

PROJECT DATA SHEET

1. TRANSACTION CODE

A = Add
 C = Change
 D = Delete

Amendment Number

DOCUMENT CODE

3

2. COUNTRY/ENTITY

Africa Regional

3. PROJECT NUMBER

698-0421

4. BUREAU/OFFICE

AFR

06

5. PROJECT TITLE (maximum 40 characters)

Combating Childhood Communic. Diseases

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)

MM DD YY
 09 30 89

7. ESTIMATED DATE OF OBLIGATION
 (Under "B." below, enter 1, 2, 3, or 4)

A. Initial FY 79 B. Quarter 3 C. Final FY 88

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

A. FUNDING SOURCE	FIRST FY 79			LIFE OF PROJECT		
	B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total
AID Appropriated Total	500		500	43,000	4,000	47,000
(Grant)	(500)	()	(500)	(43,000)	(4,000)	(47,000)
(Loan)	()	()	()	()	()	()
Other U.S. 1.						
Other U.S. 2.						
Host Country & Int. Organ.				5,000	33,000	38,000*
Other Donor(s)				209,000	209,000	418,000**
TOTALS	500		500	254,000	246,000	500,000

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) H	539	500		761		46,239		47,000	
(2)									
(3)									
(4)									
TOTALS		761		761		46,239		47,000	

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

514 589

11. SECONDARY PURPOSE CODE

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

A. Code R/H
 B. Amount 47,000

13. PROJECT PURPOSE (maximum 480 characters)

Strengthen the Africans' ability to control: Six childhood communicable diseases (measles, polio, tuberculosis, diphtheria, pertussis (whooping cough) and tetanus) through Expanded Program for Immunization (EPI); diseases of local importance such as yellow fever and yaws, and possible malaria at some point in the future, and provide simple treatment for the Control of Diarrhea Disease (CDD).

14. SCHEDULED EVALUATIONS

Interim MM YY MM YY Final MM YY

15. SOURCE/ORIGIN OF GOODS AND SERVICES

000 941 Local Other (Specify)

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

* Estimated host country, UNICEF, WHO, etc., contributions to AID regionally funded country specific activities.

** Estimated combined host country, CADA and other donor contributions to balance of EPI and CDD nationwide effort for decade of the 80s.

17. APPROVED BY

Signature
 Title Donald F. Miller
 Director, AFR/RA

Date Signed
 MM DD YY
 09 15 81

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

MM DD YY
 09 15 81

25 SEP 1981

ACTION MEMORANDUM FOR THE ADMINISTRATOR

THRU : ES
THRU : AA/PPC, Larry Smucker (Acting) *LS*
FROM : AA/AFR, F. S. Ruddy *F. S. Ruddy*
SUBJECT : Combatting Childhood Communicable Diseases (CCCD)
Project (698-0421) - Project Authorization Amendment

Problem: Your approval is requested for a grant of \$46,239,000 from the FAA Section 105 (Health) appropriation to finance the Combatting Childhood Communicable Diseases Project (698-0421). Of this amount, \$2,718,000 is to be obligated in FY 1981. A total of \$761,000 was previously authorized for this project to finance project design activities.

Discussion:

Project Background and Description

This Project will provide \$47,000,000 over an eight year period (1981-1988) as the U.S. contribution to a multi-donor effort aimed at combatting childhood communicable diseases in sub-Saharan Africa. The objective of the Project is to increase the ability of African governments to:

- control measles, polio, tuberculosis, diphtheria, pertussis, and tetanus (through enhancing their capacities to develop and administer immunization programs)
- provide simple and effective treatment for the control of diarrheal disease
- control diseases of local importance, such as yaws and yellow fever.

The target area is, ultimately, all of sub-Saharan Africa. The target population for vaccine preventable diseases includes all children under one year of age and all pregnant women (neonatal tetanus). The target population for the programs aimed at controlling diarrheal diseases includes all children under five years of age. (The target populations for programs aimed at controlling locally significant diseases, of course, are to be defined on a case by case basis). It is estimated that, at present, only 5-10% of the target populations are now being immunized and/or are receiving effective treatment for diarrheal diseases. This low percentage is a major reason why up to 25% of the children born each year in Africa are now dying before reaching the age of five years. It is hoped and expected that, as a result of efforts generated through this Project, together with efforts being made by WHO, UNICEF and others, some 45-50% of the target population will be receiving immunizations and/or treatment for diarrheal diseases by the end of this Project and that by the end of this century 80-100% of the target populations will be reached.

This Project constitutes the U.S. contribution in the overall effort being made by the CADA nations to deal with this problem. (CADA - Concerted Action for the Development of Africa - participants include Belgium, Canada, the Federal Republic of Germany,

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France, the U.K. and the U.S.) The U.S. suggested the CCCD Project as a possible CADA initiative early in 1980. CADA's policy committee accepted and approved the project concept in December, 1980 and designated the U.S. as the lead donor in the effort.

The Project will consist of two interrelated sets of activities - regional support activities, and country-specific activities. Approximately \$28,000,000 of the \$46,239,000 requested for this Project will be for regional support activities and the balance will be reserved for country-specific activities.

Regional support activities will include : a) the development and implementation of training programs to upgrade the skills of key personnel involved in the various countries' disease control efforts; and b) providing technical assistance to individual countries to enable them to improve their disease surveillance and evaluation systems, their health education and promotion efforts, and their operations research efforts.

Country-specific activities will focus on strengthening the capabilities of the ministries of health of African nations to control childhood communicable diseases. Each country-specific activity will be negotiated between the host government and the donor or donors. In AID's case this would be an agreement executed between USAID and the host government and would provide commodity assistance such as cold chain and transportation equipment and vaccines (principally measles vaccine, since UNICEF is usually able to provide the other vaccines at a far lower cost).

AID is currently involved in providing assistance for immunization programs in eleven countries in Africa. Other donors are working in some 15 - 20 countries, but these programs vary from assistance at the national level to smaller localized efforts. It is anticipated that the CCCD program will coordinate these activities and expand the programs so that there will be major donor supported childhood disease control programs in 30 - 35 African countries by the end of the project. AID would be supporting 15 - 20 of these programs through country-specific activities during this eight year period.

It is estimated that a total of close to 500 million dollars will be required to immunize and treat approximately 50% of the target population by the end of this decade. The African governments are expected to provide over half of this amount through their regular health budgets. The balance will be provided by WHO, UNICEF, and others. We have estimated the AID and CADA share to be approximately 125 million dollars. AID's contribution for this project, 1981 - 1988, will be 47 million dollars.

The AID contribution will be utilized as follows:

	<u>First Year</u>	<u>LOP</u>
<u>Regional Support Activities</u>		
Technical Assistance	\$2.7	\$13.2
Training		7.9
Project Design	0.7	0.7
<u>Country-Specific Activities</u>		
Technical Assistance		2.8
Commodities & Local Costs		10.4
Sub-Total		35.0
Inflation/Contingency		12.0
Total		<u>\$47.0</u>

The Africa Bureau is aware that this Project could call for a significant share of the Health appropriation funds probably available to the Bureau for the balance of the decade. Because of uncertainties regarding availabilities of Health appropriation funds for FY 1982 and beyond, however, it is not possible to estimate, with any accuracy, how great a share of these funds the Project will call for. The Bureau, however, does not consider this "mortgaging" of future year availabilities to be a problem. We are confident: 1) that this Project is addressing a very serious health problem in Africa and merits the commitment of substantial resources; and 2) that, in the event the need arises, we can re-allocate resources to take into account actual resource levels as they become known. In any event, within two years from the time of authorization the AA/AFR will review the progress made under this project to determine whether U.S. support should be continued and, if so, the extent to which any necessary adjustments to the project design and work plan will need to be undertaken prior to the obligation of FY 83 funds.

Findings

On the basis of the analyses contained in the Project Paper, the Director of AFR/RA has concluded that the Project is technically, socio-economically, and financially sound. The intent and requirements of Section 611(a) of the FAA have been met.

The Africa Bureau Environmental Officer concurs with the findings of the Director, AFR/RA that this Project meets the criteria for Categorical Exclusion from environmental review in accordance with Section 216.2(C)(2)(VIII) of the FAA.

This is a regional activity and, as such, human rights issues will be considered at the time bilateral agreements are made with individual countries.

Committee Action

The participants at an Africa Bureau Project Review Meeting (July 24, 1981) and the Bureau's Executive Committee for Project Review (July 29, 1981) have considered this Project and recommend its approval.

Conditions and Covenants

There are no conditions or covenants required of or with participating host countries prior to authorization of this Project. Individual project agreements with the various countries will specify disbursement, accounting, and control procedures to be effected when funds are to be obligated to the countries.

Congressional Apprisement

Congress was advised of AID's intent to implement this Project in the FY 1981 Congressional Presentation. No further notification is required.

Responsible Officers

The officer responsible for backstopping this Project in AID/W is Mr. Noel Marsh (AFR/RA). A.I.D. field posts (or embassies) will assign officers responsible for specific countries.

Recommendation: That you sign the attached Project Authorization and thereby approve a grant from the Health appropriation in the amount of \$46,239,000 to finance the Combatting Childhood Communicable Diseases Project (698-0421).

Drafted by: AFR/DR/CCWAP:RFBarnes:cel:9/15/81.

Clearances:

GC:JBolton JRB 9/25/81
 AAA/PPC/PDP:JERiksson Ranski 9-25-81

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

PROJECT AUTHORIZATION

Name of Entity: Africa Regional
Name of Project: Combatting Childhood Communicable Diseases
Number of Project: 698-0421

1. Pursuant to Section 104 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Combatting Childhood Communicable Diseases project (CCCD) (the "Project") involving planned obligations in an amount not to exceed \$47,000,000 in grant funds over an eight-year period from the date of authorization, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange and local currency costs for the Project. The total amount of \$47,000,000 authorized herein includes the previously authorized amount of \$761,000. This authorization document supersedes the prior authorization document and amendments thereto.

2. The purpose of the Project is to combat childhood communicable diseases in sub-Saharan Africa. The project will increase the ability of African Governments to control measles, polio, tuberculosis, diphtheria, pertussis, and tetanus by enhancing their capacities to develop and administer immunization programs; to provide effective treatment and control of diarrheal disease; and to control diseases of local importance, such as yellow fever, yaws, and possibly malaria in the future. The project will strengthen present national activities to develop effective planning, operations management, cold chain and other logistic support systems and health education programs.

The Project will consist of two interrelated sets of activities: regional support activities and country-specific activities. Regional support activities will include: (a) the development and implementation of training programs to upgrade the skills of key personnel involved in the participating countries' disease control efforts; and (b) technical assistance to individual countries to enable them to improve disease surveillance and evaluation systems, health education efforts, and research efforts. Country-specific activities will strengthen disease control capabilities of particular countries and will be directed at resolving particular health problems in those countries. Vaccines, will be supplied through the country-specific activities.

3. The agreements, which may be negotiated and executed by the officers to whom such authority is delegated in accordance with AID regulations and delegations of authorities shall be subject to the following terms, covenants and conditions, together with such other terms and conditions as AID may deem appropriate.

4. Source and Origin of Goods and Services

The source, origin and nationality of goods and services financed by AID under this Project will be determined and applied in sub-projects approved hereunder in accordance with the source/origin and nationality rules set forth in AID Handbook 1, Supplement B. These rules will be stated specifically in the authorization document for each sub-project.

5. Conditions and Covenants

There are no conditions or covenants required of or with participating host countries prior to authorization of this Project. Individual project agreements with the various countries will specify disbursement, accounting, and control procedures to be effected when funds are to be obligated to the countries.

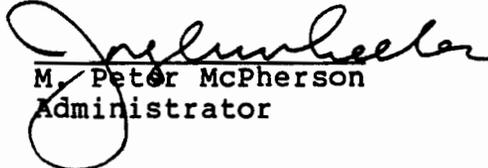
6. Waivers

Waiver authority with respect to sub-projects will be exercised in accordance with applicable delegations of authority.

7. Evaluation

Within two years from the date of authorization of this project, the Africa Bureau shall evaluate the progress of the project and the Assistant Administrator for the Africa Bureau shall determine in writing whether AID will continue to support the project and whether the project authorization should be amended prior to the obligation of funds for Fiscal Year 1983.

Date: Sept 28, 1981

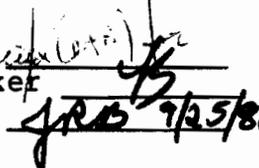

M. Peter McPherson
Administrator

Clearances:

AA/AFR:FRuddy

A-AA/PPC:LSmucker

GC:JBolton


JRB 9/25/81

THE DESIGN TEAM

Noel R. Marsh	Team Leader/AID, AFR/RA
Dr. Paul Zukin	Consultant/Physician-Health Planner
Mr. Andrew Agle	Health Operations Officer/CDC
Ms. Maureen Lewis	Health Economist/AID, PPC/PDPR

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I. SUMMARY AND RECOMMENDATIONS

1.1 Face Sheet

1.2 Recommendations

The following actions are recommended herein:

- A. Authorization in the amount of \$1,218,000 from FY 81 funds of assistance to the Combatting Childhood Communicable Diseases Project (CCCD).
- B. Approval of life-of-project funding subject to the availability of funds in the amount not to exceed \$47,000,000.
- C. A waiver to authorize purchase of non-American-made cold chain equipment (See Annex H).

1.3 Description of Project

This project will provide \$47,000,000 over an eight year period (1981-1988) as the U.S. contribution to a multidonor regional effort to combat childhood communicable diseases in sub-Sahara Africa. It will focus on increasing the Africans' ability to control:

- Six childhood communicable diseases ((measles, polio, tuberculosis, diphtheria, pertussis (whooping cough) and tetanus)) through Expanded Program for Immunization (EPI).
- Diseases of local importance such as yellow fever and yaws and possible malaria at some point in the future, and
- Provide simple treatment for the Control of Diarrhea Disease (CDD).

The concept of having a regional expanded immunization program for Africa has been under consideration by AID for the past three years, and a number of AID financed efforts assisted by the Center for Disease Control (CDC) in Atlanta have been launched. Early in 1980 the U.S. suggested the CCCD project as a possible CADA (Concerted Action for the Development of Africa) initiative. The policy committee of this newly formed group of donor nations (Belgium, Canada, Federal Republic of Germany, France UK and U.S.) meeting in Brussels in December 1980 approved the project in principle. The project design then proceeded in consultation with the other CADA members, WHO, UNICEF and the African countries who would potentially participate in the program.

The approach of the project is to:

- Establish a regional project to train, provide technical assistance and support to key elements of the individual country EPI and CDD activities.

- Build on what already exists in terms of individual country activities and integrate activities into primary health care systems whenever feasible.
- Strengthen present bilateral activities to develop effective planning, operations management, cold chain and other logistic support systems and health education programs.

The target area is ultimately all of sub-Saharan Africa. The target population is under one year olds and pregnant women (neonatal tetanus) for the Expanded Program for Immunization (EPI), and under five year olds for control of diarrhea disease (CDD). It is estimated that about five to ten percent of the total EPI target population is now being immunized. Adding the CCCD program to the on-going activities supported by WHO, UNICEF and others should bring the total Africanwide coverage up to 50 percent by the mid to late 1980s and close to 90 percent by the year 2000.

The bulk of AID funding (\$25 million) would go to finance the Regional Support part of the program designed to strengthen in-country disease control capability. The balance of AID's funds (\$19 million) and the bulk of the other CADA members' contributions would be used to support country programs to improve the delivery of these services to the target population.

AID inputs will consist of CDC personnel (Atlanta and African based) to help conduct training, develop data and evaluation systems and assist in field operations and epidemiological surveillance, funds to support country health education programs, operations research, and the procurement of vaccines, rehydration salts, cold chain and other delivery equipment.

1.4 Financial Summary

WHO has estimated that about \$500 million will be required to reach the target population over the next decade. The design team considers this order of magnitude to be accurate based on its own calculations, cost estimates and assumptions on inflation.

A 5% contingency and an allowance for 10% inflation compounded annually was used to develop the budget for the AID supported part of the project. Costs for fully immunizing a child and for treatment of diarrhea with rehydration salts were also inflated at the rate of 10% annually.

Each participating African country will provide the international transportation and continued salary support for their trainees. No direct host country contributions will be made to the Regional Support Project.

A minimum of 25% contribution to the country-specific activities by the host governments will be required. In actual fact these contributions are expected to exceed the minimum in most cases since host countries will be financing the majority of the local costs. For planning purposes it has been estimated that about two-thirds of the country-specific activity costs will be provided by the host countries and other donor organizations such as UNICEF.

Summary of U.S. Inputs (\$millions)

<u>Regional Support</u>	<u>U.S. 1st Year</u>	<u>U.S.LOP</u>
Technical Assistance		
PASA	2.7	11.9
Contract Services (Health ED.)		2.0
Training		7.9
<u>Country-Specific*</u>		
Immunization (EPI)		8.0
Diarrhea Control (CDD)		5.2
Inflation/Contingency	_____	<u>12.0</u>
Total	2.7	47.0

* Includes funds for data collection, disease surveillance and evaluation (\$1.4 million) and operations research (\$1.4 million).

1.5 Project Development and Implementation

This project was designed by AFR/RA with the assistance of Dr. Paul Zukin as the principal AID consultant. The present project paper represents a substantial redesign of an earlier draft prepared by a One America/CDC team in the summer of 1980. The project development process included the following steps:

- o A series of authorizing memoranda from AA/AFR to enable project funds to be expended on design and early implementing actions May 1979 through May 1981.
- o Consultation with each CADA member October 1980.
- o Concepts Paper presented to CADA Technical Group November 1980.
- o Meeting with WHO/AFRO director to discuss CCCD project and seek cooperation from WHO/AFRO; January 1981.
- o Draft Project Paper submitted to field missions for comments and discussions with host countries; May 1981.
- o Consultations with several African governments, selected USAID field missions, REDSOs and WHO/AFRO to discuss present design; June 1981 and solicit ideas and comments for inclusion in the final design.

1.6 Findings

On the basis of the analysis contained herein, the Director of AFR/RA concludes that the project is technically, economically and financially sound. The analysis reflected herein supports the conclusion that the project meets all applicable A.I.D. criteria, and will not have an adverse impact on the environment.

1.7 Issues

A number of issues were raised during the design process. The two principal concerns related to how the CCCD project should deal with: (1) family planning, nutrition and maternal child care, and (2) how the management of the project should be structured. The Project Paper addresses these issues and makes recommendations on how they should be dealt with in the project. If the Project Review Committee differs with these recommendations a separate issues paper suggesting alternatives will accompany the Project Paper when it goes to the ECPR.

1.8 Environmental Action Recommended

In accordance with Section 216.2(c) of AID Regulation 16 a "categorical exclusion" has been requested.

II. PROJECT DESCRIPTION

A. Background

Up to one-fourth of the children born each year in Africa are now dying before reaching the age of five years. Many of these children can be saved if they are immunized in time and receive simple forms of treatment for the basic and most common childhood diseases. This project is designed to save the lives of these children and contribute to their improved health status.

Unlike the eradication campaigns that worked so well for smallpox this program requires building permanent national organizations to immunize all under one year olds, to treat the under five year old population for diarrhea and to control other selected endemic diseases in children on a sustained basis. The goal though ambitious is attainable if sufficient resources can be mobilized, people trained and programs managed. Tackling the problem on a region-wide basis appears to be the best way to achieve this goal. This clearly calls for collaboration and coordination among the major donors to work with the individual countries and international organizations in an all-out effort that should probably span over twenty years.

CADA, a group of six donor nations banded together in early 1980 in an attempt to enhance the effectiveness of their development support to Africa, seemed to be a likely and appropriate mechanism to activate this program. After several exploratory meetings involving WHO and others the CADA policy group meeting in Brussels in December 1980 announced its willingness to consider the CCCD program as one of the major CADA initiatives. The U.S., as the lead donor, was given the charge to work with the Africans and other CADA members to design and coordinate a program that will build upon and expand on the existing Expanded Programme on Immunization (EPI) and diarrheal disease control (CDD) activities being undertaken at national and local levels. It is to be a total and massive effort involving the coordination of all the donors and ultimately all the countries of sub-Saharan Africa.

The draft design has been reviewed and discussed with the recipients and donors leading to the final design and the authorization of funds. The program will build on activities already supported by the individual CADA countries and other donors as well as the extensive work being done by WHO, UNICEF and by African countries themselves. This concerted action program is scheduled to begin in 1981. The design presented here covers the first eight years of this coordinated and combined effort. Much of the detail and focus is on the AID supported elements of the program, for this document also provides the justification for the Africa Bureau's request for funding this program.

The program concept has been discussed for some time and a number of actions have been taken in anticipation its implementation. WHO has done much of the pioneering work and both WHO/Geneva and WHO/AFRO have been active in sensitizing the ministries of health and government officials throughout the region regarding the actions and sacrifices that will be required to achieve the desired results.

