfare, with technical assistance provided by a Contractor to be chosen following Project Paper approval through normal AID contracting procedures with the collaboration and approval of the Zanzibar Government. The nature of this project and commodities to be purchased will lead to commodity procurement by a number of different entities.

In accordance with Handbook 1B Chapter 3, the Government of Zanzibar will be responsible for purchasing all motor vehicles and bicycles for the project. To assist in this process and to expedite timely arrival of the vehicles, upon which much of project implementation depends, it is expected that the Mission will be requested by the Government of Zanzibar to request AID/W issuance of a direct letter of commitment to the supplier for the vehicles. A USAID PIO/C may be used to expedite arrival of furniture and appliances.

Handbook 1B further states that a contractor may be selected to procure commodities and services on behalf of the grantee, when the magnitude of purchases, necessity of careful timing of purchases and the non-availability of technical expertise in the Government so indicates. Managerial control is still exercised over this procurement by the administering agency through the contractual relationship. In this Project the Contractor may be expected to procure the office equipment, health education equipment, furniture and appliances and source reduction equipment as outlined below. The contractor procurement procedures and procurement capability will be reviewed and approved in writing by AID prior to his undertaking any commodity procurement. In the event a non-U.S. contractor is selected, consideration will be given to purchasing these items through a procurement service agent. This mechanism is preferred over Mission or AID procurement both for policy reasons, as stated in Handbook 1B and for reasons of a limited number of direct hire staff in the Missions which will continue into the near future.

However, Handbook 15, appendix D7 does state that commodities to be purchased in support of malaria control activities must be procured through a PIO/C issued by AID/W. Thus, the chloroquine, insecticides and control equipment to be purchased under the AID portion of the project budget as outlined below, will be purchased under a PIO/C issued from AID/W with supporting information supplied to AID/W by the Mission and the Contractor. The Government of Zanzibar will purchase the chloroquine and insecticides as detailed in the GOZ portion of the project budget.

Procurement Schedule

<u>Commodity</u>	<u>Cost (\$000)</u>	<u>Date Ordered</u>	<u>Expected Arrival</u>	<u>Ordered By</u>	<u>Authorizing Document</u>
<b>A. <u>Motor Vehicles</u></b>					
10 Landrovers	180	Mar.81	Aug. 81	ZanGov	Direct Letter of Commitment to Supplier
2 Trucks (3-1/4 ton)	50	Mar.81	Aug. 81	"	"
3 Trucks (1-ton pickup)	45	Mar.81	Aug. 81	"	"
37 Scooters (120 cc.)	56	Mar.81	Aug. 81	"	"
223 Bicycles	45	Mar.81	Aug. 81	"	"
Spares for above	76	Mar.81	Aug. 81	"	"
<b>B. <u>Chloroquine</u></b>					
	54	June 81	Sept. 81	AID/W	PIO/C
	55	June 81	Sept. 81	ZanGov	
	176	June 82	Sept. 82	AID/W	PIO/C
	110	June 82	Sept. 82	ZanGov	
	249	June 83	Sept. 83	AID/W	PIO/C
	110	June 83	Sept. 84	ZanGov	
	294	June 84	Sept. 84	AID/W	PIO/C
	110	June 84	Sept. 85	ZanGov	
	294	June 85	Sept. 85	AID/W	PIO/C
	110	June 85	Sept. 86	ZanGov	
	142	June 86	Sept. 86	AID/W	PIO/C
	55	June 86		ZanGov	
<b>C. <u>Insecticides</u></b>					
(a) ULV Space Spraying (Malathion)					
(b) Residual Spray (Malathion, DDT depending on susceptibility)					
(c) Larviciding (Triton-X207, diesel oil, detergent motor oil)					
	51	June 81	Sept. 81	AID/W	PIO/C
	28	June 81	Sept. 81	ZanGov	
	102	June 82	Sept. 82	AID/W	PIO/C
	56	June 82	Sept. 82	ZanGov	
	102	June 83	Sept. 83	AID/W	PIO/C
	56	June 83	Sept. 83	ZanGov	
	103	June 84	Sept. 84	AID/W	PIO/C
	56	June 84	Sept. 84	ZanGov	
	102	June 85	Sept. 85	AID/W	PIO/C
	56	June 85	Sept. 85	ZanGov	
	51	June 86	Sept. 86	AID/W	PIO/C
	28	June 86	Sept. 86	ZanGov	