AID began the preliminary design work for this program as early as 1979. It has also laid some of the groundwork for the future implementation through a series of small projects to help individual countries prepare to expand their immunization and other childhood disease control efforts. In 1979 and 1980 EPI specialists were sent to Burundi, Congo, Liberia, Rwanda, Somalia, Sudan and Tanzania to assess needs and to explore the interest of those governments in EPI and participating in a broader CCCD effort. Other teams went to Ghana, Ivory Coast, Mali and Togo to determine the need for and likelihood of controlling yaws.

These activities resulted in AID funding five short term projects, each providing approximately \$500,000 over two years to assist with EPI operations; in Congo, Ghana, Liberia, Rwanda and Somalia. AID through its bilateral and regional mechanisms is assisting or planning to assist the following countries in programs to combat childhood communicable diseases: Burundi, Congo, Ghana, Liberia, Mauritania, Rwanda, Somalia and Zaire.

Through the Strengthening Health Delivery Systems (SHDS) project, AID is funding EPI training and demonstration areas in Cameroon, The Gambia and the Ivory Coast. Three areas are included in each country, each area comprising approximately 200,000 persons. Training and demonstration cover the cold chain system including maintenance of equipment, logistics, scheduling, record keeping, etc. As the CCCD project becomes operational, it is anticipated that the training and demonstration areas described above will be incorporated into the CCCD project.

Much of the above discussed AID supported activity as well as the other donor efforts can be viewed as forerunners to the larger CCCD program whose aim it is to integrate smaller efforts into a major coordinated approach.

B. Target Diseases

The communicable/infectious diseases which are the focus of this project directly or indirectly contribute to an estimated 75-80% of infant and childhood morbidity and mortality. Many of these diseases can be largely prevented by immunization and other relatively low cost health measures.

1. Vaccine preventable diseases. Estimates are that less than 10% of children or pregnant women in sub-Sahara Africa are now being immunized. As a result, hundreds of thousands of preventable deaths and a similar number of needlessly crippled or mentally retarded children occur each year. To alleviate this situation, which is representative of many less

developed areas, the World Health Assembly established the Expanded Programme on Immunization (EPI). Its goal is to reduce morbidity and mortality from diphtheria, pertussis (whooping cough), tetanus, measles, poliomyelitis, and tuberculosis by making immunization available to every child in the world by 1990. Other EPI goals are to promote countries self-reliance in the delivery of immunization services and to establish regional self-reliance in vaccine quality control and production. The immunization aspect of the CCCD project follows the WHO EPI guidelines and is discussed below under target population.

2. Diarrheal Disease About one of every 10 children born in developing countries dies of diarrhea before reaching the age of 5 years. In sub-Saharan Africa diarrhea causes millions of deaths each year and fills more than one-third of children's beds in hospitals. It causes malnutrition because children with diarrhea are often starved or have diminished appetites, and the food lost in the stools is not adequately replaced. Malnutrition also makes children more susceptible to diarrhea and other communicable diseases, and this creates a vicious killing cycle.

Diarrhea can be prevented by breastfeeding infants and weaning young children with nutritious food and potable fluids. Most diarrheas can be treated, preventing death and associated malnutrition, by giving the sick child an oral rehydration solution made from clean water and the right amount of salts and sugar and feeding the child as soon as possible.

Three strategies have been identified to control diarrheal diseases in infants and small children.

a. Management of acute diarrheas by preventing and/or treating dehydration. Cases of acute diarrhea from any cause and in all age groups can be treated with a single oral rehydration fluid (ORS) containing sodium chloride, sodium bicarbonate, potassium chloride and glucose. ^{1/} Oral administration of this solution can replace fluids and maintain hydration in most cases of even severe diarrhea. In the absence of the preferred salt/sugar mixture, potable water containing appropriate amounts of table salt and sugar have been used with some success.

Oral rehydration therapy (ORT) is usually given by mothers in the home. It is also used in health centers and hospitals and reduces the need for costly intravenous fluids.

Several studies have demonstrated that when information on proper dietary practices (e.g., uninterrupted breast feedings, feeding of usual foods during diarrhea, as tolerated, and feeding of increased amounts of food in convalescence) is given along with oral rehydration, there is a significant weight gain over

^{1/} The formula of ORS is NaCl-3.5g., NaHCO₃-2.5g., KCl-1.5b., glucose 20g. in one liter of drinking water. The salts and glucose are generally delivered in the form of a prepackaged mixture.

time. This contributes to interruption of the diarrhea-malnutrition cycle.

Antibiotics and other medication have proved to be of little value in the treatment of diarrhea, except for severe cholera and shigella and their use is not advised since it diverts health workers from the more important tasks of rehydration and dietary management.

b. Maternal and child care practices. Diarrhea related morbidity and mortality can be reduced by:

Breast feeding, uninterrupted during the first two years of life.

Proper weaning practices, starting from the fourth to sixth month, locally available weaning foods should be added to breast milk.

Care for pregnant and lactating mothers, including adequate food.

Good personal and food hygiene.

c. Improvement of water supply, sanitation and food hygiene

While not a part of the CCCD program are important elements in controlling diarrheal disease. Activities directed at achieving the necessary improvements will be integrated with the CCCD program wherever possible.

The CDD aspect of the overall project will mainly emphasize regional activities, and will address the problem of supply of oral rehydration salts. Assisting countries to become self sufficient in producing oral rehydration salts will be a priority effort. Emphasis will also be placed on incorporating diarrheal disease control into primary health care.

3. Other Important Childhood Communicable Diseases. Control of malaria, by far the greatest single cause of childhood morbidity and mortality in Africa is being approached by AID and other donor through other programs.

A major thrust of these programs is the presumptive treatment of fevers with chloroquine. The effectiveness of this approach will differ from country to country and even between regions within a single country. If, however, it is determined to be an appropriate and affordable means of treatment within the existing or expanding community based system it could also be closely coordinated with or integrated into CCCD since one strategy of CCCD will utilize village health workers for dispensing materials for oral rehydration. These same workers where available could also dispense anti-malarial drugs. At the inception of the CCCD project, malaria

control will not be included. As the project progresses, however, the feasibility of adding presumptive treatment of fevers will be assessed. Should the hoped, for vaccine to prevent malaria become available and cost effective it is anticipated that it will be incorporated into the CCCD program.

In addition to the above mentioned childhood communicable diseases, other illnesses such as yaws are of increasing concern in certain African countries. Yaws is a chronic, nonvenereal spirochetal infection which is predominantly a disease of children under 15 years, transmitted by discharges from skin lesions via body contact, clothing or insects. During the past decade, there has been a marked resurgence of this disease in Ghana, Togo and the Ivory Coast. Yaws can be effectively controlled by prompt detection and treatment with antibiotics such as penicillin. Such a program can be integrated with developing PHC systems.

AID is presently assisting yaws and yellow fever control in Ghana. This activity will become incorporated into CCCD when that project becomes operational.

C. Target Population

The immunization aspect of the CCCD program aims to vaccinate all children during their first year of life: BCG at birth, diphtheria, pertussis and tetanus (DPT) and polio, at the third, fourth and fifth months of age and measles at the ninth month of age. This is the recommended schedule established by WHO.

Annexes A and B provide demographic data concerning sub-Saharan Africa. In mid 1980, the total population of 47 countries making up the target region was estimated at 348.1 million.

This includes an estimated 13.4 million infants under one year of age and 47.9 million between ages 1 to 4 years for a total 61.3 million children under five years. ^{1,2/} This latter group is the target of the diarrheal disease control activities since they constitute the greatest group at risk of death.

It is recognized that many children over one year of age have not been immunized and are at risk. Undoubtedly many countries will elect to immunize these children in addition to those in the first year of life. The purpose of EPI and CCCD in focusing on those under age one year is to develop an institutionalized system with the continuous capability to

^{1/}1980, "World Population Data Sheet", Population Reference Bureau, Washington, D. C.

^{2/}"Illustrative Functional Projections 1975-2000", Community and Family Study Center, The University of Chicago, 1979.

immunize children at the optimum ages to achieve disease control. After the system has been operating for three or more years, in those areas where coverage has been achieved, the great majority of children will be protected from the six vaccine preventable diseases.

It is also intended to immunize pregnant women against neonatal tetanus in order to prevent tetanus of the new born. All pregnant women should be immunized against tetanus as part of prenatal care. Mothers with subsequent pregnancies who are known to have received tetanus toxoid with prior pregnancies need a single booster every three years. However, since tetanus toxoid has rare side effects and medical records in many African countries are often incomplete, it is safer to immunize all pregnant women. Not adjusting for multiple births, one tetanus toxoid injection should be planned for each pregnancy.^{1/} As medical records and health service coverage improve, it is likely that re-immunization of multiparous women can be reduced.

The target population for control of other communicable diseases affecting children will vary with the specific disease. For example, for yaws which is primarily endemic in Ghana, Ivory Coast, and Togo, children fifteen years and under are chiefly at risk. In 1980, the total population of these three countries was estimated at 22.2 million of which almost 50 percent are under fifteen. The aim of the yaws control program is to screen 80% of those under fifteen and to treat cases found with and contacts penicillin.

Annex B details the projected population of infants under one year and children 1 to 4 years of age in 3 sub-Saharan African countries. These countries contain over 98 percent of the total population of sub-Saharan Africa excluding the Republic of South Africa. Population estimates are given for 1980, 1985, 1990 and 2000.

The present population growth of children under five in sub-Saharan Africa is somewhat over 2.5 percent per year.^{2/} This rate of growth is expected during the five year period 1981-1986, of the CCCD program. Following that, according to estimates of the University of Chicago, mortality and population growth rates are expected to decrease moderately. These trends are taken into account in the population projections used.^{3/}

^{1/} This figure assumes that some women will be known to have been recently immunized and need no injections some will only need a single booster and others will require full immunization with two doses.

^{2/} Population Reference Bureau, Washington, D. C.

^{3/} Others may disagree with this optimistic projection and forecast no drop in population growth rate for twenty years or longer. The population projections used correspond to the U.N. low variant projection. We have used this projection since it corresponds with the Population Reference Bureau figures which were used in tables comparing health indicators across sub-Saharan Africa. If the U.N. high variant projections had been used, by 1988 the discrepancy between high and low variant projections is less than 5%.

The EPI project calls for incrementally increasing the number of infants (and mothers) fully immunized, i.e., coverage, by 10 percent each year. Assuming that a 1981 population of infants under one year of 13.7 million ^{1/} is increased by 2 1/2 percent per year for the first five years and 2 percent for the subsequent second five years corresponding to the population projections in Annex B, the following table shows the number of children to be immunized each year to achieve 100% coverage in ten years.

TABLE I Number of Children 0 to 1 Years to be Immunized
Based on an Incremental Increase in Coverage by
10% per Year

<u>YEAR</u>	<u>NUMBER OF CHILDREN</u>	<u>COVERAGE</u>	<u>NUMBER OF CHILDREN TO BE IMMUNIZED</u>
1981	13,700	10%	1,370
1982	14,043	20%	2,809
1983	14,394	30%	4,318
1984	14,750	40%	5,900
1985	15,122	50%	7,561
1986	15,422	60%	9,253
1987	15,733	70%	11,103
1988	16,048	80%	12,838
1989	16,369	90%	14,732
1990	16,696	100%	16,696

The above population figures are rough estimates and merely give an indication of the order of magnitude of the task ahead. Achievement of full coverage by 1990 seems highly unlikely.

A basic question concerns the present status of EPI activities in sub-Saharan Africa. The WHO EPI medium term program for the period 1978-1983 calls for the implementation of EPI activities in 25 countries so as to provide at least 60% coverage of the target population in these countries in Africa (unnamed) by the end of 1983.

At the 1980 EPI Global Advisory Group meeting, the representative for WHO/AFRO reported that as of the end of September, 1980:

- * The program is being implemented in 30 countries (Angola, Botswana, Cameroon, Cape Verde, Congo, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Nigeria, Rwanda, Sao Tome and Principe, Sierra Leone, Swaziland, Tanzania, Uganda, Upper Volta, Zambia, Zaire);

^{1/} This figure assumes that some women will be known to have been recently immunized and need no injection; some will only need a single booster and others will require full immunization with two doses.

- * in five countries the program has been planned but not yet implemented, through lack of financial resources or for other reasons (Burundi, Chad, Equatorial Guinea, Senegal, Togo);
- * in the remaining 12 countries the program is being planned.

While the WHO target for the number of African countries with EPI programs has been more than reached, the targets for immunization coverage are not being achieved on balance (although some countries, such as Gambia, are ahead of schedule). The fact that EPI activities have been established does not necessarily mean a rapid increase in the numbers actually provided with immunizations. As of Spring 1981, we estimate sub-Sahara Africa EPI coverage as not over ten percent, far below the stated WHO goal.

Given resource limitations and lack of adequate health care infrastructure on which to build and incorporate an institutionalized communicable disease control system, it is the judgment of the CCCD project design team that the WHO targets should be revised. A goal of 50% coverage for EPI is realistic by the end of the project, i.e., 1988, and close to full coverage may be achieved by the end of the 20th century. These are the goals for this project with respect to EPI. Table II shows the number of children 0 to one year of age in sub-Sahara Africa to be immunized each year, based on an incremental increase in coverage by five percent per year. Parenthetically as used in this project paper the term "coverage" refers to the percent of children fully immunized.

Target populations for the CCCD program have been defined throughout this paper as being the under one year olds and pregnant women in the case of immunization, and those under five years for the CDD aspect of the program. Tables and calculations of targets have been based on the total population of 47 countries in sub-Sahara Africa. For immunizations this gives a total possible target population of 13.7 million children under the age of one year in 1981.

It should be noted, however, that about one-third of this population is, in fact, outside the potential target group that are likely to be served by the AID/CADA supported country-specific activities. The reason being that there is a large block of the regions' target age children who reside in countries that already have access to sufficient resources to finance EPI and CDD activities either by virtue of their favorable economic circumstances, such as in the case of Nigeria and Gabon, or because their needs are already being met by other donors as in the case of Kenya and Tanzania with their continued relationship with DANIDA. Thus, when trying to estimate the percentage of coverage that can be obtained from the introduction of AID resources it would be reasonable to reduce the regional target population base by one-third, thus increasing the percentage covered. While noting this as a fact that should be taken into account when relating inputs to actual overall regional achievements we have not tried to adjust the tables or overall coverage projections cited in the text to reflect this refinement.

The contribution of the country-specific component of the AID/CCCD project to coverage is discussed in the section on project outputs. As the CCCD project becomes operational and as additional information is forthcoming from various sources, and cooperation and collaboration increases, coordinated targets and implementation plans for each country can be established with some confidence. Until this is done, each donor and supporting organization will continue to provide assistance on an ad hoc basis.

TABLE II

- 9 -

Number of Children 0 to 1 Year of Age to be Immunized based on an incremental increase in coverage by 5% per year ^{1/}

(000)

<u>YEAR</u>	<u>NUMBER OF CHILDREN</u>	<u>COVERAGE</u>	<u>NO. OF CHILDREN TO BE IMMUNIZED - 2/3 from CADA</u>
1981	13,700	10%	1,370
1982	14,043	15%	2,106
1983	14,394	20%	2,879
1984	14,750	25%	3,688
1985	15,122	30%	4,537
1986	15,422	35%	5,398
1987	15,733	40%	6,293
1988	16,048	45%	7,222
1989	16,369	50%	8,024
1990	16,696	55%	9,183
1991	17,030	60%	10,218
1992	17,371	65%	11,291
1993	17,718	70%	12,403
1994	18,072	75%	13,554
1995	18,434	80%	14,747
1996	18,802	85%	15,981
1997	19,178	90%	17,260
1998	19,562	95%	18,584
1999	19,953	100%	19,953

^{1/}

Based on same population growth assumption as described for Table I.

Number of Children Under Age Five Years in Selected Sub-Sahara African Countries

TABLE III

COUNTRIES	Estimated No. of Children Under Age One Year (000)				Estimated No. of Children 1 - 4 Years (000)			
	1980	1985	1990	2000	1980	1985	1990	2000
ANGOLA	309	351	386	396	1062	1237	1407	1579
BENIN	143	169	198	216	504	578	680	815
BOTSWANA	33	39	42	50	116	136	154	190
BURUNDI	167	191	212	236	588	665	742	864
CAMEROON	249	300	329	396	885	1062	1201	1492
CAPE VERDE	9	9	9	9	31	32	33	32
CENTRAL AFRICA REPUBLIC	75	85	96	115	273	314	348	421
CHAD	151	166	176	181	532	587	635	684
COMOROS	15	15	18	24	57	60	69	90
CONGO	53	56	66	83	202	226	252	314
DJIBOUTI	N.A.							
EQUATORIAL GUINEA	11	12	13	14	37	42	47	54
ETHIOPIA	1300	1422	1584	1806	4505	5095	5686	6686
GABON	N.A.							
GAMBIA	20	22	24	26	73	79	87	97
GHANA	504	561	572	567	1674	1914	2107	2251
GUINEA	243	276	307	345	850	968	1123	1413
GUINEA - BISSAU	19	22	23	25	71	78	85	95
IVORY COAST	303	345	410	507	1165	1294	1464	1838
KENYA	717	768	806	993	2485	2836	3101	3701
LESOTHO	47	43	37	40	167	170	176	157
LIBERIA	65	67	72	90	238	261	282	341
MADAGASCAR	437	459	494	596	1517	1683	1849	2208
MALAWI	248	283	311	355	830	874	1108	1316
MALI	270	299	329	375	929	1053	1176	1358
MAURITANIA	49	53	62	71	181	202	230	274
MAURITIUS	21	22	23	22	74	76	83	85
MOZAMBIQUE	399	421	428	458	1396	1541	1632	1769
NIGER	239	281	320	370	810	956	1111	1361
NIGERIA	2985	3309	3611	4069	10423	11786	13133	15294
REUNION	14	14	14	14	49	48	49	53
RWANDA	207	247	288	323	726	849	995	1206
SAO TOME & PRINCIPE	N.A.							
SENEGAL	231	269	304	335	798	924	1063	1250
SEYCHELLES	N.A.							
SIERRA LEONE	128	144	153	176	439	501	559	654
SOMALIA	181	207	211	227	579	687	767	847
SUDAN	708	805	910	1105	2564	2938	3335	4136
SWAZILAND	23	26	28	29	81	94	103	107
TANZANIA	765	829	905	1090	2689	3031	3364	4052
TOGO	110	128	148	167	381	444	517	626
UGANDA	527	564	601	707	1870	2092	2284	2679
UPPER VOLTA	223	266	304	326	823	930	1057	1227
ZAIRE	1072	1150	1200	1289	3808	4205	4507	4920
ZAMBIA	265	303	342	418	916	1074	1234	1541
ZIMBABWE	355	406	433	500	1163	1398	1505	1911
TOTAL	13683	15404	16799	19141	48562	55020	61340	72009

1/ Source, "Illustrative Functional Projections 1975-2000", Community and Family Study Center, The University of Chicago, 1979. Base data was primarily obtained from the World Bank and the Population Reference Bureau. In developing projects, a cohort women aged 15-49 was taken from each country and age specific fertility rates were applied. This gives the number of births in a given year. Next, survival ratios from model life tables (Coale and Demeng) were applied to the births to derive the figures for surviving births.

D. Impact of CCCD on Fertility, Population Growth and Age Distribution:

If the project is successful it will reduce child mortality and is likely to have a dramatic effect on increasing population growth, at least initially. The hoped-for scenario is that as parents are convinced that more of their children will survive they will become more inclined to limit the size of their families. Before this occurs experience shows that fertility rates will go up somewhat, and the rate of population growth will increase. Estimates vary over the length of time it will take in the current African environment before the trend line begins to dip downward, but there is evidence that the phenomena may occur more rapidly than previously thought, and that effects on the economic growth rates will not be as drastic in the short run as once feared. Furthermore, it is generally held that mortality reduction is a precondition for fertility decline. ^{1/}

If this hypothesis is correct much of the social and economic pressure for large families will recede, and the long run effect on population growth will be positive. The validity of this thesis, however, rests heavily on the assumption that programs such as the one being proposed can demonstrate that immunization and diarrhea control will be able to get the majority of the children who are vaccinated or treated through their critical early years. It also assumes that other development activities are moving forward to increase food production, nutrition, maternal child health and introduce family planning practices to avoid the situation of having replacement mortality occurring once the children are spared and protected from the target diseases being combatted under this program.

During the design of this project the question was frequently raised concerning the role or even responsibility of the CCCD program with respect to the issue of population growth. Although there was a wide range of views expressed one point of agreement articulated by the Africans and the donors alike was that whatever is done must be on a voluntary basis. The only acceptable means of dealing with this subject is to create a situation where family planning assistance and services are available to those who desire them. There was unanimity on the point that a vigorous family planning program, while desirable, should not be posed as a precondition for assistance under the CCCD program. Beyond this consensus however there were a variety of views on how the program should deal with the issue. Proponents for including a significant family planning element in the project argued that the CCCD mechanism offered a unique opportunity to reach a large number of people with relatively little additional costs. Those arguing against inclusion felt that these interventions would best be handled through collateral actions, and that including these activities within the CCCD program would dilute the main thrusts of the program. Furthermore they argued that in many instances, particularly with respect to the EPI aspect, asking workers to perform family planning functions would be inappropriate and even counter productive.