## D. Control Equipment

1) Anti-mosquito

5 Leco ULV HD spraying units	30	May	81	Oct.	81	AID/W	PIO/C
500 Hudson sprayers	50	May	81	Oct.	81	AID/W	PIO/C
30 New Jersey Light Traps adopted for 220V. with photoelectric cell	6	May	81	Oct.	81	AID/W	PIO/C
Spares for pumps	7	May	81	Oct.	81	AID/W	PIO/C

2) Lab Equipment

12 compound binocular microscopes	22	May	81	Oct.	81	AID/W	PIO/C
3 dissecting stereo microscopes	4	May	81	Oct.	81	AID/W	PIO/C
Slides	3	May	81	Oct.	81	AID/W	PIO/C
Miscellaneous equipment	17	May	81	Oct.	81	AID/W	PIO/C
Publications	1	May	81	Oct.	81	AID/W	PIO/C

3) Source Reduction Equipment

10 wheel barrows	2	Sept.	81	Nov.	81	Contractor	Contract
25 picks	1	Sept.	81	Nov.	81	Contractor	Contract
50 shovels	2	Sept.	81	Nov.	81	Contractor	Contract
10 water pumps (2½HP diesel)	25	Sept.	81	Nov.	81	Contractor	Contract

4) Health Education Equipment

2 photo enlargers	1.5	Dec.	81	Mar.	82	Contractor	Contract
2 35mm cameras with lenses	1	"		"		"	"
Dark room equipment	1	"		"		"	"
Film	.5	"		"		"	"
2 typewriters	1	"		"		"	"
2 duplicating machines (220V)	3	"		"		"	"
2 photocopy machines (220V)	3	"		"		"	"
2 overhead projectors	1	"		"		"	"
3 transformers	1	"		"		"	"
4 batteries or projectors (for movie projector and overhead projector)	2	"		"		"	"
2 portable generators	5	"		"		"	"
2 dry photocopiers	2	"		"		"	"
500 videotapes (2")	1	"		"		"	"
40 radio tapes (15 min., 30 min)	1	"		"		"	"
Draftsman's tools	2	"		"		"	"
Publications-references	1	"		"		"	"
Printing supplies, paper, ink etc.	3	"		"		"	"

<u>Commodity</u>	<u>Cost (\$000)</u>	<u>Date Ordered</u>	<u>Date Expected</u>	<u>Ordered By</u>	<u>Document Authorizing</u>
<b>E. <u>Office Equipment</u></b>					
20 Manual typewriter with long carriage	10	Aug. 81	Dec. 81	Contractor	Contract
2 Duplicating machines (Stencil, 220V)	3	"	"	"	"
3 Photocopy machines (220V)	4	"	"	"	"
4 Filing cabinet (4-drawer legal size)	1	"	"	"	"
6 Filing cabinet (2-drawer, legal size)	2	"	"	"	"
Office furniture (desks, chairs, tables)	15	"	"	"	"
32 Stenographers' desks	6	ug. 81	Oct. 81	Contractor	Contract
3 Executive desks	.8	"	"	"	"
19 Filing cabinets	2.5	"	"	"	"
20 Tables	2	"	"	"	"
2 Conference tables	.3	"	"	"	"
72 Chairs	3	"	"	"	"
6 Benches	1	"	"	"	"
Bookshelves	.4	"	"	"	"
<b>F. <u>Furniture and Appliances</u> (for 2 technicians' houses)</b>					
Appliances (refrigerator, freezer, stove, 4 air-conditioners, washer, dryer, dehumidifier - see Mission standard list)	18	Aug. 81	Nov. 81	Contractor	Contract
Furnishings	12	"	"	"	"

**ANNEXO**  
**BIBLIOGRAPHY**

## ANNEX 0

### References for Malaria Control on Zanzibar

The design team recommends that the following list of documents be included in the basic reference library of the project. The list does not begin to indicate the wealth of malaria literature which exists and which could be of use to the project; instead it shows selected references which have been useful to the design team and which the team recommends. It is expected that the Malaria Control Program headquarters will establish a much more comprehensive antimalaria library.