^{1/} See "The Consequences of Accelerated Mortality Declines for Future Population Growth and Economic Progress in Developing Countries" - A Preliminary Exploration, Prepared by S.K. Brandel & D.R.Gwatkin - AID/OTR 147-79-56.

The design team in making its recommendations leaned towards the latter position, but did identify three areas where CCCD could positively address the population issue. These are now included in the program in the following way:

o Training: Training programs will include information on the relationship of immunization with maternal child health and nutrition as it relates to birth intervals and the effect this has in a child's ability to combat the effects of communicable disease.

o Impact Assessments: Funds will be available at the beginning of new bilateral programs or the expansion of existing programs into a new area to conduct sample surveys to get baseline data against which change can be measured. As the activities progress additional funding will be made available to produce short and concise reports on the impact of the program on population and what this might imply for the future. These reports would be designed for use by ministries of planning and presented in a manner to catch the attention of the countries' decision makers.

o Health Education: This component of the program was felt to lend itself well to the inclusion of maternal/child health, nutrition and family planning information that is closely related to other information and activities that will be used to promote a better understanding of what can be expected from the CCCD program and elicit and stimulate community participation and utilization of CCCD services.

o Referral Mechanism: In the process of implementing this project, it is anticipated that a number of related health issues will arise, particularly in the areas of family planning, nutrition and clean water. An information and referral system will be built into the CCCD program. This will help people concerned with program-related health and other issues become aware of projects such as the planned regional Population Planning Development Project (698-0437) and AID supported organizations such as WASH dealing with potable water, which might be able to provide assistance in health and family planning related areas. As the program develops, it is hoped that similar information on CADA supported programs will also be added to this referral and information systems which would be made available through the information dissemination activities of the regional support project.

In addition to these four direct links a strong case is made for the need for collateral action by AID and others to continue and expand support for programs that address specific aspects of the population and food problems. The launching of a major CCCD effort in Africa underscores the urgency of such actions which are considered essential if the CCCD program is, in fact, going to have any real meaning in terms of overall socioeconomic development.

Looking at the situation from another perspective, programs such as CCCD can have the effect of increasing the awareness of what is going on and help create a more focused pressure to induce increased development in the central areas of food production and nutrition. The subject of collateral actions is discussed more fully in the Economic Analysis contained in Annex C.

E. Purpose and Strategy

There are two aspects of the program purpose. The first is to provide a regional mechanism to strengthen the African health organizations as they prepare themselves to undertake CCCD and the second is to assist them with implementing delivery of disease control services themselves. The strategy calls for a two-pronged approach: (1) the regional support project - that take advantage of the economies of scale to develop generalized solutions for the most commonly and frequently encountered program-related problems, and (2) the country-specific activities that adapts and focuses on delivering services to the target populations.

In both aspects of the program there are four major project components;

- a. Training
- b. Data systems for Disease Surveillance, Program Management and Evaluation
- c. Health Education and Promotion, and
- d. Operations Research

In addition the country-specific activities will include commodities.

The regional support project encompasses all four components and applies them to solving management, logistics and operations problems the four common components. This will usually translate into conducting training courses for senior and mid-level management personnel, providing short term experts and other support to strengthen the national disease surveillance and evaluation capability and health education and promotional programs, and finally responding to requests to solve specific operational problems encountered during project implementation. The country-specific activities are expected to take place in essentially all countries, most of which will be assisted by donor support bilateral agreements will be entered into between countries and donors on terms which are mutually acceptable. The training will be at the national and local level and will reach further down into the ranks of the operating personnel.

An additional dimension of the country-specific activities will be the provision of direct technical assistance in the form of operational advisors. In the case of the AID/CDC supported activities in this category these advisors will spend a large portion of their time (up to 60%) working with the national implementing authorities to support them in their efforts to provide disease control services to the target population. The balance of the time of these operational advisors will be devoted to conducting training programs. This will have a double advantage of giving a practical bias to the training and lessening the dependence of the staff of the national operating programs on the expatriate advisors. The manner in which the other CADA members or other donors such as DANIDA elect to provide their assistance may differ, but the general pattern will probably be similar. In all cases countries will have the option of drawing on the regional support project for training and other types of support that it is equipped to provide.

Beneficiaries

Potentially two thirds of the more than **sixty** million children under the age of five years in sub-Saharan Africa are ultimate beneficiaries of the first eight years' CCCD activities.^{1/} By the end of this period it is projected that at least fifty percent of the EPI target.

^{1/} This figure is based on an estimated 13,700,000 births in 1980, less projected annual attrition due to childhood mortality rates (see Annex B), and takes into account the targets for disease control activities.

population (children under one year) will be fully immunized over half of the pregnant women will have been immunized against tetanus; eighty percent of the yaws endemic target population (generally children below fifteen years) will have been screened and/or treated; and over fifty percent of children under five years, who have had an episode of moderate or severe diarrhea, will have received oral rehydration therapy (ORT). Until operational areas are defined, however, and the exact target population quantified, it is not possible to estimate the number of these ultimate beneficiaries with greater accuracy.

The number of more direct beneficiaries of CCCD inputs, ministries of health and health personnel, can be estimated more easily. During FY 81-85, insitutional capabilities for program planning, data collection, program evaluation, research, and health education and promotion will be enhanced in at least 4,400 senior and mid-level health staff and training and staff development for up to an estimated 15,000 lower level health workers.

F. Evaluation

Three categories of evaluation are included in this project. First is the evaluation component of disease control programs per se. Second is the evaluation of the AID CCCD project. This is covered in a separate section of the Project Paper. The third level of evaluation is designed to assess the effectiveness of the program and identify some of the probable social and economic impact.

Impact Assessment: If the program targets are met or even approached the social and economic impact will be tremendous. Funds will be allocated within the project to identify and define some of these impacts and discuss their social and investment implications. It is neither intended nor within the financial means of the program to conduct in-depth research. These studies will analyze data from routine sources or sample surveys, estimate the likely effect on population growth and composition, and draw attention to some of the future investment implications and social and economic planning decisions that will need to be addressed. Their purpose will be conscious raising for country officials and donors rather than problem solving.

This task was included as part of the regional support project because it was felt that epidemiologists, operations officers and others budgeted for in the regional support project would have the most immediate access to the data and would be in the best position to schedule and plan the studies to identify trends and yield significant information on a timely basis. These studies will be designed with country collaboration and be conducted under contracts with U.S., other donor or African institutions or individual experts. They will be designed to obtain quick information. They should be relatively inexpensive and will be scheduled at various points during the life of the program.

G. Outputs

Each of the four major project components will have its own outputs some of which lend themselves more than others to quantification. The outputs of the regional support project are presented in considerable detail since their nature and content is well known and their dimensions more easily determined. The nature of the outputs desired for the country-specific activities are also reasonably well known, but their numbers are more difficult to estimate since the exact number of country-specific activities to be undertaken by the program (AID and others) during the first eight years is not at this point known. Each activity will need to be negotiated between the recipients and donors. This will be done periodically throughout the implementation of the total program. To overcome the problems of quantification, this aspect of the program is described illustratively and a model is costed out on the basis of experiences gained elsewhere in Africa and the Third World. An attempt has been made to differentiate between the urban and less accessible rural target populations, and allowances have been made for these differences in designing and estimating the needs for this part of the program.

1. Training. Training was considered by WHO as well as all of the African regional health organizations and ministries of health from whom the project design team obtained input, as critical to improving the ability of sub-Saharan African countries to respond to health needs at all levels. A serious lack of African health workers with sufficient training in health planning, program management and evaluation exists, particularly in such technical and program areas as EPI and CDD. Appropriate training courses have been or are being developed by WHO and CDC.

The CCCD project will continue WHO's emphasis on developing and conducting courses as priority elements of disease control programs. During 1981-1985, CCCD will sponsor both regional and country-specific training activities and will emphasize staff development and the training of trainers for lower level health workers (see Annex B for training schedule).^{1/}

(a) Management Training:

Forty two, two week regional training courses and seventy incountry training courses will be conducted on the control of childhood communicable diseases for approximately 4,800 senior and mid-level sub-Saharan Africa health workers. In addition, over 15,000 staff will be trained at the services delivery level.

^{1/} These courses have been developed by CDC in consultation with WHO and are available from both organizations. The training schedule was worked out in collaboration with senior WHO EPI and CDD officials in Geneva in June, 1981.

EPI Management I (Senior Level)

First offered in 1977, this two week course teaches skills in program planning, management and evaluation to national level communicable disease control managers. Five sequenced modules are included:

- determining extent of disease problems
- determining program priorities
- setting objectives and determining strategies including the costing of options
- evaluation
- work systems

The course, with an average of 40 trainees, is presented on a regional or sub-regional basis, with several countries sending senior level personnel as participants. The curriculum is available in English, Spanish and French. Through March, 1980, the course has been conducted by WHO/CDC four times in Africa (in Algeria, Congo, Ivory Coast and Nigeria) and over 150 participants have been trained. The plan is to give this course once in English and once in French, each in 1982, 1983, and 1984 and in 1986 and 1988. Once the CCCD project is operational, WHO will look to the project to provide all senior level EPI training in sub-Shara Africa.

Over the life of the project there will be 400 persons trained in EPI Management I.

CDD Management I (Senior Level)

The first diarrheal disease control management course for forty national CDD program managers was recently given in Bangkok by WHO with the assistance of CDC.

The course was organized into seven modules as follows:

- Priorities
- Objectives and targets
- Delivery systems
- Sub-targets
- Logistics
- Evaluation
- Problem solving

The methodology used in the course is similar to that employed in the EPI courses on management and supervision.

During 1982, 1983, 1984, 1986 and 1988, one English and one French course, as detailed above, will be given, each targeted to have forty participants.

During the eight year project, 400 trainees will participate in 14 CDD Management I courses.

EPI Management II (Mid-Level)

In 1980, 10 mid-level EPI courses were given in sub-Saharan Africa, four by CDC (three through SHDS in Cameroon, the Gambia and Ivory Coast, and one bilateral in Zaire) five by WHO, and one by DANIDA.

The mid-level course contains eight modules which may be presented in any order. These are:

- cold chain
- supervision
- training
- conducting vaccination sessions
- community participation
- coverage evaluation
- allocation of resources
- disease surveillance

During years 1982, 1983 and 1984, one course each in English and French will be given. In the next four years, one English and one French course will be given every two years. These courses, to be presented on a regular basis are primarily for the purpose of training state, division or provincial level EPI supervisors to provide them with the skills necessary to manage EPI programs and to train district level supervisors in their own countries.

Courses each in English and French will be given annually at the country level to train district supervisors, providing them with the skills to train and develop subordinate staff at the service delivery level. Five courses in each language will be given in years 1982, and 1983 and four courses in each language in years 1984 through 1988.

The regional courses will be presented over a two-week period. Country level courses will be conducted during three one-week sessions spread over the year in order to provide ample time for practical application of the material presented in the eight subject-specific modules. Staff at the service delivery level will be trained one module at a time in conjunction with monthly staff meetings. Such training can be accomplished allowing 1-2 days per module. In total, 2,800 health workers will be trained in 70 EPI mid-level management courses.

CDD Management II (Mid-Level)

To date no mid-level CDD management courses have been given. WHO and CDC have yet to develop the course curriculum but will begin the design of the course by spring, 1981. The course will be field tested in fall, 1982 and the first offering will be in FY 1983, the third project

year, when one regional course each will be given in English and French. In the subsequent six project years, two courses each will be given in English and French. The split between regional and country level courses will be one regional and two country level, in each language, per year. All told, there will be 1280 health workers trained in 32 CDD mid-level management courses.

The possibility of combining EPI and CDD management training is under consideration. This is discussed in the Technical Feasibility section of the Project Paper.

(b) Cold Chain Technical and Managerial

The Cold Chain Unit of EPI WHO/Geneva has developed a course on vaccine handling and distribution which is generally presented in one day in conjunction with either Management I or II courses. An expanded version (four/five days) is also available for training cold chain specialists. This will be offered on an ad hoc basis, on request. In addition, twenty-four two week sub-regional courses will be conducted in French and English, four each in years 1982 through 1986 and two each in 1987 and 1988, for approximately 1,000 field level health workers on cold chain repair and maintenance in specific countries or groups of countries.

(c) Seminars (Workshops):

Seminars/workshops will be organized in French and English as required to deal with other selected childhood communicable diseases (such as yaws, yellow fever, malaria, etc.) specific to or prevalent in a given country or sub-region.

Training for other activities will be arranged as needed. This will include developing educational materials and curricula for use in training primary care teams at district and lower levels.

Training in West and Central Africa will be coordinated with the Strengthening Health Delivery Systems (SHDS) project and other appropriate organizations. National training will be at the request of the specific African country and in cooperation with other donors providing assistance. Wherever possible, the project will incorporate EPI, CDD and other CCCD-related training into existing institutional curricula.

The number of these seminars/workshops will reflect demand and ability of project staff to provide assistance. An estimate is for a total of ten during the life of the project.

The training component is the largest and perhaps the most crucial element in the entire program. To successfully implement this component will require the assignment of responsibility at several different levels. The content and teaching methodology will be based on the WHO/CDC model and experience. Careful attention will be paid to getting feedback from the evaluations and results from operations research to introduce changes that will make the training more relevant and effective. The responsibility for making sure this occurs will rest with CDC, who will serve as the implementing agent for the project.

Of equal importance to the effectiveness of the training is the selection of participants, scheduling and conducting of the instructions itself and continued communication and follow-up with those who pass through the courses. It is hoped that WHO/AFRO, who has had a great deal of experience in this area, will accept the primary responsibility for this aspect of the program. The stationing of a resident CCCD trainer/coordinator in Brazzaville is designed to ease the staff burden of this function on WHO/AFRO and facilitate communication and cooperation between the CADA members, WHO/AFRO headquarters and its member states.

To assure a practical bias and operational orientation to the courses, instructors will be selected on the basis of their field experience as well as their technical knowledge. While much of the expertise will be drawn from CDC Atlanta and other CADA countries willing to make their experts available, a large part of the training will be carried out by the three African based CDC epidemiologists and the operations officers engaged in ongoing country-specific activities. In the latter case we have estimated that 40% of their time will be spent on the regional aspects of the program. Each case will need to be negotiated and the division of time agreed upon at the time the individual country agreements are drawn up. CDC will be responsible for mobilizing and providing the teaching manpower and making the necessary arrangements to assure their timely availability.

2. Data Systems for Disease Surveillance, Program Management and Evaluation

The USAID project will add to WHO sponsored initiatives to strengthen national capabilities to collect relevant health data for disease surveillance and for the planning, conducting and evaluating of communicable disease programs and will assist participating countries to improve their surveillance and evaluation systems, as follows:

• Surveillance systems to be developed or strengthened will be directed at major causes of morbidity and mortality with particular reference to the target diseases and target populations included in the CCCD program. Disease surveillance will be related to persons, place, time, health care interventions such as immunizations and oral rehydration therapy and to other variables. The project will stimulate ministries of health to report surveillance data to WHO/AFRO in a standardized format and on a regular basis.

• Management information systems to be developed or strengthened will include:

- Establishing baseline data needs;
- Systems for collecting, processing, analyzing and using data. Transmittal of information will be limited to that useful for planning, monitoring, supervision and evaluation;
- Needs assessment and problem identification and establishing action programs with quantitative objectives;
- Identification of indicators and proxies for monitoring and evaluating program performance.

• Evaluation of program performance and impact to include:

- Performance of program components such as the cold chain, logistics, etc., and overall performance in terms of reduction of morbidity and mortality for the target diseases;
- Impact of the CCCD program on specific demographic and socio-economic parameters.

The project will also provide short term epidemiological assistance in generating and revising national EPI and CDD plans. The CDC staff who will implement the project at the regional level have participated in demonstration, planning, and training exercises for EPI in Burundi, Cameroon, Central African Republic, Congo, Gabon, The Gambia, Ghana, Ivory Coast, Rwanda, Sudan, Somalia and Zaire.

Diarrheal control programs are primarily in the planning stages and the bulk of activities early on will involve short-term data collection and program planning. Development of CCCD activities to fight diseases other than EPI related and diarrhea will depend upon request from African countries during 1981-1988.

To carry out this project component, CDC will post three epidemiologists in Africa, geographically dispersed, for example, one each at OCEAC*, OCCGE* and in South East Africa. These staff will split their time between regional communicable disease control organizations; individual country counterpart training and disease control activities; outbreak investigations; research; and regional training. In addition, two Atlanta based epidemiologists will back up the field personnel.

Activities in this component will be carried out at all levels of the health care system as follows:

Central level - In addition to formal training courses previously described, where there is a CDC country resident operations officer, that individual will work with a national counterpart to provide day to day long term technical assistance and on-the-job training. Although posted in one country, CDC personnel will be expected to serve more than the country in which they are resident.

Both long and short term training will be offered. The short-term training will consist of sending national communicable disease control managers of countries where there are AID bilateral CCCD projects to CDC, Atlanta, for a three week Epidemiologic Intelligence Surveillance (EIS) course. Over the life of the project, managers from 15 countries are expected to take the EIS course. Average cost for transportation and living expenses for those attending the course in 1981 will be around \$4,000.

Most countries where AID has supported health care have had personnel trained at the graduate level in epidemiology and biostatistics under AID sponsorship. The CCCD project does not intend to offer graduate level training except in those few instances where there is insufficient skill level in a country to allow for the development of self-sufficiency in communicable disease control.

Supplementing the above activities at the central level, CDC, at least annually, will make available personnel to conduct evaluations of country data systems for disease control with the aim of making recommendations for improvement. These evaluations, which will require two weeks on the average, will be initially restricted to countries having AID bilateral projects.

* OCEAC - Organization for coordination and cooperation in the struggle against Endemic Diseases (Central Africa).

* OCCGE - Organization for coordination and cooperation in the struggle against Endemic Diseases (West Africa).

As part of the overall effort to build up African expertise and increase the exchange and transfer of knowledge within the region, AID would channel funds to WHO/AFRO to cover the costs of African experts to participate as members of these evaluation teams. This Technical Cooperation between Developing Countries (TCDC) approach will be introduced into all the components of the program whenever this technique appears feasible and warranted.

Regional level (in country) - Support at the state, provincial or regional level in countries will consist of short term technical assistance from CDC personnel, opportunity to attend a one-week basic course in epidemiology and disease surveillance (to be developed by CDC) and training in the management courses described.

District, health center and community levels - CDC will develop training materials to be used at these levels.

3. Health Education and Promotion

The ultimate success of the CCCD program will depend upon its acceptance by those who are the targets of disease control services. Although infants and small children make up the bulk of the target group, in fact it is the mothers who are the key decision makers with respect to health matters.

A needs assessment points up two major problems.

First, how to motivate country officials, health and otherwise, to place high priority on implementing communicable disease control programs.

Second, how to motivate full utilization of available CCCD services. Part of this problem is to identify and overcome resistances which lead to non-utilization and drop-outs by potential service recipients. Equally important is working with and through community groups and particularly with mothers and others who influence decisions affecting health related behavior.

The scope of products and services to obtain program support and ensure utilization and compliance include:

- Production and use of health promotion materials
- Developing community acceptance and participation in promoting CCCD services and activities by:
 - formal education in health establishments and schools
 - informal adult and child education - mother to mother, etc.
 - treating the sick and providing preventive care
 - getting community participation in sanitation and potable water development.
 - working through community organizations such as local councils, health committees, etc.

To develop the health education/promotion component of the CCCD project, a contract will be let to obtain the services of a health educator. This individual will have the responsibility of developing and managing this project component under the direction of AID in collaboration with CDC. Four months will be allowed to design the component content and work plan.

Early on, the health educator will consult with other CADA member health specialists as well as with those from WHO and UNICEF and will visit African health education/promotion specialists to assess needs and appropriate interventions firsthand.

Several CADA members, the United Kingdom in particular, have special expertise in health education and promotion in African countries. The CADA mechanism will provide a means of using this expertise in the CCCD program.

To assist the health educator, U.S. and African institutions and individual specialists will be contracted. They will provide short-term technical assistance to both the regional project and country specific activities. Use of Peace Corps volunteers will also be explored.

4. Operations Research (OR)

The CCCD project does not plan to undertake basic research since this is outside the purview of the project. It will however conduct and assist others to conduct studies on health services and operations, cost effectiveness studies and controlled field trials of various interventions; so as to provide answers to specific questions posed by those responsible for carrying out communicable disease control activities.

The precise operational studies which will be conducted cannot be delineated or quantified until the project is underway. However, the following are examples of the kinds of OR activities which may be carried out:

Data Systems - develop and field test:

- o Disease surveillance methodologies to improve data reporting and analysis, including methods of involving community in disease recognition and surveillance;
- o Methods for improved collection, analysis and use of critical program performance data;
- o Use of sentinel disease indicators, sentinel reporting sites and simple survey techniques;
- o Methods to improve disease reporting, including emphasis on least necessary data using simple but adequate forms.

Services Delivery and Program Implementation:

- o Test methods for coordinating and integrating the components of CCCD within Primary Health Care for effectiveness in reducing morbidity and mortality from target diseases;
- o Field test alternative strategies for delivering EPI and other CCCD services, e.g., urban vs rural, alternative immunization schedules, facility based vs outreach;
- o Compare for effectiveness, efficiency, acceptability, utilization, maintainability, etc.;

 - Different types and makes of refrigerators;
 - Different types and makes of cold boxes and vaccine carriers;
 - Nylon vs glass syringes;
 - Jet injectors vs syringes;
 - Oral rehydration salt packets vs home prepared mixtures.

- o Develop and field test alternate logistical and supply systems, such as community based distribution of medications for the presumptive treatment of fevers (malaria) and oral rehydration salts.
- o Assess the ability of various categories of health workers and service recipients to carry out disease control activities.

Training

- o Assess training methodologies, sequencing and phasing for effectiveness in improving performance.

Health Education and Promotion

- o Develop and test methods to promote community involvement in and support for CCCD activities and services.
- o Identify factors contributing to immunization acceptance and rejection and to immunization coverage.
- o Develop and test methods to increase utilization of CCCD services, including studies of measures to identify and where possible remove barriers to utilization - i.e., increase utilization and compliance.

In conducting operations research on EPI, CCCD will coordinate activities with the WHO EPI units in Geneva and Brazzaville. Research activities will be the direct responsibility of host country ministries of health and to the maximum extent possible carried out by national health officials and African institutions.

In the area of diarrheal disease control, CCCD will emphasize and support field studies in child care practices, in the use of prevention and improved methods of treatment and in assessing the effectiveness of oral rehydration therapy.

An important research focus will be to test the effectiveness of community based systems for presumptive therapy for malaria. Area specific research will be done before malaria control is added as a target disease to any of the country-specific activities.

A screening procedure for research activities will need to be developed.

It is recommended that for low cost studies, i.e., these under \$5,000, countries in consultation with the assigned CDC operations officer and CDC regional epidemiologist will submit a research protocol and funding request to the Operations Research Working Group of the Advisory Council. The Working Group will decide on which research activities to fund. Requests for funding of studies costing more than \$5,000 would be screened by the Working Group and submitted to the Advisory Council for approval.

Most research projects are expected to be small-scale, time-limited and low cost: under \$5,000. Some extensive field trials or formal operational research projects involving modeling and mathematical analysis and synthesis may be expensive: \$50,000 or more. An average cost of \$10,000 per research project has been estimated by CDC. Assuming a research budget of \$200,000 per year, during the last seven years of the project, an average of 20 research projects will be conducted annually. In many instances the same study may be carried out in more than one locality; this would be considered as multiple projects.

To coordinate, advise on the conduct of CCCD research and provide technical assistance with research, CDC will appoint an Atlanta based epidemiologist half time, as the responsible individual. This epidemiologist will be assisted by CDC African field personnel and short term consultants. Collaboration with African research specialists will be emphasized. Research activities will increase as the CCCD country programs grow in number. For planning purposes, it is assumed that CDC field personnel and short term consultants collectively will spend two person years annually on research activities. These are added to the CDC half-time research manager.

Policy with respect to selection of appropriate areas for study will be established by the CCCD Advisory Council. The Working Group for OR will set guide lines with respect to priorities and procedures. To a considerable degree, funds will be made available to individual countries to conduct OR activities, assisted where necessary by CCCD project personnel.

5. Country-Specific Activities

The target for the CCCD program is to increase immunization and other childhood communicable disease control activities incrementally by five percent each year so as to approach close to 100% coverage of the target population in twenty years.

How close an individual country will come to the theoretical 100% coverage depends on a number of factors such as the extent and rate of development of its health infrastructure and how much it is willing to spend to reach the most inaccessible segment of the population. Even with a sustained twenty year effort the probability is that people living in very remote areas will not be touched by the program. It is recognized that achievement will be uneven since immunization and diarrheal and other disease control activities can only grow at a rate parallel to the expanding national capabilities.

a. Donor - Recipient Country Relationships

Criteria for selection of countries for bilateral AID supported CCCD activities will be the same as for any other AID bilateral program.

Some important factors to be assessed in considering AID support for a specific country for CCCD activities are:

- Country need for assistance
- Country request to participate in the CCCD program
- Level of country commitment to CCCD and primary health care
- Ability of country to carry out and maintain CCCD activities. This involves availability to resources, supplies, appropriate staff, necessary infrastructure, etc., and the willingness to commit these to CCCD.
- Previous country performance on health programs
- Technical feasibility - access to population, etc.
- Relationship of contemplated CCCD activities to WHO, UNICEF or other donor activities
- Relationship of CCCD to national health policy and impact on existing health care activities
- Availability of donor support and donor choice for specific country assistance, and
- Adequate baseline health data for program planning and management. This includes the willingness of countries to permit appropriate data collection.
- Countries willingness to monitor demographic and other impact of disease control activities so that they can plan for the future.

It is likely that other donors will set minimum conditions to be met before assistance is provided to support CCCD activities. These are expected to vary, on a country by country and donor by donor basis.

In all countries considered for CADA support, there should be a realistic assessment of the timing of donor phaseout and country takeover of CCCD responsibilities.

All countries supported by CADA will be expected to participate to some degree in providing costs, staff and other requirements of the CCCD program. In the more affluent countries this participation might also include provision of housing for expatriate experts, facilities for training, vehicles, fuel, etc. The poorer countries will require some form of time-phased budget support to augment their own contributions for local and recurrent costs

The outputs of this part of the program will consist of (a) a number of countries with incrementally increasing, nationally operating activities directed at combating childhood communicable diseases; (b) donor/host country coordination to help link host-country needs with donor capabilities (WHO/AFRO and the CADA mechanism itself are expected to be the main catalytic agent to foster this development); and (c) the establishment action plans which integrate CCCD into national primary care programs.

b. Operating CCCD Activities

Annex F summarizes the AID supported health activities related to CCCD that are known to be going on or planned in the near future within the region of sub-Sahara Africa. Others CADA members are preferring similar lists. To these will be added information for UNICEF, WHO and other donors. In this way it is hoped that as the CCCD program evolves, the many communicable control disease activities can be coordinated and brought into close association with the CCCD program and benefit from the regional support project and other services offered by the program.

One of the principles underlying the CCCD program design is to the maximum extent possible to work with and build upon what already exists. In many cases a start has already been made and general agreements have been reached between the host governments and the donors. In these cases the existing activities are described in this paper as a matter of fact, but future expansions and the methods of financing them are still conjecture at this point. In other cases no specific agreements between the potentially participating governments have been reached, but based on general expressions of interest it is reasonable to assume that agreements will be reached and actual operating programs begun during the five year life of this phase of the CCCD program.

It is expected that discussions and implementation planning between CADA members and individual African countries will begin as early as the end of 1981 and continue throughout the life of the project. This should result in new country-specific activities being added each year. For planning purposes we have assumed that there will be 20 country-specific activities operating and supported by the CCCD program by 1985. Although the details for each country-specific activity will be negotiated

by the concerned parties it is expected that all will have a number of common elements and will follow patterns already set by those activities that are already underway.

The training of operating personnel at the local level is expected to be one of the elements in the various country-specific activities that will be closely tied to the teaching concepts that guide senior and mid-level training conducted at the regional and sub-regional levels. The supervisors will be given instruction in teaching techniques at the time of their training and will be expected upon their return to provide in-country training to the operating personnel at the local level. This will be done in conjunction with the normal supervisory visits. Drawing on the experience gained in the SHDS supported Gambia project which was evaluated in November 1980, a training protocol is being developed. Supervisors will be provided with "mini training modules" appropriate for use during their regular visits to field staff. Supervisor/trainers will be urged to schedule their field visits rather than having them occur on an ad hoc basis. The objectives will be to visit each field post at least once per quarter and allow sufficient time for interaction between the supervisor and the staff. In most instances one working day should be sufficient to accomplish the training and supervisory objectives.

To help understand how the country-specific activities and the regional project fit together four models are presented to illustrate how the CCCD program might work under differing circumstances. It is recognized that these activities vary greatly ranging from small elements of a country's overall health program, carried on with little or no outside assistance, to major efforts supported by international or bilateral donors. While each country situation will differ there are usually three main variables that will determine how the CCCD program can best be applied and adapted to a particular given situation. First, when planning for activities at the country level particular attention will be paid to where the country and, more specifically, the health sector is on the spectrum of development, second, the degree to which EPI/CDD activities are already integrated into the regular health care system; and third, the various arrangements that exist between the host country and the principal donors with respect to project implementation.

The aim of the country-specific activity part of the CCCD program is to be flexible enough to provide assistance that can relate and strengthen what is presently going on and do so in a manner that is compatible with existing bilateral, multilateral or regional arrangements. To aid in the understanding of how the country-specific activities of the program can work, four models are presented to illustrate likely patterns that may emerge as the CCCD program moves into the implementation phase.

Model 1:

This model would apply to countries where little in the area of EPI or CDD was currently going on. In most instances these would be the poorer countries that lack the resources and trained manpower to undertake and sustain major national immunization efforts. The initial CCCD country-specific response to these situations would probably be on a limited scale focusing on urban based or area specific programs. These programs could be expanded gradually as conditions allowed. Since recurrent cost constraints would be a significant factor this model would need to include clear plans for sharing the burden of operating expenses and an indication of the duration of such commitments by the donor.

Model 2:

The second model would apply to countries where very little was going on in the area of EPI and CDD even though they had or were planning major bilateral health programs. In a number of countries in this situation various funding mechanisms such as the AID supported Accelerated Impact Project (AIP) and three demonstration areas of the SHDS regional project have been used to get EPI activities started prior to the completion of the design of the broader CCCD effort. These activities have usually been short term undertakings or pilot projects to deliver services to a limited target area and allow for a buildup of organizational competence and experience while a more extensive long term activity is being planned. It is planned to have these broader bilateral programs absorb and integrate the start-up of EPI and CDD programs into the countries regular on-going health delivery system. Under this model countries and donors would be encouraged to maintain their planned schedules or perhaps even accelerate them, for integrating the EPI and CDD elements into broader health programs. Through training and operational research the regional project can be expected to assist in the transition. Once EPI and CDD activities are integrated into national health programs to CCCD regional project could continue to be used to support those elements over the duration of the CCCD program.

Model 3:

The third model could apply to countries where short term EPI and CDD activities similar to those described in Model 2 have been initiated but where no long term bilateral commitments for continued health programs have been made. Under these circumstances it is envisaged that a longer term country-specific activity could be negotiated under the CCCD umbrella by AID or one of the other CADA members with the host country to build upon the earlier efforts and provide continued support to the EPI and CDD elements of the countries' national health care system.

Model 4:

In countries which already have substantial bilateral programs that include EPI and CDD elements, it is anticipated that these programs would continue on a bilateral basis. However, because of the services and facilities offered through the CCCD regional project, it is possible that the host country and their donors may wish to modify their agreements and reprogram some of the funds to take advantage of what is offered through the CCCD program. Under this model implementation of existing bilateral programs could be accelerated by increased training, research, and other supporting activity at the regional level.

These four models are meant to be illustrative and are by no means exhaustive. Variations and combinations of these models will be worked out during negotiations, and it is understood that each country and donor will have preferred styles of operation which it will wish to incorporate into the specific agreements. The main purpose in citing these hypothetical examples is to underscore the intent and desire to keep this element of the program flexible, in order to have the CCCD program address the needs of countries in varying circumstances and be responsive to different needs.

c. Country-Specific Coordinating Plans

As each country-specific agreement is worked out careful attention will be paid to laying out an effective means of coordinating the efforts of all the donors and interested parties within the country. Each agreement should include a specific plan for coordination. In this regard the following aspects will be considered:

(i) Relationship of the national implementing authority to the CCCD Regional Project:

Each country-specific agreement will need to "spell out" as precisely as possible what it expects to receive from the regional project and when these inputs are needed. The plan should also address the manner in which continued communication between the regional project and the country specific activity will occur. Each participating country will need to budget sufficient funds to permit the country-specific activity to take full advantage of what the regional project has to offer. This would include funds for such items as per diem and travel costs for trainees that are not covered under the regional project or salaries or researchers working on a regionally funded, country-specific research task. To facilitate this coordination the regional project periodically will publish an information pamphlet describing what can be provided regionally as well as other pertinent information. Another element that will need to be clearly defined at the outset is the amount of time the AID funded operations officers will be expected to spend outside a given country conducting or evaluating the regional training courses. This also should be spelled out in the "Coordination Plan."

(ii) Relationship between bilateral missions and the regional project

While this issue will need to be addressed by all the CADA and associated donors, it is discussed in this paper with specific reference to AID and the USAID overseas missions.

This is an extremely important and potentially sensitive issue and one in which any areas of confusion or uncertainty should be clarified and solved at the earliest stage.

The intent of the regionally funded country-specific activities is to help countries desiring to expand their immunization, diarrhea control and other locally important childhood diseases programs. This help can be provided in a variety of ways and within the overall ground rules can be tailored to meet the specific needs of the country. The ability to remain flexible is essential for the success of this element of the program.

As part of the project design process drafts of the PP were sent to U.S. African field missions and discussions were held with mission personnel and with African country representatives in West, Central and East Africa, as well as with WHO/ Geneva, WHO/AFRO, UNICEF and the other CADA members. Since the design process included actual involvement of both potential participating countries and donors, it is believed that the USAID missions will now be able to establish a continuing dialogue to work out the most effective means of interfacing the CCCD program with ongoing or planned national and bilateral health projects.

As explained above there are a number of different ways (or models) to bring about this interface, and each case will need to be worked out and tailored to fit the particular situation. The role of the field missions in project implementation will also differ depending on the model being followed. It is hoped that having USAID missions involved at the design stage will result in making the CCCD effort fully supportive of bilateral programs and that this will facilitate future health program coordination.

(iii) Relationship of AID supported regional projects to the CCCD program

The CCCD program will build upon the work that has already been accomplished under the SHDS project. It is expected that training facilities established under SHDS will be used to the maximum extent possible for the training being carried out under the CCCD program.

It is further expected that "Objective 3" of the SHDS project, i.e., EPI demonstration and training and disease surveillance, will be absorbed into the CCCD program after December 1982 when the current SHDS effort is scheduled to be concluded. This absorption would also include

bringing in the CDC epidemiologist and operations officer positions which are now part of the SHDS project, although the nature of their assignment and possibly their physical location may be changed to fit the priorities and needs of the CCCD program. These details and the timing of the transition will be worked out as the implementation discussions with the Africans move forward. This dialogue is expected to begin immediately following project authorization, i.e., the fall of 1981. Meanwhile the CCCD budget has been constructed to allow for the inclusion of these positions.

(iv) Role of other regional health organizations and inter-country cooperation:

The active role expected to be played by WHO/AFRO has been dealt with in some detail elsewhere in the paper. In addition to WHO/AFRO there are a number of African based groups who can play an important part in improving the overall level of coordination and achieve a mutually beneficial level of cooperation at both the national and regional levels. Regional organizations such as the West African Health Secretariat, SHDS, OCCGE, and OCEAC can play a similar role. Donor countries, acting singly or in concerted action, can also serve to encourage CCCD coordination. Finally, and most importantly, African countries themselves can assist one another with technical cooperation to strengthen their own health systems by exchanging information and expertise.

(v) TCDC as a means of achieving coordination

"Technical Cooperation Among Developing Countries (TCDC)" can take the form of sharing resources such as training facilities, technical cooperation and assistance, exchange of scientific reports and studies, multinational participation in field trials (as in the Kolda Department study in Senegal) and in joint conferences concerned with scientific and operational aspects of CCCD. It is expected that WHO/AFRO, Brazzaville will play a significant role in stimulating this coordination, collaboration and cooperation.

Project funds will be made available to WHO/AFRO to finance this type of activity, especially as it relates to training and evaluation and the exchange of experts among African nations. In the case of some of the more affluent countries such as Nigeria it is hoped that arrangements can be worked out to allow their participation in the project's regional support activities on the same basis as the poorer nations in return for their willingness to support TCDC aspects of the program as their contribution to the CCCD effort.

d. Integrating CCCD with Primary Health Care

To the extent feasible, communicable disease control programs will be incorporated into developing primary health (PHC) systems in Africa. The goal of primary health care, as established by WHO, is to have by the year 2000 the following basic health care components provided to all persons throughout the world; promotion of proper nutrition and an adequate supply of safe

water; basic sanitation; maternal and child health services, including family planning; immunization against the major infectious diseases; prevention and control of locally endemic diseases; education concerning prevalent health problems and promotion of methods for preventing and controlling them; and appropriate treatment for common disease and injuries.

CCCD services will be initiated through existing health services or primary health care systems to the extent they exist, or using curative facilities on an interim basis where necessary. Although not part of this program, it is noted that a functioning health delivery system and infrastructure is an essential part of a successful long range program to combat childhood communicable diseases and expand primary health care coverage. In recognition of this, it was agreed in the November, 1980 CADA technical working group meeting that CADA members should take every opportunity to encourage the development of health infrastructure so as to enhance the abilities of the participating countries to achieve the CCCD objectives.

The delivery of oral rehydration solutions (ORS) by all levels of health care providers may be possible to accomplish in a relatively short time. However, due to the technical difficulties inherent with immunization activities (record keeping, different dosage schedules for different vaccines, cold chain maintenance, the need for parenteral injections, etc.), it will be difficult if not impossible to have provision of immunizations routinely available at most peripheral rural health units. Therefore, it will required operational and health services research to develop acceptable, cost effective and affordable methods to provide immunizations to hard to reach population groups.

During the initial phase of the CCCD program, it is expected that several of the basic components of PHC will be established in many of the developing health care systems in sub-Saharan Africa.

e. Procedure for Initiating or expanding a country-specific activity

In cooperation with WHO it is hoped to be able to continue the practice of using joint host country, WHO/AFRO, and donor teams to help determine the need for and feasibility of beginning new country-specific activities or expanding an existing program. This would usually involve sending in a team, or in some cases a single individual, to collaborate with Ministry of Health personnel in carrying out a needs assessment and other activities which would lead to the development of a CCCD program that could be integrated into the existing system. One of the criteria for providing country-specific assistance would be an assessment of the cost effectiveness of the proposed activity with respect to reduction of disease prevalence and morbidity and mortality and the financial ability of the host country to sustain the program over the long run. The duration and phasing out of donor assistance would be specifically addressed in all the country-specific agreements.

III. Project Analysis

A. Financial

1. Financial Plan

The financial implication of the regional project and the country-specific activities are quite different. The regional effort is totally donor financed, has no permanent recurrent cost implications and is not subject to the 25% host country contribution rules that apply to AID bilateral programs. The AID supported country-specific activities are subject to the minimum 25% rule, and we assume other donors will apply similar formulas. We have in fact made an assumption that because of the high percentage of local currency costs involved in this aspect of the program (this is especially true when technical assistance and training costs are funded under a separate regional budget) that host country contributions covering local salaries, training and transportation cost together with contributions from international agencies such as UNICEF would amount to 2/3 of the total cost. These activities have distinct recurrent cost implications, their scope and implementation strategies will vary from country to country and each donor will negotiate and design its own programs and make its own arrangement for cost sharing. While this makes it difficult to estimate budgets with any great precision it has been possible to develop illustrative budgets based on the components of the EPI and CDD cost factors and the experience gained from a number of operating programs. These tables are contained in this section of the paper. The explanation of how these estimates were developed and the rationales for allocating costs are contained in this section together with budget summaries.

a. Regional Support Project

There are a number of costs that can be attributed to the regional project, without question. The salary and support costs of the Atlanta based support staff is a clear example. There are other costs that cut across both the regional and country-specific elements of the program. Here the distinction is not as clear. Although percentages of technical time to be allocated to each element have been estimated and distinctions have been made between the regional and country focus within each of the major program components, it was felt that going the next step of allocating costs between the two elements at this point would be arbitrary. We have thus elected to include all CDC related cost in the regional project. That is to say even though an operations officer may be working 60% of the time on a country-specific activity and only 40% on the regional training component of the program, this person's total cost have been budgetted in the regional project. Similarly all training down to the level of "Management II" has been shown as a regional cost though in many cases this "in-country" training may only involve nationals from one country. Health education has also been shown as a regional support cost since it is planned to administer this element under a single contract, though in actual fact the bulk of the expenditure will occur at the country level. Training and Health Education appear as line items in the Regional Support portion of the budget. Training at the local and district level is chargeable to the particular country-specific activity and has been included as part of the per immunized child calculations. In a similar manner the costs of data collection, disease surveillance, evaluations and operations research have been included in the "per child" cost factor calculation. These two elements appear as line items in the country-specific portion of the budget.

Including two major "gray areas" cost components in the regional support project is in some respect misleading, but on the other hand it is a much simpler and more straightforward budgetting approach, and once the allocation formula is known the apparent distortions are readily explained.