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## ANNEX P

## Worksheet for Economic Analysis

The following worksheets were prepared in developing the calculations presented in Section III.A.5. which showed the Zanzibar Malaria Control Project to be favorable with respect to benefit-cost ratio, net present worth, internal economic rate of return, and projected recurrent costs.

Calculation of Running (Recurrent) Costs for Phase I Years

		(\$000)					
Budget Item	FY	81*	82	83	84	85	86*
Salaries		198	396	396	396	396	198
Training		48	115	115	115	115	58
Chloroquine		109	286	359	404	404	197
Insecticides		79	158	158	159	158	79
Transport		192	385	385	385	385	192
Utilities, Rent		13	26	26	26	26	13
Inflation (5%, 12% Compd)		63	282	480	751	1037	673
Contingency (5%)		32	68	72	74	74	37
Totals		734	1716	1991	2310	2595	1447
Zanzibar Budget		318	717	771	872	990	591
Zanzibar Share		43%	42%	39%	38%	38%	41%

\*FY 81 and FY 86 are half year budgets only

Population and Age Group Projections

<u>Year</u>	<u>Total Population</u> <sup>a/</sup>	<u>Ages 0 - 4</u> <sup>b/</sup>	<u>Ages 5 - 14</u> <sup>c/</sup>	<u>Ages 15 &amp; Over</u> <sup>d/</sup>	<u>Pregant Women</u> <sup>e/</sup>
1980	500,000	95,000	150,000	230,000	25,000
1981	515,000	98,000	155,000	236,000	26,000
1982	530,000	101,000	159,000	243,000	27,000
1983	546,000	104,000	164,000	251,000	27,000
1984	562,000	107,000	167,000	260,000	28,000
1985	579,000	110,000	174,000	266,000	29,000
1986	596,000	113,000	179,000	274,000	30,000
1987	614,000	117,000	184,000	282,000	31,000
1988	632,000	120,000	190,000	290,000	32,000
1989	651,000	124,000	195,000	299,000	33,000
1990	671,000	127,000	201,000	309,000	34,000

<sup>a/</sup> Average annual growth rate of 3 percent.

<sup>b/</sup> Represents 19 percent of the total population.

<sup>c/</sup> Represents 30 percent of the total population.

<sup>d/</sup> Represents 46 percent of the total population.

<sup>e/</sup> Represents 5 percent of the total population.

Percentage of Total Population Expected  
to Suffer Malaria - All Age Groups

<u>Year</u>	<u>Without the Project</u>	<u>With the Project</u>
1	79%	75%
2	82%	68%
3	84%	60%
4	86%	55%
5	89%	50%
6	91%	44%
7	93%	39%
8	95%	34%
9	96%	29%
10	96%	25%

Income Loss Avoided  
(U.S. dollars)

<u>Year</u>	<u>Labor Force</u> <sup>a/</sup>	<u>Days Lost</u> <sup>b/</sup>	<u>Daily Income</u> <sup>c/</sup>	<u>Income Loss/Case</u> <sup>d/</sup>	<u>Total Income Loss</u> <sup>e/</sup>
1	7,200	12	\$ .98	\$ 12	\$ 86,000
2	23,400	12	1.10	13	304,000
3	39,600	12	1.22	15	594,000
4	54,000	12	1.34	16	864,000
5	69,000	12	1.46	18	1,242,000
6	85,800	12	1.59	19	1,630,000
7	102,000	12	1.83	22	2,244,000
8	118,200	12	2.10	25	2,955,000
9	134,400	12	2.32	28	3,763,000
10	145,800	12	2.56	31	4,520,000

a/ Sixty percent of the population ages 15 and over is engaged in some economic activity.

b/ Assumes that a person will fall sick with malaria four times a year and will stay out of work for 3 days each time.

c/ Shadow priced at 50 percent of the minimum wage but including an inflation factor of 12 percent per year.

d/ Computed by multiplying the number of days lost by the daily income.

e/ Computed by multiplying the labor force by the loss income per case.