The decision on whether to base CDC staff in the field or in Atlanta was made on the basis of the relative effectiveness with which they could carry out their technical functions as well as the costs involved. The average cost of maintaining a professional person in the field vs basing that person in Atlanta with a substantial travel budget is higher by a factor of three. The relative ease of air travel from the U.S. to all points in Africa vs some of the scheduling difficulties encountered in intra-Africa travel was also considered. Based on these and other factors including the access to other experts and the ability to use the CDC facilities, it was decided to locate a number of CDC personnel who will work in the CCCD program in Atlanta. Starting with two professional person years in 1981 this staff is projected to build up to five person years in 1983. This level would be maintained through most of the life of the project. The staff will be supported by a secretary. The Atlanta based staff will spend a considerable portion of their time in the field looking on the implementation of the project, but will also provide an important backstopping and support for the CDC field staff who will be stationed in Africa. These include the regional training coordinator, the three regional epidemiologists and the operations officers who must obviously work closely with their counterparts in carrying out the country-specific activities.

In the case of both the CDC Atlanta based staff and the CDC resident African staff a considerable amount of money has been allocated for travel. This is considered an essential cost without which the concept of the regional program cannot be made to work. Budget Summaries follow. Details are included in Annex B.

i. Training

Over and above the amounts required to fund the Participating Service Agreement (PASA) with CDC, the Regional support budget will also cover the cost of most of the senior and mid-level training and finance the contract to provide health education support to the country-specific activities. The training budget includes per diem and internal travel for all participants and trainers. The budget has been developed on the assumption that all participants attending these courses will be provided the same per diem and allowances whether they are nationals of the country where the course is being taught or coming from neighboring countries. Participants from the more developed African countries who might be expected to be able to afford to support their own participants will also be supported by the project on the same basis as other attendees, but it is planned to reach an understanding with these countries to provide TCDC support to the program as part of their contribution to the regional effort.

The training budget also includes amounts to be provided to WHO/AFRO to help defray the cost of logistic support for the training programs (estimated at 40% of the annual training budget), and to cover the costs of the TCDC element of the program not covered under the arrangements referred to above.

To the extent that training is conducted by CDC personnel the costs are already covered from the technical assistance portion of the budget. The TCDC element within the training component is expected to become an increasingly important element as more senior Africans are trained and gain more experience working in their expanding programs. Funds to cover their salary, per diem and international and local travel costs while on these assignments (usually one to two weeks) would be covered from this part of the budget, and made available to WHO/AFRO who will administer this element of the program.

The costs of conducting in-country Management II level training has been included in the Regional Support Project rather than the country-specific activities to allow flexibility to adapt to differing situations. It is expected that most of these courses would be attended by the nationals of the country in which they are taught, but in the case of some of the smaller countries it may be possible to include nationals from one or two neighboring countries. It is also anticipated that these courses will be offered in countries which do not have country-specific activities funded by AID through this project, and the regional support mechanism would seem to be a convenient way of providing this training. In all cases it is envisaged that this part of the budget will cover the per diem international costs of the students and the full cost of any outside instructors. The host country would provide the national instructors and continue the salaries of their participants.

ii. Health Education

These services will be provided through an AID contract and made available to country-specific programs as requested. The CADA working group will screen these requests to assure their relevance and compatibility with the objectives of the program. Funds will also be made available to train the Peace Corps volunteers selected to work on these programs. The working group will also be responsible for coordinating the work of other CADA members in this area to assure that the efforts will compliment each other and avoid overlap.

b. Country Specific Activities

While recognizing that there will be considerable variations in funding arrangements illustrative line item budgets have been developed based on the component of the cost factors used to develop the composite cost to fully immunize a child. A similar formula was used to calculate CDD costs after detailed discussions with the director of the Diarrhea Disease Control Program of WHO/AFRO. Tables V and VI show the estimated coverage for the region as a whole during the eight year span of this program and estimates the likely CADA support of the total effort. Having determined these general magnitudes and assumed that AID will fund approximately 25% of the CADA effort through the country-specific part of the CCCD program. This is reflected in Table VII. Table VIII then translates these totals into an illustrative line item budget over the life of the project. More detailed budgets for the planned AID financed elements of the program are contained in Annex .

This part of the budget also includes funding to cover the costs of data collection, disease surveillance and evaluation. The cost of producing and distributing assessments of the impact of the program will also be funded under this element of the program. This part of the budget will also be the source of financing for the operations research activities most of which will be carried out at the country level.

TABLE IV

CCCD BUDGET SUMMARY FOR THE REGIONAL SUPPORT PROJECT
(ALL FIGURES ROUNDED TO NEAREST \$1000)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>TOTAL</u>
I Technical Assistance (CDC/HHS PASA)									
(a) U.S. Support Staff									
Salaries & Benefits	110	208	245	245	245	198	198	125	1574
Support Cost	-	100	50	50	30	30	20	10	290
Travel	24	72	92	92	92	92	70	24	558
(b) Field Staff									
Salaries & Allowances	-	330	1140	1200	1200	1200	1200	750	7020
Travel	-	20	100	100	100	100	100	60	580
(c) CDC Overhead									
U.S. 20%	27	142	305	317	317	304	298	182	1892
Overseas 5%	-	1	5	5	5	5	5	3	29
SUBTOTAL (PASA)	161	873	1937	2009	1989	1929	1891	1154	11943
II Training	-	1097	1273	1388	887	1377	723	1215	7960
III Health Education & Promotion	-	420	260	500	260	410	70	80	2000
IV Inflation - 10% compounded	-	-	347	779	941	1486	1342	1469	6364
TOTAL	161	2390	3817	4676	4077	5202	4026	3918	28,267
TOTAL ROUNDED	200	2300	3800	4600	4000	5200	4000	3900	28,000

TABLE V

COUNTRY SPECIFIC ACTIVITIES (EPI)
NUMBER OF CHILDREN 0 TO 1 YEAR OF AGE TO BE IMMUNIZED BASED ON AN INCREMENTAL
INCREASE IN COVERAGE BY 5% PER YEAR

(1) YEAR	(2) NO. OF CHILDREN	(3) COVERAGE	(4) TOTAL NO. OF CHILDREN TO BE IMMUNIZED	(5) NO. OF CHILDREN TO BE IMMUNIZED- -CADA PROGRAM)	(6) NO. OF CHILDREN TO BE IMMUNIZED- AID-SUPPORTED	(7) EST. COST PER CHILD	(8) AID'S SUPPORT UNDER CCCD (\$000)
1981	13,700	10%	1,370				
1982	14,043	15%	2,106	1411	353	4.80	565
1983	14,394	20%	2,879	1929	482	5.28	848
1984	14,750	25%	3,688	2471	618	5.81	1197
1985	15,122	30%	4,537	3040	760	6.49	1644
1986	15,422	35%	5,398	3617	904	7.13	2149
1987	15,733	40%	6,293	4216	1054	7.90	2776
1988	16,048	45%	7,222	4839	1210	8.69	3504
TOTAL							\$12,683

1. (5) = 2/3 of (4) - It is estimated that organization that are not part of the CADA group will be responsible for the immunization of about one-third of the total number of children to be immunized. Examples are: DANIPA; PVO's; and African Countries such as, Nigeria, Gabon and Ivory Coast.

2. (6) = 25% of (5) - It is estimated that AID through the country-specific portion of the CCCD project will be directly involved in the immunization of 23.5% of those children immunized through the CADA program.

3. (8) = AID's cost is estimated to be one-third of the total cost to fully - immunize each child. Two-thirds of the total cost will be from the host country in salaries, facilities, vehicle maintenance and operating costs, etc. and from other donors such as WHO, UNICEF and others.

4. AID'S contribution for EPI 1981 - 1988 is estimated to \$12,683,000. That amount is rounded to \$13 million.

Table VI

Country Specific Activities - Control of Diarrhea Disease

(\$000)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>TOTAL</u>
Number of Children Treated	600	660	792	1030	1442	2163	3460	
Cost Per Child	\$1.00	\$1.10	\$1.21	\$1.33	\$1.46	\$1.61	\$1.77	
Total Cost	\$600	726	958	1370	2105	3482	6124	\$15,365
AID's Support	<u>\$235</u>	<u>280</u>	<u>370</u>	<u>500</u>	<u>820</u>	<u>1350</u>	<u>2445</u>	<u>\$ 6,000</u>
Support from Others	\$365	446	588	870	1285	2132	3679	\$ 9,365

Assumptions

1. Approximately 10% of the children under the age of 5 years (625,000 in 1980) receive treatment for diarrhea. Beginning in 1982, the CADA program will provide treatment to the additional number of children as indicated above.
2. Approximately 39% of total cost is funded by AID; the balance is to be provided from other sources including host countries.
3. 10% inflation of costs per year.
4. Target age group is children under five years of age.
5. Percent of target reached each year is as follows: 1982 base year; 1983 is 110% of 1982; 1984 is 120% of 1983; 1985 is 130% of 1984; 1986 is 140% of 1985; 1987 is 150% of 1986 and 1988 is 160% of 1987.

Table VIA

Country Specific Activities - Control of Diarrhea Disease Combined With
Malaria Presumptive Chemotherapy

(\$000)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>Total</u>
Number of Children Treated	600	660	792	1030	1441	216	3460	
Cost Per Child (CDD)	\$1.00	\$1.10	\$1.21	\$1.33	\$1.46	\$1.61	\$1.77	
Cost Per Child (Malaria)	.06	.06	.07	.07	.07	.08	.08	
Total Cost (CDD alone)	\$600	726	958	1370	2105	3482	6124	\$15,365
(CDD & Malaria)	\$606	766	1014	1442	2206	3655	6401	\$16,090
AID's Support	<u>\$235</u>	<u>280</u>	<u>370</u>	<u>500</u>	<u>820</u>	<u>1350</u>	<u>2445</u>	<u>\$ 6,000</u>
Support from Others	\$365	446	588	870	1285	2132	3679	\$ 9,365
Costs Required to Add on Malaria Therapy	6	30	56	72	101	173	277	\$ 720

Assumptions

1. Approximately 10% of the children under the age of 5 years (625,000 in 1980) receive treatment for diarrhea. Beginning in 1982, the CADA program will provide treatment to the additional number of children as indicated above.
2. Approximately 39% of total cost is funded by AID; the balance is to be provided from other sources including host countries.
3. 10% inflation of costs per year.
4. Target age group is children under five years of age.
5. Percent of target reached each year is as follows: 1982 base year; 1983 is 110% of 1982; 1984 is 120% of 1983; 1985 is 130% of 1984; 1986 is 140% of 1985; 1987 is 150% of 1986 and 1988 is 160% of 1987.
6. For malaria program, 3 febrile episodes per year per child are assumed.
7. For malaria therapy, chloroquine would be supplied by the same community dispensary system as employed by CDD. In this manner, distribution and transportation costs would be shared and not substantively higher than estimates for the CDD program.

Cost Estimates for Childhood Chloroquine Presumptive Therapy:
(New Table added to Final Printing of PP)

Footnote:

For a base population of 100,000, there would be approximately 20,000 children under five years of age. Assuming that there would be an average of three febrile episodes per year per child requiring chloroquine presumptive therapy at the 10 mg/kg dosage, a total of 60,000 therapies would be dispensed annually.

The average child would weigh approximately 15 kg, and the average presumptive dose of chloroquine would be 150 mg. Based upon WHO estimates for chloroquine (obtained at cost in Europe), each dose would cost \$0.02. This estimate would apply for chloroquine imported in bulk free of duties. The cost might be lower were chloroquine produced and distributed regionally in Africa.

Should a program of prompt chloroquine therapy of febrile illnesses be thoroughly implemented in highly malarious areas, a reduction in childhood mortality of 25-50% (depending on the level of transmission) would be anticipated. If presumptive fever therapy were integrated with a community program of oral rehydration for diarrhea, the reduction in mortality would be enhanced considerably. Additionally, to the extent that delivery and supply costs were shared among various programs, the actual costs for each would be lowered proportionately.

Table VII

Illustrative Line Item Budget for Country Specific Activities (EPI)

	1982	1983	1984	1985	1986	1987	1988	TOTAL
Vaccine and Supplies	463	698	984	1,352	1,766	2,281	2,881	10,425
Cold Chain Equipment	92	137	194	266	348	450	568	2,055
Transportation & Maintenance	92	137	194	266	348	450	568	2,055
Salaries and Training	990	1,486	2,097	2,880	3,765	4,863	6,139	22,220
Other								
A) Operations Research	29	43	61	84	110	142	178	647
B) Data Collection, Disease Surveillance	29	43	61	84	110	142	178	647
Total	1,695	2,544	3,591	4,932	6,447	8,328	10,512	38,049
AID	565	848	1,197	1,644	2,149	2,776	3,504	12,683
Others	1,130	1,696	2,394	3,288	4,298	5,552	7,008	25,366
			<u>AID</u>			<u>Host Countries and Others</u>		<u>TOTAL</u>
Foreign Exchange			10,147			3,146		13,293
Local Currency			<u>2,536</u>			<u>22,220</u>		<u>24,756</u>
Total			12,683			25,366		38,049

Assumptions

1. All of Line Item - Salaries and Training - are local cost to be funded by host countries and others.
2. 20% of AID costs will be in local currency.

TABLE VIII

SCHEDULE OF ANNUAL OBLIGATIONS

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>TOTAL</u>
CDC/HHS PASA's & Project Design	281	2,718	1,201	2,000	2,000	2,000	1,000	500	200	11,900
Health Education	-	-	500	500	-0-	800	-0-	200	-0-	2,000
Training			1,100	1,500	1,500	1,000	1,500	800	500	7,960
Data Evaluation & Surveillance	-	-	200	500	200	200	100	100	100	1,400
OPS Research	-	-	200	500	200	200	100	100	100	1,400
EPI Country Specific	-	-	500	1,000	1,500	1,000	1,000	1,000	600	6,600
CDD Country Specific	-	-	300	1,000	1,000	500	500	301	200	3,800
Sub Total	281	2,718	4,000	7,000	6,400	5,700	4,200	3,001	1,700	35,000
Contingency & Inflation	-0-	-0-	-0-	1,500	2,000	2,500	2,600	2,000	1,300	12,000
TOTAL	281	2,718	4,000	8,500	8,500	8,200	6,800	5,001	3,000	47,000

TABLE IX

ILLUSTRATIVE LINE ITEM BUDGET FOR COUNTRY-SPECIFIC ACTIVITIES (CDD)

	1982	1983	1984	1985	1986	1987	1988	TOTAL
Commodities	192	232	307	430	674	1114	1960	4917
Transportation and Other Costs	400	494	651	932	1431	2360	4164	10440
TOTAL	600	726	958	1370	2105	3402	6124	15365
ATD Support	235	200	370	500	020	1350	2445	6000
Host Country and Others	365	446	500	070	070	2132	3679	9365

Assumptions:

- 1) Oral Rehydration Salts Equals 32% of Cost.
- 2) Transportation and Other Costs Includes Operations Research (\$500) and Data Collection and Surveillance (\$500)

2. Methodology used to estimate costs of immunizations

The information contained in Table V has been developed using a composite factor of \$4.80 per fully immunized child (average of \$4.56 fixed facilities plus \$5.00 for outreach services). The \$4.80 is estimated cost for 1982. This figure has been compounded at the rate of 10% annually to adjust for inflation. There are large differences in cost per fully immunized child depending on program strategy used. Barnum estimates the range to be from \$3.65, for children immunized in fixed health facilities, to \$8.90 for children served by mobile teams. Dr. Barnum also estimates that 1/4 of children have easy access to fixed facilities, another 1/4 are accessible by outreach activities from those fixed facilities, and that as many as 1/2 are accessible only by mobile teams.

It is recognized that from the point of view of equity, and in some instances political reality, outreach activities will be undertaken. However, as a general principle cost estimates were made on the assumption that the "close in" population would be served first, and any significant outreach programs would only be introduced at a later stage. The assumption appeared reasonable based on cost consideration as well as some persuasive epidemiological arguments. The financial plan was therefore developed for the AID supported country-specific activities, based on the use of fixed facilities in the early years with "outreach" programs gradually being added as the majority of the population in the vicinity of the fixed facilities were reached. In support of this approach it was also argued that epidemiologically many immunizable diseases behave quite differently in rural areas as compared to urban areas. This is a function of population density, causing more frequent exposure (and perhaps closer) to diseased persons; and population exchanges the result of visitors and new arrivals, which is common to urban centers. In fact, cities are for many diseases like the hub of a wheel, spinning off infections with home bound visitors from rural areas.

Because of their less frequent exposure to diseased persons, rural children generally catch childhood diseases at a later age, when these diseases are less life-threatening.

Since urban areas are generally more important epidemiologically, we propose to follow the practice advised by WHO to start where it is easiest and where the likelihood of success is the highest.

3. Methodology used to calculate costs of diarrhea program

Assuming that the costs of CDC technical assistance, training and health education needs can be met from the regional projects, the remaining cost chargeable to the country-specific activity would be the cost of the salts themselves plus data collection, operations research and transportation cost. An Annual factor of \$1.00 per child treated has been used to develop the budget for this aspect of the program.

This assumes .08¢ per one dose packet of salts. It is further assumed that the average treatment requires two doses and that each treated child will on the average have two episodes per year. Thus the cost of materials is .32¢. We have assumed that the cost of delivering these materials to the mother of the sick child would be an additional .68¢. The \$1.00 figure used in 1982 has then been adjusted at the rate of 10% per year to allow for inflation. The number of children targetted for treatment each year as shown on Table VI are absolute and not cumulative numbers.

B. Economic

The analysis below represents a summary of the full analysis presented in Annex C, and the irregular footnotes and table numbers correspond to consecutive numbering in that annex.

1. Disease Profile

Infectious and parasitic diseases in concert with malnutrition bear almost exclusive responsibility for the high mortality in developing countries. Among infants and young children infectious disease is the major cause of death; parasitic infection affects adults more frequently, causing high adult morbidity rather than mortality. ^{1/}

A recent report by A.S. McCook lists the five leading infectious diseases in 36 African countries as reported and compiled by WHO; Infectious, parasitic (particularly malaria) and diarrheal diseases make up the major causes of morbidity and mortality in sub-Saharan African countries. However, reducing the incidence and prevalence of infectious and diarrheal diseases is the basis for the CCCD project and the subsequent analysis will refer only to these diseases; choice of immunizations should be a function of the disease pattern of the country receiving assistance under this program.

2. Demographic and Health Characteristics

Africa has the highest regional death rate (21.2 per 1000 population) in the world, and the highest worldwide infant mortality rate. The high average infant mortality rate of around 153 per thousand live births partially explains the low average regional life expectancy at birth of 47.2 for men and 50.3 for women, the lowest worldwide regional averages.

The population of Africa is expected to rise by 278 percent. Since roughly 52 percent of the population is in the childbearing ages (15-44) and most of the balance of the population is below age 15, the current average birth rate of 46 is not expected to fall in the short run.

This project thus has clear implications for population growth rates. The anticipated fall in mortality will raise the number of children surviving to adolescence, and should contribute to lower maternal morbidity and mortality, thus raising women's fecundity; both factors will exacerbate the climbing population growth rates emerging in a number of African countries and predicted in the rest. However, both experience and research in mortality findings indicate that fertility (and therefore population growth rates) does not fall until mortality is reduced somewhat. Given these factors the projected number of births in Table X following the U.N.'s low variant population projections is highly optimistic, especially for the next five years.

3. Targets

Women of reproductive age and children under five years generally make up the high risk health groups in LDCs. This project aims at the latter cohort emphasizing oral rehydration therapy for children under five, and immunization for newborn infants and children under a year old. The tetanus immunization is targeted at pregnant women.

^{1/} Samuel Preston, "Causes and Consequences of Mortality Declines in Less Developed Countries during the Twentieth Century." in Richard Easterlin, ed., Population and Economic Change in Developing Countries, NBER, 1980.

TABLE X.

ESTIMATED NUMBER OF IMMUNIZATIONS REQUIRED

UNDER LOW -VARIANT POPULATION GROWTH AND EXPECTED

INCREASE IN PHC SERVICE COVERAGE IN SUB-SAHARAN AFRICA

	<u>Number of Births - Low Variant a/ (Millions)</u>	<u>Number of Children to be Immunized b/ (Millions)</u>	<u>Fixed</u>	<u>Project Growth of PHC Services c/ Outreach + Fixed (% of Population with Access)</u>
1980	15.3	13.3	25	50
1981	15.7	13.7	25.5	51
1982	16.1	14.0	26	52
1983	16.6	14.4	26.5	53
1984	17.0	14.8	27	54
1985	17.4	15.1	27.5	55
1986	17.9	15.4	28	56
1987	18.4	15.7	28.5	57
1988	18.8	16.0	29	58
1989	19.3	16.4	29.5	59
1990	19.8	16.7	30	60
1991	20.3	17.0	30.5	61
1992	20.7	17.4	31	62
1993	21.2	17.7	31.5	63
1994	21.8	18.1	32	64

a/ Starting from 350.2 million population in 1980. This is based on a 1979 estimated population of 340.5 million for sub-Sahara Africa. Projections based on United Nations estimates for low population growth.

b/ The number of children needed immunization in a given year is estimated as the number of births minus fifteen percent to account for an average infant mortality rate of 150 (150 infant deaths per 1000 live births).

c/ The projection assumes that growth of the fixed delivery system will be sufficient to stay abreast of a moderate growth in population plus an additional . 5 percentage points a year.

SOURCE: Population Reference Bureau. 1979 World Population Data Sheet.

4. Cost Effectiveness

Immunizations. The cost of fully immunizing a child has been calculated in various programs from \$1.90 in Yaounde, Cameroon to \$9.25 in Sudan ^{2/}. In Table 3 below the costs of fully immunizing a child and providing tetanus immunizations for pregnant women are given for services delivered through (1) existing PHC facilities (fixed); (2) provision of outreach services from existing facilities (outreach); and (3) establishment of mobile teams to reach remote rural areas (mobile). The costs are largely based on previous immunization programs in Kenya, Cameroon, Sudan and Somalia, and can only provide rough orders of magnitude. According to Table XI providing immunization through fixed facilities is the most cost effective approach. On the basis of these calculations, the project should be implemented to initially serve those with existing access, only introducing outreach once the population of "fixed" services are covered. Use of mobile teams is not effective and should be a low priority. The latter is not discussed here as an alternative. ^{3/}

Roughly 25 percent of sub-Saharan Africa's population has access to public health care; household coverage can perhaps be doubled by adding outreach services. In Table X the extent and growth of fixed and outreach service is estimated. The same table indicates the total number of newborns anticipated in each year and the size of the immunizable infant population.

Expansion of fixed service coverage is expected to exceed population growth by half a percentage point a year; outreach services will increase by one percentage point a year, maintaining the ratio of covering double fixed service coverage.

Table XII provides cost estimates of immunization coverage applying the data compiled in Table X and the cost estimates for fixed and fixed/outreach immunizations from Table XI.

The total cost of immunizations is based on the number of surviving children (Table 2), the proportion of that population which can be immunized and the cost of fully immunizing a child. This means that in 1982 2.5 percent of newborns, or the 14 million surviving children, and up to 16.1 million mothers will be fully immunized at a cost of \$10.13 million, or \$4.80 per child.^{4/} The cost of immunizing pregnant women is included in the per child costs in Table 4. Since cost breakdowns are not available for the latter, the validity of this assumption cannot be confirmed, nor can we compare the cost effectiveness of including or excluding it. The cost effectiveness of immunizing all versus only pregnant women cannot be explored either.

^{2/} All cost data originate from "Cost Effectiveness of Programs to Combat Communicable Childhood Diseases in Kenya" by Howard Barnum, AID/SOC/PDC-C-0201, #2, 1980.

^{3/} This argument weighs efficiency at the expense of equity. A less efficient but more equitable approach would not concentrate exclusively on providing those with some health care services with immunizations, but would attempt to reach the currently unserved more promptly.

^{4/} The only cost figure available is the average per child cost. In applying this figure we assume a horizontal average cost curve, so we have assumed a constant average cost and have compounded the per capita cost 10 percent annually to account for inflation.

TABLE XI
HYPOTHETICAL COSTS PER FULLY IMMUNIZED CHILD
WITH ALTERNATIVE DELIVERY MODES
 (1979 US DOLLARS)

Delivery Mode	Vaccine Supply ^{b/}	Cold Chain	Trans- portation	Salaries/ Training ^{c/}	Other ^{d/}	Total Cost/Fully Immunized Child ^{e/}		Domestic Cost	Foreign Exchange Costs
Fixed	1.00	.20	.20	2.00	.25	3.65	(4.80) ^{f/}	2.20	1.45
Outreach	1.05	.30	.30	2.00	.25	3.90	(5.13)	2.20	1.70
Mobile ^{a/}	1.05	.30	4.75	2.50	.30	8.90	(11.70)	2.75	6.15

^{a/} Mobile teams require imported petroleum, explaining the high transportation and foreign exchange component of the mobile mode.

^{b/} Vaccine wastage is assumed 5% higher in Outreach, Mobile Modes.

^{c/} Salary and training costs are arbitrary and may be higher or lower depending on the salary scale in each location.

^{d/} Other costs include surveillance, evaluation and research.

^{e/} Includes costs of immunizing pregnant women as well.

^{f/} Total cost figure in parentheses indicates the fully immunized cost per child and mother immunized in 1982 U.S. dollars.

SOURCE: Barnum, Annex XXX

TABLE XII

Projected Size of Population To Be Covered and
Estimated Total Annual Cost of Alternative EPI Delivery

Estimated Proportion of Target Population Receiving Immunizations		Number of Immunizations a/		Cost per Fully Immunized Child b/		Total Cost of Immunizations d/	
Year	%	Infants	Pregnant Women c/	Fixed	Outreach	Fixed	Outreach
		('000,000)		Services	Services	Services	Services
				(US \$)		(US \$1,000,000)	
1981	10	1.37	1.57	4.42	4.66	6.05	6.38
1982	15	2.11	2.42	4.80	5.13	10.13	10.82
1983	20	2.88	3.32	5.28	5.64	15.21	16.24
1984	25	3.69	4.25	5.81	6.21	21.44	22.92
1985	30	4.54	5.22	6.49	6.83	29.46	31.01
1986	35	5.40	6.27	7.13	7.51	38.50	40.55
1987	40	6.29	7.36	7.84	8.26	49.31	51.96
1988	45	7.22	8.46	8.63	9.09	62.31	65.63
1989	50	8.02	9.65	9.49	10.00	76.11	80.20
1990	55	9.18	10.89	10.44	11.00	95.84	100.98
1991	60	10.22	12.18	11.48	12.10	117.33	123.66

a/ The figures are the number of immunizations, based on Table 3 and the proportion receiving immunization listed in Column 1.

b/ Implies 10% inflation rate, based on a 1979 figure of \$3.65 per fully immunized child. (Includes cost of immunization for pregnant women).

c/ Separate data on costs for immunizing pregnant women is not available.

d/ Total cost values include surveillance, evaluation and research, but not the costs of technical advisors, management training or health education all of which contribute to the immunization. These cost figures assume that the relevant population have access to fixed facilities and related outreach services.

Note: Column 6 = (Col. 2) x (Col. 4)
Column 7 = (Col. 2) x (Col. 5)

Table XIII estimates the total costs if projected coverage is achieved and expansion of fixed and outreach services follows the anticipated growth path shown in Table X. In the first three years of the project fixed services can fully accommodate the EPI. From 1985 on the total costs include an increasing proportion of outreach services which leads to a rapid increase in costs. The total amount required to meet the target population between 1982 and 1989 is \$307.99 million, using outreach only when fixed services can no longer accommodate the entire target population. The total cost of using fixed and outreach services exceeds the cost of only using fixed services by less than \$6 million; however, the costs savings are over \$11 million if a combination of fixed and outreach is used instead of just outreach.

a. Alternative Immunization Packages:

The cost effectiveness of health interventions can be measured by comparing the costs per disease case and the costs per death prevented across programs. For example, it is useful to estimate and compare the costs per case and death prevented of separate programs versus package immunizations to identify the most cost effective approach to immunization.

Cost effectiveness comparisons can easily be calculated by dividing the total cost of each immunization program, or combination program, by the appropriate number of recorded cases and deaths (attack rate). Data constraints often inhibit such analysis; however, below is an example of just such an analysis in Kenya.

Example: Table XIV provides the necessary comparative data for the seven immunizable diseases. The cost per death prevented by the entire immunization program is \$85. It is also estimated that the cost per death prevented by adding the immunization of children over one year of age in the implementation phase is 60 percent greater than the cost per death prevented from the immunization of new births only (in Table 6, #8 versus #9). While the absolute difference in cost is not great (\$70 versus \$113 per death prevented), the cost differential does imply that, it is more cost effective to concentrate on immunizing newborns rather than adding full immunization programs for older children to an existing PHC program. This discrepancy is attributable to the higher attack rates and case fatality rates in the first year of life for many of the diseases.

Looking at the separate immunizations it can be seen that the measles immunization is the most significant component of the total program and, at \$50 per death prevented would be highly cost effective even if it were necessary to carry it out as a separate program. DPT, TT and BCG together are somewhat costly (at \$274 per death prevented) as a separate program but are highly cost effective (at \$69 per death prevented) as a component of the total program.

In contrast polio immunization, even when considered as marginal (that is, as an added program) cost almost twenty times more (\$114) per case prevented and seven times more (\$568) per death prevented than the overall program. It should be noted that this result is highly dependent on the low attack rate for polio and the estimated domestic recurrent costs. If the true attack rate

TABLE XIII

Cost of Coverage with Fixed and Outreach Services

<u>Year</u>	<u>Number of Infants Covered (millions)</u>	<u>Percent Covered by Fixed Services</u>	<u>Percent Covered by Outreach Services</u>	<u>Total Cost a/ (millions)</u>
1981	1.37	26.5	-	6.05
1982	2.11	27	-	10.13
1983	2.88	27.5	-	15.21
1984	3.69	28	-	21.44
1985	4.54	27.5	2.5	29.53
1986	5.40	28	7.0	38.85
1987	6.29	28.5	11.5	49.99
1988	7.22	29	16.0	63.31
1989	8.02	29.5	20.5	79.53
1990	9.18	30	25.0	98.23

a/ The first four years the total cost is only for fixed services.

COST EFFECTIVENESS OF POSSIBLE IMMUNIZATION PROGRAMS
FOR KENYA

PROGRAM DESCRIPTION	COST 000's of K. sh.	COST PER CASE PREVENTED	COST PER DEATH PREVENTED
		K.sh. (\$)	K. sh. (\$)
1. Total Program	131999	36 (\$4.8)	641 (\$85)
2. DPT, TT, BCG only	93763	61 (\$8.1)	2058 (\$274)
3. Measles only	59291	28 (\$3.7)	374 (\$50)
4. Polio only	76902	9539 (\$1272)	47676 (\$6357)
5. DPT, TT, BCG as marginal program ^{1/}	23729	15 (\$2)	521 (\$69)
6. Measles as marginal program	31368	15 (\$2)	198 (\$26)
7. Polio as marginal program	6868	852 (\$114)	4258 (\$568)
8. New Births only	69470	33 (\$4.4)	527 (\$70)
9. Implementation marginal (ALL IMMUNIZATIONS)	62529	40 (\$5.3)	946 (\$113)
10. Implementation marginal (DPT, BCG, Polio)	39205	56 (\$7.5)	2815 (\$375)

1/ Marginal implies an add-on immunization effort to existing PHC system; otherwise a vertical immunization project is assumed.

Note: These data were compiled from existing studies; missing data were extrapolated from other African studies. However, the data are not unrealistic.

Source: "Cost Effectiveness of Programs to Combat Communicable Childhood Diseases in Kenya," Howard Barnum, AID/SOD/PDC-C-0201, #2. 1980.

is significantly underestimated or the additional personnel time and other recurrent costs are greatly overestimated the actual cost effectiveness of polio immunization would be greater. But, as calculated, the high cost of polio immunization per unit of effectiveness encourages a search for alternative, more cost effective interventions.

This example can easily be adopted in designing the country-specific immunization efforts; if any of the relevant data are obtainable such analysis should be undertaken to identify the most cost effective immunization program.

b. Training and Technical Advisors:

Alternative methods for ensuring competent manpower for EPI implementation do not exist. Adequate training is fundamental to the success of primary health care delivery in general and to EPI efforts in particular. Under such circumstances the issue becomes the adequacy, relevance and quality of training and the training needs of each level of health personnel.

c. Diarrheal Disease

Oral Rehydration

This section considers the cost effectiveness of a program of oral rehydration for children suffering from diarrhea. Two alternative estimates of costs are made. The first estimate gives the cost of mounting a separate, independent, rehydration program not drawing on personnel time or administrative expenses of the immunization program. The second estimate gives the cost of adding oral rehydration as part of an integrated child health program including immunization. In this case the instruction and motivation of the mother in the use of oral rehydration therapy would be given at the same time as a visit for immunization.

Given the costs and effects estimated in the Annex, it can be calculated that with an effectiveness of 25 percent the cost per death prevented by an independent oral rehydration would be (\$147) and for the "added" program the cost per death prevented would be (\$122). Twenty five percent effectiveness is not a well established figure.

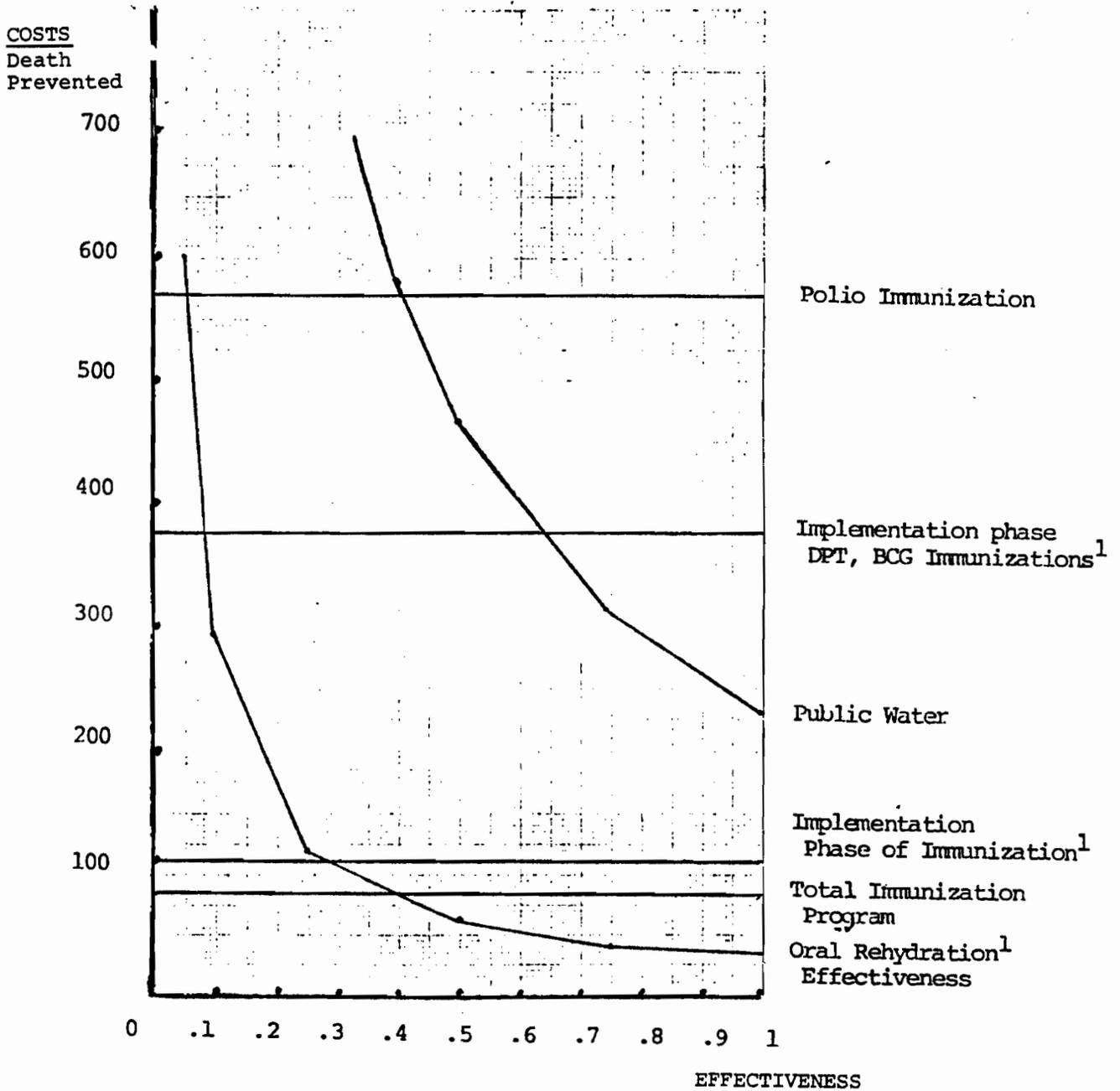
5. Community Water Project

In this section the hypothetical cost effectiveness of a low technology water supply project is estimated for a community of 10,000. This effort is an alternative means of reducing child mortality due to diarrheal disease.

To allow a comparison of the alternative programs, Figure 1 provides, graphically, a summary of the calculations of the cost per death prevented of immunizations, water programs and oral rehydration therapy in Kenya. Because the efficiency of the program is not well established the cost effectiveness of the oral rehydration and the community water project are presented as functions of their respective levels of effectiveness. The efficiency of immunizations is more firmly established and the costs per death prevented are horizontal lines, indicating fixed levels of effectiveness which are based on the immunization effectiveness calculations above.

FIGURE 1

COMPARISON OF THE COST EFFECTIVENESS OF A
PUBLIC WATER PROJECT AND ORAL REHYDRATION PROGRAM
WITH SELECTED IMMUNIZATIONS



¹ Considered as added to an ongoing immunization program.

Source: Barnum, "Cost Effectiveness of Programs to Combat Communicable Diseases in Kenya"

Both polio immunizations and community water projects are much less cost effective, as measures to reduce child mortality than are the other immunizations or oral rehydration. At a .25 level of effectiveness oral rehydration is a more efficient use of funds to reduce child deaths than water projects at any level of effectiveness and is approximately \$500 less per child death prevented than polio immunization. At a level of effectiveness above .1 the addition of oral rehydration to an immunization project is more efficient than the DPT. BCG immunization of children 1-4 in the implementation phase of the project (measle immunization is highly cost effective in both program phases); and, if the level of effectiveness of oral rehydration in home therapy is greater than .4 the cost per death prevented through the integrated program (immunization plus oral rehydration) will be less than for the total immunization program separately.

An implication of this analysis is that a careful study needs to be made of disease incidence before designing an immunization program. A second, more specific implication is that oral rehydration administered in home therapy may be a justifiable alternative use of funds to polio immunization or, if the effectiveness of oral rehydration is high enough, to the immunization of children over one year of age with DPT, BCG in the implementation phase of the program.

6. Complementary Sectoral Initiatives

Complementary efforts in population/family planning, nutrition, and water supply and sanitation are needed to maximize the effectiveness and benefits of the EPI. None of these programs can be easily integrated into CCCD, but countries participating in the immunization program should consider developing and implementing projects in these complementary sectors to enhance the benefits and minimize the potential negative side effects of EPI.

7. Financing

The costs of continuing the immunization program once the donor input terminates have not been estimated. PHC costs are high and population pressures will exacerbate the problem; and, foreign exchange is a major constraint for most of the African countries. Hence, program continuation may well hinge on long term donor assistance, for even the marginal cost of adding immunizations to existing systems may be unaffordable for the low income countries of sub-Saharan Africa.

Other bilateral donors as well as AID should extend their assistance or involve WHO in coordinating continuation in the various countries. Without plans for such a shift the investments made by AID in particular and CADA in general will have very little payoff. However, a more relevant time for such an assessment may be at mid-project review, but it should definitely be an important consideration for CADA.

C. Technical

The technical feasibility of the control of the major childhood communicable diseases proposed by this project has been extensively investigated by WHO, CDC, and other health organizations. The basic methods selected for the control of these important childhood communicable diseases in sub-Saharan Africa have been demonstrated by these organizations to be effective. Similarly, these and other studies have demonstrated the wide ranging needs for support in those program areas covered by the intervention components of this project.

The impact of immunization can be predicted with reasonable certainty based on work carried out in several countries over the last three years. Projects undertaken by CDC in selected areas of Cameroon, Gambia, Ivory Coast and Zaire indicate that coverage of at least fifty percent of the susceptible population with the target vaccines can ordinarily be achieved in these countries within five years. This would result in a reduction of approximately fifty percent in morbidity and mortality attributed to the targeted vaccine preventable diseases. In addition, the effective control of these diseases in developing countries attests to the technical feasibility of this method of disease control. However, for most of these vaccines to be effective, they must be carefully handled, kept adequately refrigerated until administered and the full dose injected into the recipient. In sub-Saharan Africa, one of the greatest challenges to mounting an effective immunization program is the development of an efficient cold chain for vaccines, especially in rural areas. The development of an adequate cold chain is technically feasible but will require considerable investigation to determine how vaccines can best be delivered to medically underserved populations.

Less experience is available regarding the effectiveness of diarrheal disease control programs, especially in Africa. However, from WHO and CDC experience in demonstration projects in Asia and Latin America, oral rehydration therapy programs have been shown to reduce infant and childhood mortality from diarrhea by ten to thirty percent (actually fifty percent or greater in the cases treated). The oral rehydration packets are relatively inexpensive and the technology is available for their production within some African countries.

The effective control of yaws in Africa has also been shown to be attainable if sustained efforts at case identification and treatment with penicillin are applied.

The cost-effectiveness of presumptive treatment for malaria requires study before this activity is incorporated into the CCCD program.

All CCCD project components have an important technical assistance element which is key to the implementation of CCCD. In addition to the short-term technical assistance for program planning, evaluation, surveys, operational research and training, long-term assignment of technical assistance personnel will be required on both regional and sub-regional bases. (Regional and sub-regional medical epidemiologists can assist with data systems, epidemiologic surveillance, and program problems in developing countries.) Management

weakness is a pervasive problem in developing countries, and a major thrust of the project will be to increase country self-reliance and capability in this area. Implementation of individual country programs will be greatly assisted by the temporary assignment of operations officers.