In-Patient Costs Avoided

(U.S.\$ 000's)

<u>Year</u>	<u>Cost Avoided</u>
1	26
2	104
3	202
4	302
5	436
6	599
7	806
8	1,015
9	1,284
10	1,561

Assumptions:

- (a) Ten percent of the population affected with malaria will require hospitalization.
- (b) Infants (ages 0 to 4), children (ages 5 to 14) and pregnant women will stay 5 days at the hospital; those over 15 years of age will stay 3 days at the hospital
- (c) Hospital costs per day, including drug treatment has been estimated at U.S.\$ 3.0 in 1980.
- (d) An inflation factor of 12 percent per year has been added to the hospital cost.

Cost of Drugs Avoided for Outpatient Cases

<u>Year</u>	<u>Number of Patients Avoided</u> <sup>a/</sup>	<u>Drug Cost per Patient (U.S. dollars)</u> <sup>b/</sup>	<u>Total Cost of Drugs Avoided (U.S. \$ 000's)</u> <sup>c/</sup>
1	19,950	.30	6
2	71,250	.34	24
3	124,450	.38	47
4	163,300	.43	71
5	213,750	.48	103
6	266,000	.53	141
7	315,400	.59	167
8	365,750	.66	241
9	414,200	.73	302
10	452,200	.82	371

<sup>a/</sup> Assumes that 95 percent of total malaria cases (excluding those requiring hospitalization) will receive 10 malaria pills once a year.

<sup>b/</sup> Assumes an inflation factor of 12 percent per year.

<sup>c/</sup> Computed by multiplying the number of patients by the cost per patient.

Gross Economic Benefits  
(U.S.\$ 000's)

<u>Year</u>	<u>Income Loss Avoided</u>	<u>In-Patient Costs Avoided</u>	<u>Cost of Drugs Avoided</u>	<u>Total Gross Benefits</u>
1	86	26	6	118
2	304	104	24	432
3	594	202	47	843
4	864	302	71	1,237
5	1,242	436	103	1,781
6	1,630	599	141	2,370
7	2,244	806	167	3,217
8	2,955	1,015	241	4,211
9	3,763	1,284	302	5,349
10	4,520	1,561	371	6,452
	<u>18,202</u>	<u>6,335</u>	<u>1,473</u>	<u>26,010</u>

Benefit-Cost Ratio, Net Present Worth and Internal Economic Rate of Return  
(U.S.\$ 000's)

<u>Year</u>	<u>Gross Costs</u>	<u>Gross Benefits</u>	<u>Gross Incremental Benefits</u>	<u>Present Worth Costs at 10%</u>	<u>Present Worth Benefits at 10%</u>	<u>Present Worth of Gross Incremental Benefits at 10%</u>
1	2,069	118	- 1,951	1,881	107	- 1,774
2	2,093	432	- 1,661	1,729	357	- 1,372
3	2,326	843	1,483	1,747	633	- 1,114
4	3,486	1,237	2,249	2,381	845	- 1,536
5	2,720	1,781	939	1,689	1,106	- 583
6	1,588	2,370	782	896	1,337	- 441
7	636	3,217	2,581	326	1,650	- 1,324
8	694	4,211	3,517	324	1,967	- 1,643
9	758	5,349	4,591	321	2,268	- 1,947
10	828	6,452	5,624	320	2,490	- 2,170
	<u>7,198</u>	<u>26,010</u>	+ <u>8,812</u>	<u>11,614</u>	<u>12,760</u>	<u>1,146</u>

Benefit-Cost Ratio at 10% = 1.1

Internal Economic Rate of Return = 11%

Net Present Worth at 10% = U.S.\$ 1,146,000