Following its consultations, interviews, meetings and other research in Europe, Africa and the U.S., the project design team identified the following intervention components as essential and of critical importance for the achievement of CCCD objectives:

1. Training and Staff Development

The critical importance of training to improve the capability of sub-Saharan African health systems to meet health care needs was discussed earlier.

Principal inputs for this project component would consist of appropriate curriculum development, long and short term technical assistance training personnel, U.S. and African, and travel and per diem for course participants.

Typical costs for training activities, as estimated by CDC are as follows:

Regional two week management course	\$80,000
In country, mid-level management course, three one week sessions per year	30,000
Cold chain course	50,000
Seminars/workshops, each	50,000

Using these figures, the total cost for training and staff development over the life of the project, unadjusted for inflation, are:

42 two week regional courses	x \$80,000 = 3.36 million ^{1/}
80 three week in-country courses	x 30,000 = 2.4 million ^{2/}
24 cold chain courses	x 50,000 = 1.2 million
10 seminars/workshops	x 50,000 = <u>0.50 million</u>
	Total - \$7.46 million

The rationale for the training recommended is as follows:

1/ Includes 10 courses each for EPI and CDD, Management I and II

2/ Includes 60 EPI and 10 CDD courses.

Management I

As a result of WHO-EPI activities, almost all sub-Saharan Africa countries have had senior level personnel attending an EPI Management I course. For the future, the EPI senior level courses will be conducted primarily to train personnel turnovers and to maintain skill levels and upgrade those previously trained. This "maintenance" phase will be accomplished by using "facilitators," i.e., those previously trained in the training course.

Management I for CDD is just getting started. The CCCD courses will utilize the curriculum developed by WHO/CDC (see Annex II).

Management II

As previously noted for EPI, one regional two week course will be given annually in both English and French to train state, division or provincial EPI supervisors, concentrating on providing them with skills necessary to train district level EPI supervisory personnel. These in turn will be trained in the three, one week in country management II courses, and they will train subordinate staff at the service delivery level in conjunction with monthly staff meetings, with assistance from higher level personnel and resident CDC staff when available.

On the average, one state, division or provincial level EPI supervisor per million population will be trained in regional courses; one district level supervisor per 150,000 population will be trained in country and one service delivery level supervisor per 25,000 population will be trained by the district supervisors. The rural support project will pay for management I and II, both EPI and CDD, as well as for cold chain courses and seminars. The country specific programs may partially fund training down to the village level, depending on the country situation.

The mid-level training for CDD is still in the planning stage.

Both WHO and CDC are presently considering combining EPI and CDD management training. Should this occur, there is no present intent to reduce the number of total training sessions to be provided under the CCCD project. The number of people to be trained reflects projected trained manpower needs and takes into account availability of suitable participating country health workers both in terms of numbers and their being able to spend the required time attending courses.

At periodic project reviews and evaluation, the adequacy and level of the training effort will be assessed and adjustments will be made as required.

Management I and II usually involve 40 participants and 10 facilitators (trainees) in addition to the course managers. Typically, eight participants and two facilitators constitute a training group. Every effort is made to have in each group one facilitator who has previously gone through the course. In this way a pool of trained facilitators is developed.

Although the regional level management courses are for a two week period, in fact three weeks are required to put on such a training session. A "pre-course" week is necessary to prepare for the course, make necessary arrangements and to go through course materials and methodology with the untrained facilitators who will actually carry out much of the training.

Completion of Management I does not adequately prepare graduates to supervise EPI or CDD activities. Generally these graduates will spend two weeks to six months in a demonstration training area. Currently, there are three such areas in West Africa in the SHDS project, Cameroon, The Gambia, and Ivory Coast, and it is anticipated that similar areas will be available in East Africa.

In addition to the training detailed above, there will be in-country on the job training, and staff development with respect to disease surveillance, data and evaluation.

2. Data Systems for Disease Surveillance, Program Management and Evaluation

WHO/AFRO is already providing training for senior and middle level epidemiologists in courses that are offered twice a year. It is planned that the CCCD effort would provide the in-country follow up to achieve a greater spread effect from the training. This component of the regional support project would focus on:

a. Developing a capacity at the local level to conduct simple analyses and use the data collected to assist and guide them in the conduct of their work, and

b. At the regional level the development of an on-going system of problem identification and solution.

c. At the national level measuring progress towards disease reduction targets.

Funds will be made available through the regional support project to conduct sub-regional "continuing education programs" both for the collection and the use of relevant data. It is envisioned that one to two, two week courses would be taught in each of several sub-regions each year with one week being devoted to formal training and the second week involving the presentation of an actual epidemiological studies conducted in a specific area within the region. The objective will be to familiarize the participants, not necessarily physicians, with the practical use of the data and allow them to share in the actual experience of others in the region involved in operational programs. The CDC regional epidemiologists would be primarily responsible for organizing and conducting the courses, but funds would also be available to finance outside experts and to fund TCDC participants.

3. Health Education/Promotion

The ultimate success of all health service programs is substantially dependent upon the informed participation and support of the communities and

population served. Children are the ultimate target population for the services provided by this project. However, major efforts will be necessary to inform parents and community leaders of the rationale justifying support of the program being made available, so as to gain their participation. Although health education/promotion has long been identified as an essential component for successful programs, in practice it has been poorly supported in many African countries, and the opportunity exists for CCCD activities to make a major contribution to correct this situation.

In order to stimulate the health education element of the CCCD program, AID will provide funds through the CCCD Regional Support project to coordinate the overall CCCD effort in this area, provide a means of supporting health education efforts at the country level, and facilitate the involvement of Peace Corps volunteers in a number of the CCCD country specific activities.

The services of a full time health educator will be obtained under contract to coordinate this element of the CCCD program. The contractor should have a sociological/anthropological orientation as opposed to a materials production bias, since the majority of the regional effort will be in support of programs to gain political support for EPI and CDD activities at the policy level and stimulate community involvement at the village and local level. Although some materials will be prepared for use in the regional training program the emphasis of the full time coordinator will be directed at supporting and stimulating local programs. Funds will be available in the contract to furnish short term experts to work with the ministries to build up their own capabilities in this area and overcome specific problems which might arise in the process of carrying out the CCCD program.

To the extent possible the short term advisors should be drawn from available African sources, but when this is not feasible we would anticipate non African short term advisors would have a particular knowledge of the country in question as well as having the requisite technical expertise and experience.

Limited funds will be available to develop culturally specific materials for local use in the activities to promote community participation and understanding of the program. Before preparing these materials, contractors will be required to seek inputs from target populations. These materials will be tested for appropriateness prior to being reproduced in quantity. By stressing local participation at all stages these activities should result in programs with a definite area or community focus. At the same time this approach seeks to build a capability within the ministry to operate effectively at the community level. In this respect the Regional Support project serves as a convenient mechanism to deliver these services down to the level where they are needed and cumulatively can have a substantial impact on the success of the CCCD program.

Because of the importance of being able to work at the community level to get the EPI and CDD messages understood and accepted this aspect of the program is ideally suited for Peace Corps involvement. AID therefore intends to work closely with the Peace Corp to plan and implement a collaborative effort in this area. The Regional Support project will provide funds to train

volunteers who are designated to work in CCCD country specific activities, and will work jointly with the Peace Corps to assure that the timing and nature of the volunteers' tours are dovetailed with the rest of the CCCD effort.

At the time the agreements are drawn up at the country level the role of the Peace Corps along with that of AID and the responsibilities of the host country will be spelled out. Although the actual number of volunteers required is an unknown at this point, an estimate of 150 to work on the CCCD program is being used for planning purposes.

Through the CADA mechanism and collaboration with other donors it is planned to combine the experience and resources of several donors to achieve a significant impact on the area of health education as it relates to CCCD program. WHO, UNICEF and several CADA members have had considerable experience in developing appropriate posters and similar materials and have come up with many innovative approaches to health education and promotion. The UK has a particularly impressive record in this field and has expressed considerable interest in becoming active in this part of the CADA program. Other donors have also indicated their desire to participate in the promotional and educational side of the program.

All these efforts will be focused on building a permanent capability within the health ministries that will permit them to provide continuing and effective support to the EPI and CDD activities during and beyond the time frame of the current CCCD program.

4. Operations Research

Although WHO and many African nations have developed specific programs for the control of childhood communicable diseases, many technical and operational issues remain to be clarified. This component of CCCD project activities will include applied field research to address deficiencies in knowledge, which provides significant obstacles to the achievement of project objectives as well as activities directed towards the study of ways to more efficiently and effectively utilize current knowledge.

It is primarily up to program managers to recognize the need for management information. However, program managers in most less developed countries require orientation and guidance in this matter.

Historically, few studies of health services have resulted in significant change in the service studied. This is often because the study was carried out as an intellectual inquiry rather than to provide information for management decision-making. Studies and operational research tend to be too complex and overly ambitious. It is important to keep these as simple as possible and to provide answers to specific questions. With this in mind, in the CCCD project, it is anticipated that although many studies will be performed, most will be small and inexpensive. Most of the study proposals will be initiated by the people responsible for making the programs work. The grants will be made to

the country programs to conduct the research to solve their specific field problem. Once studies are completed the Regional Support project will take responsibility for distributing the results throughout the region so that others facing similar problems can also benefit from the results and findings.

D. Social Soundness

The earlier design team under contract with One America, Inc. contained an anthropologist/sociologist, Dr. Theresa Anne Ware. She traveled with the team to Africa where they visited countries during the space of weeks. Dr. Ware's more detailed Social Soundness analysis is contained in Annex E. It is summarized in this section of the Project Paper.

1. Sociocultural Feasibility

Health Interventions and Demands on Targeted Adult Populations

The ultimate demand on targeted adult populations, especially mothers, is that they assume full responsibility for the maintenance of the health of their children and that of their families. This demand implies changes in individual and group beliefs, attitudes, and behavior about health, illness, and disease.

An understanding of how Africans respond to health, illness, and disease requires on-going appropriate social science research and information about groups targeted. This understanding should be reflected in the design and implementation of health education and public promotion programs. Building on the familiar also facilitates understanding and acceptance of a new intervention. Change will "make more sense" if brought about within familiar and cultural frames of reference.

Demographic and Social Unit Analysis

Demographic profiles of participating countries - migration and resettlement patterns, as well as birth rates, ethnic and language makeup; and income and educational levels should be available from WHO and other regional sources. This data is critical because it will provide the base for forecasting demographic configurations into the next decade when the effects of CCCD will bear upon economic policy.

The location and clustering of important religious and political groups should also be determined. Being in a position to analyze population shifts and movements, as well as structural and behavioral patterns of family units, kin groups, political groups, and religious groups should facilitate planning and operations design.

Locally Familiar Health Structures: Indigenous Health Care

It is incumbent upon the planners of the country specific activities to have an understanding of traditional health systems, not as an odd collection of customs nor for the purpose of ridding a group of taboos, rituals or witchcraft; but as a part of a complex of social relationships and cultural patterns of beliefs and behavior. Traditional health systems should be understood not solely for the purpose of pinpointing cultural resistances or obstacles, though this is important but to identify positive aspects which can be strengthened and utilized in the fuller realization of the delivery of a CCCD program.

Specialty categories within the traditional hierarchy of specialists are as follows:

- 1) First, there are the women whose training, skills, and techniques "include such practices as the use of poultices, purgatives and emetics, inducing sweating by various processes, and all the traditional birth practices." 1/ Women are generally considered to be very unspecialized people within the hierarchy of traditional health specialists. Their significant role and status is that of midwife and/or traditional birth attendant.
- 2) Second are the male specialists with ascribed or acquired skills and techniques in such areas as bone-setting and rudimentary surgery.
- 3) Next are the male religious-medical specialists whose roles are highly specialized.
- 4) Last are the herbalists or traditional pharmacists whose extensive knowledge of herbs, mixtures of herbs, and bark is utilized in such illnesses as headaches, rashes, and fevers.

2. Spread Effects: The Diffusion of Innovation

Women as a Crucial Target Population

The population expected to ultimately benefit directly from EPI and CDD activities will be sub-Saharan African children aged 0-5 years. To get to this population, however, it will be necessary to go through the adult population, especially mothers. EPI and CDD activities will be greatly facilitated by an understanding of women's roles and status in their society.

Women, for example, have the daily task and responsibility of supplying water for all household needs. Contaminated drinking water is a source of illness in children and adults, yet boiling water may not be perceived as a sensible or practical solution to this problem; especially in light of the problem of a fuel supply for rural villages.

Allocation of Time and Implications for EPI and CDD Activities

Since a rural woman's time and daily routine is so inextricably interwoven with her role and status as a wife and mother, it is important to understand the regularized social and economic production behavior of these women if their acceptance and participation in CCCD-related activities is to be expected. These women cannot be expected to halt or interrupt their daily routine to participate in or listen to health education information concerning EPI and CDD.

Language, Women and Spread Effect

Women, especially rural women, will communicate most proficiently in the major indigenous language of their country. It will therefore be important to design materials, both written and audiovisual, which are the language and culture-specific.

Leadership/Authority and Diffusion

Identifying and soliciting the support of respected leaders from the center to the periphery would be a first step in the diffusion process. The entry point for a new health intervention may be through an agricultural extension program or through a Ministry of Education extension program.

At the periphery, local religious, political, or traditional family leaders may have more power, influence, and authority than Ministry of Health civil servants. Traditional medical specialists, depending on the degree of specialization and whether powers are ascribed or acquired, will enjoy a legitimacy and credibility not possible for outsiders.

Patterns of Mobility

Local populations are involved daily and seasonally in social and production activities which do not necessarily permit them to have or give much time to dialogue with visiting personnel about a new intervention. A record of the pattern of movement and mobility into and out of an area would permit planning which meshes with the flow of normal mobility and production activities. Communication and information points of entry may be most effective at known leisure periods or during peak market periods.

IV. IMPLEMENTATION ARRANGEMENTS

A. Administrative

1. Management Principles

The concept of CADA was to form an association of key donors who could collaborate to increase the efficiency of their resources already flowing to Africa as well as attracting additional resources by developing large programs of "concerted" action. Projects undertaken by CADA were to be of a large enough magnitude that any one donor could not be expected to provide all the funding, inputs would be forthcoming from at least three CADA members, the program would have impact on more than one country and preferably the region, and the nature of the effort would be such that could be identified as a CADA initiative. The CCCD program clearly meets most of these criteria.

In addition to establishing project selection criteria the CADA group also voiced a strong conviction that it should not establish a permanent secretariate or add another level of bureaucracy to the international community. The basic idea is to let each donor continue and expand their bilateral programs, but through CADA mechanism engender a new spirit of cooperation and increased focus in the efforts to assist the African countries in their development struggle. The management concept is one of cooperation and parallel financing as opposed to comingling and joint financing. For CADA programs one of the CADA members is designated as the lead donor, and as such has the task of coordinating the efforts of the other members and assuring a close working relationship and coordination between the CADA group and the international agencies and other non-CADA donors who may be active in the sector.

In the case of the CCCD program where WHO has already made considerable progress, a close and cooperative working relationship with WHO/AFRO will need to be maintained and is, indeed, critical to the success of the effort. Much of the management and monitoring responsibility can be shared, but the donors will need to retain management and accountability of the aspects of the program that relate to the expenditure and utilization of their resources. In arriving at its recommendations concerning the management of this program, the design team has tried to develop a structure that would build upon the strength of the activities already being carried out under WHO/AFRO auspices and would also emphasize the criteria and principles enunciated by the CADA group. Thus the structure presented below has been formulated with the idea of achieving maximum cooperation, allowing each of the principal donors the opportunity to function within the operating principles set by their national governments or international secretariates with full recognition to the position and role of WHO/AFRO and UNICEF in the region.

2. Management Structure

The direction and policy guidance for the overall program will be provided by an Advisory Council. The Council will be aided in its task by four or possibly five working groups. AID will play the role of principal coordinator and will manage those aspects of the regional support project which are funded by the U.S. CDC will be the implementing agent for this part of the program. The management of activities financed by AID and other CADA members at the country level will be the responsibility of the host countries along with the sponsoring donor, based on the agreements they work out.

(a) Advisory Council

At this stage in the development of the program it is envisaged that the council will have eight to eleven voting members depending on the number of CADA countries actively contributing to the program. Membership will include:

- o CADA (min. 3, max. 6 - more likely 4, including AID)
- o African experts (1 Anglophone, 1 Francophone)
- o WHO/AFRO
- o AFDB
- o UNICEF

Associated members could include:

- o Other non-contributing CADA countries
- o WHO/Geneva
- o CDC
- o Other donors with active EPI programs such as DANIDA

The Advisory Council will be chaired by AID as lead CADA donor. There will be in addition an executive committee to assist the chair in dealing with technical issues and formulating policy recommendations. Membership of this committee will ideally include WHO/AFRO, the two African Committee experts and CDC if these entities are willing to accept the assignment and serve in these capacities.

(b) Technical Working Groups

To assist the council in its work it is proposed to have four and possibly five working groups. These working groups will be technical in nature and the membership would be dependent on the technical expertise available. The Advisory Council will be responsible for establishing the committees and selecting their membership which might include technical experts drawn from African institutions or from sponsoring CADA countries, technical or operating personnel from CDC, WHO/AFRO, WHO/Geneva, UNICEF and USAID field missions or other CADA bilateral programs or regional organizations such as OCCGE, OCEAC, West African Health Secretariate, etc.

The working groups would meet on an as needed basis. It is currently anticipated that there would be a working group established for each of the components of the program, i.e., training, data and evaluation, operations research and health education. A fifth group to advise and assist on commodity procurement may be established if the Advisory Council deems it necessary or advisable. The council will be responsible for defining the scope of work for these groups and establishing the procedures and rules of operation.

The CADA management mechanism for this program is expected to evolve as the project moves further into the implementation phase and as the contact between the CADA members themselves as well as with the client states becomes more frequent. As this occurs roles will become more defined and specific functional assignments will be made. The object will be to provide the leadership and incentive for continued cooperation and coordination without overstructuring the process.

(c) Information Exchanges or Related Health Activities

During the design of this program it became apparent that in many instances there was a lack of information on precisely what was going on within a given country with respect to EPI and CDD activity. As part of the design effort reports were to be produced by each of the CADA members describing their EPI, CDD and related primary health care activities in the region. The intent is to establish a simple way of sharing this information with concerned host country officials and others active in the sector. A means for periodically updating this data also needs to be established. It is currently planned to designate a person within the donor community to work with a member of the host government to keep the information current and assure that it is shared with all the interested and concerned parties on a regular basis. The list of AID supported related health activities was the first of these reports to be completed. It is contained in Annex F. Other CADA members as well as international organizations have been provided with copies and have in turn agreed to produce and distribute similar material on their activities. As CCCD country activities are initiated or expanded this information sharing function will be assigned to someone such as a CDC operations officer or the UNICEF or WHO/AFRO representative who would be closely associated with the program. This person would then be responsible for motivating and stimulating this information sharing procedure.

3. AID

The AID funded portion of this project will be supervised by the Office of Regional Affairs in the Bureau for Africa (AFR/RA). A senior project officer will be charged with the overall management responsibility of the program. A full time physician will be assigned to the AFR/RA staff to monitor the PASA with CDC and other contracts related to the program and provide the overall technical coordination for all elements of the program. In order to provide continuity and maintain close contact with CADA technical community he will be assisted in this task by a senior physician advisor who will continue under contract to participate in the annual technical meetings, and further the collaboration between all concerned parties to the program that was started during the design phase.

It is also expected the personnel of the field missions and the REDSOs can be drawn upon to assist in solving specific field management problems, particularly in the case of the bilateral missions when the management issues are closely related to their ongoing health activities. Technical assistance funds will be obligated by a PASA or an amendment to the existing PASA with CDC and through an AID contract for the health education aspect of the program. Funds for training, data surveillance and evaluations, and operations research will be obligated under an umbrella grant agreement probably executed with WHO/Brazzaville if they are in agreement with this procedure. Limited Scope Agreements will be used for country-specific activities with special provisions and procedures prescribed for centralizing procurement of vaccines and cold chain and other delivery equipment.

4. Procurement Plan

The CCCD project will be implemented on two levels, regional and country specific. At the regional level, the implementing agent, the Center for Disease Control through its purchasing division will be responsible for the procurement of commodities, personnel and other goods and services necessary to implement the project at that level. Procurement under this grant will be in accordance with AID Handbook II and subject to AID (AFR/RA) approval. At the country-specific level the individual USAID Missions, with the technical assistance of CDC, will procure the necessary goods and services through normal AID channels. All local purchases of shelf-items will be made by the USAIDs but will be approved in advance on an annual basis by AFR/RA.

No construction is anticipated under the Grant. CDC will undertake its own recruitment of any U.S. personnel through its own channels and a PIO/T will be issued by AFR/RA for those activities to be conducted at the regional level. Country-specific activities that require long term technical assistance will obtain it through mission issued PIOs after approval of the PP for the start-up activities.

Procurement of vaccines and other pharmaceuticals to be used in the project will be in accordance with Handbook 1, Supplement B, Chapter 4c3 which contains a complete statement of AID's pharmaceutical policy. AID's policy applies to AID-financial local currency procurement as well as to dollar procurement. Vehicles have not been included as local cost items because it is expected that foreign exchange will be required for their procurement by the various USAIDs.

Justification for Source/Origin waiver requests for the purchase of vehicles from other than the United States will be included in bilateral assistance requests and will be judged on their individual merit. The same procedure will be followed by CDC for the regional portion of the project. Local purchases under the CCCD project will conform to sound commercial practices and will be consistent with the provisions of Handbook 1B, Chapter 18, local laws and policies of local USAIDs.

Pursuant to page 18-2 Handbook 1B, 18 A4 (a), (b) on purchase of Code 899 (non-Code 941) products or shelf items in local markets, A.I.D. financial inputs will not exceed 10% of overall costs during the life-of-project. Single items costs of Code 899 products will not exceed \$2,500.

Local and foreign purchases will be scheduled at the initiation of the project and will be modified at the beginning of each calendar year. Scheduling or commodity purchases will take into account the projected average time necessary for surface shipment and/or air freight of vehicles and other commodities. Replacement vehicles will be ordered six months to one year prior to the time they are required by the project. For country-specific activities before any monies are obligated during each year of the AID Grant, a commodity procurement schedule will be submitted to and approved by AFR/RA.

Disbursement of local currency will be consonant with procedures established by AID.

B. Implementation Plan

A number of EPI country-specific activities have been started under the AID regionally funded Accelerated Impact Program (AIP). As these activities (usually planned for two years or less) approach their termination dates the CCCD program will evaluate the experience and determine what follow-on actions consistent with the model described earlier in the paper may be appropriate.

All of the country-specific activities to be financed with regional funds under the CCCD will be closely coordinated with the field missions and discussed in advance with the other CADA members. When a country expresses interest in participating in the program on a country-specific basis and is willing and able to meet the criteria, negotiations would begin between the field missions or REDSOs following the pattern used for developing a bilateral agreement. The PID would be submitted from the field and approved in AID/W. The mission director or REDSO director, depending on existing arrangements, will authorize the country-specific activities. It will be necessary for the field mission to stay in close contact with AFR/RA during the process to assure that the country project takes full advantage of what can be provided through the Regional Support Project. When the grant agreement is negotiated funds will be allotted to the field, and the project will be administered and monitored in the same manner as a regular bilateral project with AFR/RA providing the Washington backstopping and CDC/Atlanta providing the agreed-upon technical services through the regionally funded PASA.

The monthly events on the implementation timetable encompass anticipated AID, CADA and bilateral actions which need to take place over the life of the project.

<u>Month/Year</u>	<u>Event</u>
July 1981	PP Approved
August 1981	CDC PASA amended
Sept. 1981	CADA Technical Meeting
Late fall 81 or early 82	Implementation discussions with Africans
March 1982	CDC produces detailed implementation schedule including timebables for fielding personnel training schedule and outline for data and surveillance effort.
April 1982	First meeting of Advisory Council. At this meeting working groups will be appointed, and tentative schedules for initiated or expanding EPI and CDD activities will be developed.

C. Evaluation

Four internal and three external evaluations of CCCD project activities will be carried out over the five year life of the project.

1. Internal

The first internal evaluation will be conducted in late calendar, 1982, approximately eighteen months after initiation of the project. This should allow ample time for project start up.

Internal evaluations will review the status of regional and sub-regional activities. They will also note the extent of other donor interest and the opportunities for cooperative involvement in CCCD.

The focus of the evaluation will be on measuring program performance including level of effort and management and logistical performance of each element of the project, e.g., health education and promotion impact on consumer acceptance of disease control services. The process of the project will be studied with the aim of delineating potential areas where operational research would be useful in finding ways to reduce project costs and/or improve achievement of project targets as a result of project activities.

Evaluation results will be used as the basis for project modification and as the data base for the subsequent years internal evaluation.

The first internal evaluation will be carried out by a four person team, representing WHO, CDC, AID, and a participating CADA country. 1/

Evaluation of country CCCD activities will include host country personnel in addition to the CCCD evaluation team.

The number and size of operating CCCD programs will expand during the life of the project. To undertake site visits and other evaluation activities increasing numbers of evaluators will be required as the project progresses. Thus, the second evaluation in late 1983 will be conducted by two teams. For the third internal evaluation (scheduled for late 1984) and the fourth and final internal evaluation (to be held in September, 1985), three teams will be utilized. Four persons may not be required on all teams.

Both CDC and WHO have well-developed protocols for evaluating disease control programs. It is assumed that these will be appropriate for the CCCD project. In the event they are not, AID or a contractor could be employed to establish the necessary project data base and evaluation methodology.

1/ For the purposes of evaluation, all of the team representatives are considered internal personnel. All internal evaluations will be carried out by teams whose members come from the four organizations noted.

2. External

In addition to concern over level of effort, process, and program performance, the external evaluation will measure project outcomes - e.g., actual impact on mortality and morbidity.

The first external evaluation will take place in November, 1983, carried out by a team of five persons (public health physician/team leader, health educator, operations officer, anthropologist, and economist). This team will conduct an evaluation to measure the following project output indicators:

1. number of ministry of health managers and mid-level personnel trained in EPI, CDD and yaws techniques;
2. number of baseline surveys conducted;
3. number of operations' plans written;
4. number of health information systems designed; and
5. quantities and utilization of project commodities.

This evaluation will also examine the status of cold chain refrigerator equipment in terms of the condition of chain refrigerator equipment and the number and competence of people trained in maintenance. Health education and promotion activities will be evaluated for quality and quantity of materials developed and distributed and for impact on utilization of CCCD services.

As the project develops, additional external evaluators will probably be required. Their number will be kept at a minimum consistent with undertaking the work required. The disciplines employed generally will be those noted above. It is also likely that a biostatistician will be needed, particularly to assist with outcome measures.

The second and third external evaluations will take place in late 1984 and 1985 respectively.

It is anticipated that the external evaluators will suggest profitable areas for operational research to deal with deficiencies and problems concerning project activities.

Particularly important will be outcomes evaluation, for example, the effect of the project on extent of effective immunization (sero conversion); impact on health status; project costs and cost effectiveness; cultural appropriateness of service programs; training outcomes, etc.

The third (final) evaluation will assess the extent to which the project has achieved its purpose and objectives and will make recommendations for follow on CCCD activities.

3. Evaluation Schedule

a. First internal evaluation	November 82
b. Second internal evaluation	October 83
c. First external evaluation	November 83
d. Third internal evaluation	October 84
e. Second external evaluation	November 85
f. Final internal evaluation	September 87
g. Final external evaluation	November 87

D. Conditions, Covenants and Negotiating Status

1) Regional Support Project

Before monies are obligated for the PASA with CDC, each fiscal year an annual budget will be submitted to and approval by AID/W. Before project agreement (s) are executed obligating funds to cover the training costs funded under the Regional Support project, detailed budgets including numbers of each type of training course to be given will be submitted to AID (AFR/RA) for approval. These submissions will cover the current years anticipated expenditures and projecting future year requirements.

2) Country-Specific Activities

(a) Before monies are obligated to cover the costs of data collection, disease surveillance and evaluation, and operations research financed under this section of the project annual budgets will be prepared by CDC and approved by AID. The project agreement(s) will also set forth the disbursement procedures to transfer these funds to the individual country activities where implementation will take place.

(b) When individual limited-scope-grant agreements are planned to be executed under this program the concerned USAID or REDSOs, in collaboration with CDC, will submit a Project Identification Document (PID) to AID/W for approval. There are no outstanding covenants.

**PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK**

Life of Project: _____
 From FY 81 to FY 88
 Total U. S. Funding \$47 million
 Date Prepared: July 2, 1981

Project Title & Number: Combatting Childhood Communicable Diseases

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <p>To improve the health status of the pediatric population of sub-Saharan Africa.</p>	<p>Measures of Goal Achievement: Reduced morbidity and mortality rates for selected communicable diseases in target populations. (See details in project description.)</p> <p>(1) Reduction in incidence and prevalence of selected communicable diseases (2) Target population participation in health care activities. (See details in project description.)</p>	<p>A marked increase (50%) of countries with an acceptable primary health care (PHC) program includes a CCCD component.</p> <p>Incremental increase in immunizations against target diseases in participating countries by 10% per year.</p>	<p>Assumptions for achieving goal targets: Adequate baseline data will be available or will be collected by special surveys.</p> <p>Participating governments will support the development and maintenance of data collection systems.</p>
<p>Project Purpose: Strengthen the Africans' ability to control:</p> <ul style="list-style-type: none"> o Six childhood communicable diseases (measles, polio, tuberculosis, diphtheria, pertussis (whooping cough) and tetanus) through Expanded Program for Immunization (EPI). o Diseases of local importance such as yellow fever and yaws and possible malaria at some point in the future, and o Provide simple treatment for the Control of Diarrhea Disease (CDD). 	<p>Conditions that will indicate purpose has been achieved: End of project status.</p> <p>50% of target population in AID supported countries fully minimized against the six EPI diseases.</p> <p>50% reduction in prevalence of EPI diseases and episodes of diarrheal deaths.</p>	<p>(1) Trained Personnel (2) EPI Activities Operating</p>	<p>Assumptions for achieving purpose: Participating countries will continue to place a high priority on CCCD and developing PHC programs and will provide adequate resources to support these activities.</p> <p>WHO, SHDS, and other regional organizations will continue to provide support and training in developing country-specific health care programs.</p> <p>Participating countries will actively seek participation in CCCD programs.</p>
<p>Outputs:</p> <p>(1) Trained Personnel (2) CDD and EPI Activities Operating</p>	<p>Magnitude of Outputs:</p> <p>(1) 4800 upper and mid-level health personnel trained in target region; trainees for lower level health workers trained. (2) CCCD programs (EPI/CDD) operating in a minimum of twenty countries. (3) MCH's conducting new operational research projects in 10-15 countries.</p>	<p>(1) CCCD project records (2) Assessment of MOH programs (3) On-site visits (4) On-going training program observation</p>	<p>Participating countries will make adequate and appropriate personnel available for participant training.</p>
<p>Inputs:</p> <p>(1) Technical Assistance (2) Training (3) Data Systems for Disease Surveillance, Program Management and Evaluation (4) Health Education and Promotion (5) Operations Research (6) Commodities</p>	<p>Implementation Target (Type and Quantity)</p> <p>97 Person Years 112 courses given 25 Systems 160 OR Activities</p> <p>Measles Vaccine (5,381,000 doses) Cold Chain Equipment Vehicles (65-4/wheel drive, 500 mobilettes, 650 bicycles) Immunization Supplies & Equipment Oral Rehydration packets (20 million)</p>	<p>(1) PASA with CDC (2) PIO/Ts. Grant Agreements (3) PIO/Cs. (4) PIO/Ts and in-country records.</p>	<p>Assumptions for providing inputs: MOHs develop ways and means of reproducing, distributing and utilizing: a. Oral rehydration salts; b. CCCD health promotion materials.</p> <p>Participating country has the ability to provide personnel, building space and other support. T/A personnel can be recruited and assigned to project as needed.</p>

Detailed Regional Support Project Budgets

	<u>Page</u>
I. Technical Assistance	
A. CDC Staff (Atlanta)	1
B. CDC Staff (Field)	2
C. Overhead	
II. Training	3
A. EPI	
B. CDD	
C. WHO/AFRO	
III. Health Education	4

CCCD BUDGET (In 000s U.S. \$)

	1981		1982		1983		1984		1985		1986		1987		1988		Total	
	\$	Mo.	\$															
I. Technical Assistance																		
A. CDC Staff (Atlanta)																		
1. Salaries and Benefits:																		
a. Technical Coordinator	50	12	50	12	50	12	50	12	50	12	50	12	50	12	50	12	12	
b. Evaluator/Assist. T/C	25	6	50	12	50	12	50	12	50	12	50	12	50	12	-	-	-	
c. Trainer (1/2 time)	-	-	20	6	20	6	20	6	20	6	10	3	10	3	10	3	3	
d. Med. Epidemo. (OR)	-	-	25	6	50	12	50	12	50	12	25	6	25	6	25	6	6	
e. Med. Epidemo. (Data) (1/2 time)	-	-	13	3	25	6	25	6	25	6	13	3	13	3	-	-	-	
f. Admin. Officer	15	6	30	12	30	12	30	12	30	12	30	12	30	12	30	12	12	
g. Secretary	20	12	20	12	20	12	20	12	20	12	20	12	20	12	10	6	6	
Sub-Total	110	36	208	63	245	72	245	72	245	72	198	60	198	60	125	39	\$1,574	
2. Travel & Per Diem																		
a. Domestic	4		12		12		12		12		12		10		4		78	
b. Foreign	20		60		80		80		80		80		60		20		480	
Sub-Total	24		72		92		92		92		92		70		24		558	
3. Communica., Info., Dissem., & Commodity Support	-	-	100		50		50		30		30		20		10		290	
TOTAL	134		380		307		387		367		320		288		159		\$2,422	

1

ANNEX B

II Training

AID FINANCED TRAINING

	1982		1983		1984		1985		1986		1987		1988		Total	
	\$	C ^{1/}	\$	C	\$	C	\$	C	\$	C	\$	C	\$	C		
A. EPI Management																
1. EPI Management I	160	2	160	2	160	2	-	-	160	2	-	-	160	2	800	10
2. " Management II (Regional)	160	2	160	2	160	2	-	-	160	2	-	-	160	2	800	10
3. " Management II (In-Country)	300	10	300	10	240	8	240	8	240	8	240	8	240	8	1800	60
4. " Cold Chain	200	4	200	4	200	4	200	4	200	4	100	2	100	2	1200	24
B. CDD Management																
1. CDD Management I	160	2	160	2	160	2	-	-	160	2	-	-	160	2	800	10
2. CDD Management II (Regional)	-	-	160	2	160	2	160	2	160	2	160	2	160	2	960	12
3. CDD Management II (In-Country)	-	-	-	-	120	4	120	4	120	4	120	4	120	4	600	20
4. Other Workshops/Seminars	50	1	50	1	100	2	100	2	100	2	50	1	50	1	500	10
C. WHO/AFRO Management																
1. TCDC	25		35		35		35		25		25		20		200	
2. Training & Logistics	42		48		53		32		52		28		45		300	
TOTAL	1097		1273		1388		887		1377		723		1215		7960	

1/ Number of Courses

CCCD BUDGET (In 000s U.S. Dollars)

	1981	1982	1983	1984	1985	1986	1987	1988	Total
III. Health Education									
Contract Services									
1. Long Term	-	240	-	240	-	240	-	60	780
2. Short Term	-	130	200	200	200	120	30	20	900
3. Materials	-	20	30	30	30	20	10	-	140
4. PCV Training	-	30	30	30	30	30	30	-	180
									<u>2,000</u>

ECONOMIC ANALYSIS

The decision to initiate a health program in sub-Saharan Africa poses a number of difficulties. Every country in the region approaches health care in a different manner; some have significant investments in urban care, others have attempted provision of primary health care to rural populations, still others have chosen a combination program. To effectively assist such diverse systems, a cost effective, flexible initiative is necessary. An immunization and diarrheal disease control program, with strong emphasis on management, administration and training, was selected to meet the criteria. Given this decision, the following discussion provides an economic rationale for the choice and a modified cost effectiveness analysis of various approaches to achieving the project goals.

I. Disease Profile

Infectious and parasitic diseases in concert with malnutrition bear almost exclusive responsibility for the high mortality in developing countries. Among infants and young children infectious disease is the major cause of death; parasitic infection affects adults more frequently, causing high adult morbidity rather than mortality. ^{1/}

A recent report by A.S. McCook lists the five leading infectious diseases in 36 African countries as reported and compiled by WHO; these are listed in Table 1. Infectious, parasitic and particularly malaria diarrheal diseases make up the major causes of morbidity and mortality in sub-Saharan African countries. However, reducing the incidence and prevalence of infectious and diarrheal diseases is the basis for the CCOD project and the subsequent analysis will refer only to these diseases.

The regional health program under CIDA auspices focuses directly on infectious and diarrheal disease among the high risk population of infants, young children and pregnant women. To significantly affect mortality among infants and small children in the short term requires efforts to reduce infectious and diarrheal disease prevalence. However, choice of immunizations should be a function of the disease pattern of the country receiving assistance under this program.

TABLE I

Ranking of Leading Infectious Disease (1974-76)in Nineteen Sub-Saharan African Countries

Measles	Tuberculosis
Diarrheal Disease	Diphtheria
Pertussis (Whooping Cough)	Tetanus

Source: A.S. McCook, 1980. "Report on Child Health in sub-Saharan Africa, with Particular Reference to EPI and Diarrheal Diseases."

^{1/} Samuel Preston, "Causes and Consequences of Mortality Declines in Less Developed Countries during the Twentieth Century." In Richard Easterlin, ed., Population and Economic Change in Developing Countries, NBER, 1980.

II. Demographic and Health Characteristics

Africa has the highest regional death rate (21.2 per 1000 population) in the world, and the highest worldwide infant mortality rate. 2/ The high average infant mortality rate of around 153 per thousand live births partially explains the low average regional life expectancy at birth of 47.2 for men and 50.3 for women, the lowest worldwide regional averages.3/

High mortality encourages high fertility as couples generally compensate by having more children than they want to ensure survival of a desired minimum. Africa is projected to experience the largest percentage increase in population of all the regions between 1950 and 2000. The population of Africa is expected to rise by 278 percent; the second greatest increase is anticipated in (Western and Southeast) Asia with a projected 212 percent increase. Since roughly 52 percent of the population is in the childbearing ages (15-44) and most of the balance of the population is below age 15, the current average birth rate of 46 is not expected to fall in the short run.

This project thus has clear implications for population growth rates. The anticipated fall in mortality will raise the number of children surviving to adolescence, and should contribute to lower maternal morbidity and mortality, thus raising women's fecundity; both factors will exacerbate the climbing population growth rates emerging in a number of African countries and predicted in the rest. The immunization and oral rehydration efforts funded under this project are designed to build upon and improve an already functioning health care system; together, these will contribute to an accelerated decline. 4/ However, both experience and research in mortality findings indicate that fertility (and therefore population growth rates) does not fall until mortality is reduced somewhat. Given these factors the projected number of births in Table 3 following the U.N.'s low variant population projections is highly optimistic, especially for the next five years. The long term outlook is more optimistic since improved health and this survival generally encourage lower fertility.

III. Targets

Women of reproductive age and small children under five years generally make up the high risk health groups in LDCs. This project aims at both cohorts, emphasizing oral rehydration therapy for children under five, and immunization for newborn infants and children under a year old. The tetanus immunization is targeted at pregnant women.

2/ D.L. Nortman and E. Hofstatter, "Population and Family Planning Programs, A Compendium of Data through 1978", The Population Council, 1980.

3/ Infant mortality rates are from the U.S. Bureau of the Census, all other figures are from Nortman and Hofstatter.

4/ In "The Consequences of Accelerated Mortality Declines for Future Population Growth and Economic Progress in Developing Countries," D. Gwatkin and S. Brandel discuss population increases under alternative mortality schedules for each region including Africa. Under rapid mortality decline schedule they estimate a 14 percent increase in Africa's population between 1975 and 2100.

The expectation is to have roughly 50 percent of children under one year old immunized by 1989 (1982-1989) at a total cost of between \$302.5 (fixed services and \$319.3 (outreach) million. All pregnant women with access to fixed facilities are targeted for tetanus immunization; the cost of this program is included in the per capita cost of infant immunization.

Estimates project that 27.5 percent of the sub-Saharan Africa population will have access to fixed health care facilities by 1985 and 30 percent by 1990. The estimates for the total number of children requiring immunizations for each year of the project is listed in Table 2. The 1981 estimate is 15.7 million infants which rises to 19.8 by 1990. The proportion of newborns receiving immunizations will be a function of the percent of population covered by fixed services plus whatever outreach efforts are included; this also determines the number of children receiving oral rehydration therapy and the proportion of pregnant women immunized. Hence the extent of primary health care service coverage and the outreach capability ultimately defines the target population.

IV. Cost Effectiveness

Estimating the net benefits of an immunization and diarrheal disease control program is extremely difficult, particularly since the direct economic benefits are decreased mortality among infants and children under five. Quantifying benefits in health traditionally involves deriving the present value of expected lifetime income. This method of estimating benefits has been criticized for neglecting most women, and children, neither of whom generally earn monetary income. ^{5/}

This project addresses the most salient infant and child diseases underlying the high mortality rates for these cohorts. The benefits of preserving life and investing in human capital are considered adequate to substantiate expenditure on immunizations and diarrheal control. The remaining issues are the following: (1) the cost-effectiveness of immunizations delivered alone versus their delivery as part of a "package" of immunizations, given existing disease prevalence and alternative immunization delivery mechanisms; and (2) alternative means and costs of preventing and/or curing diarrheal disease. In both instances we assume fixed output objectives and therefore measure optimal (cost effective inputs.

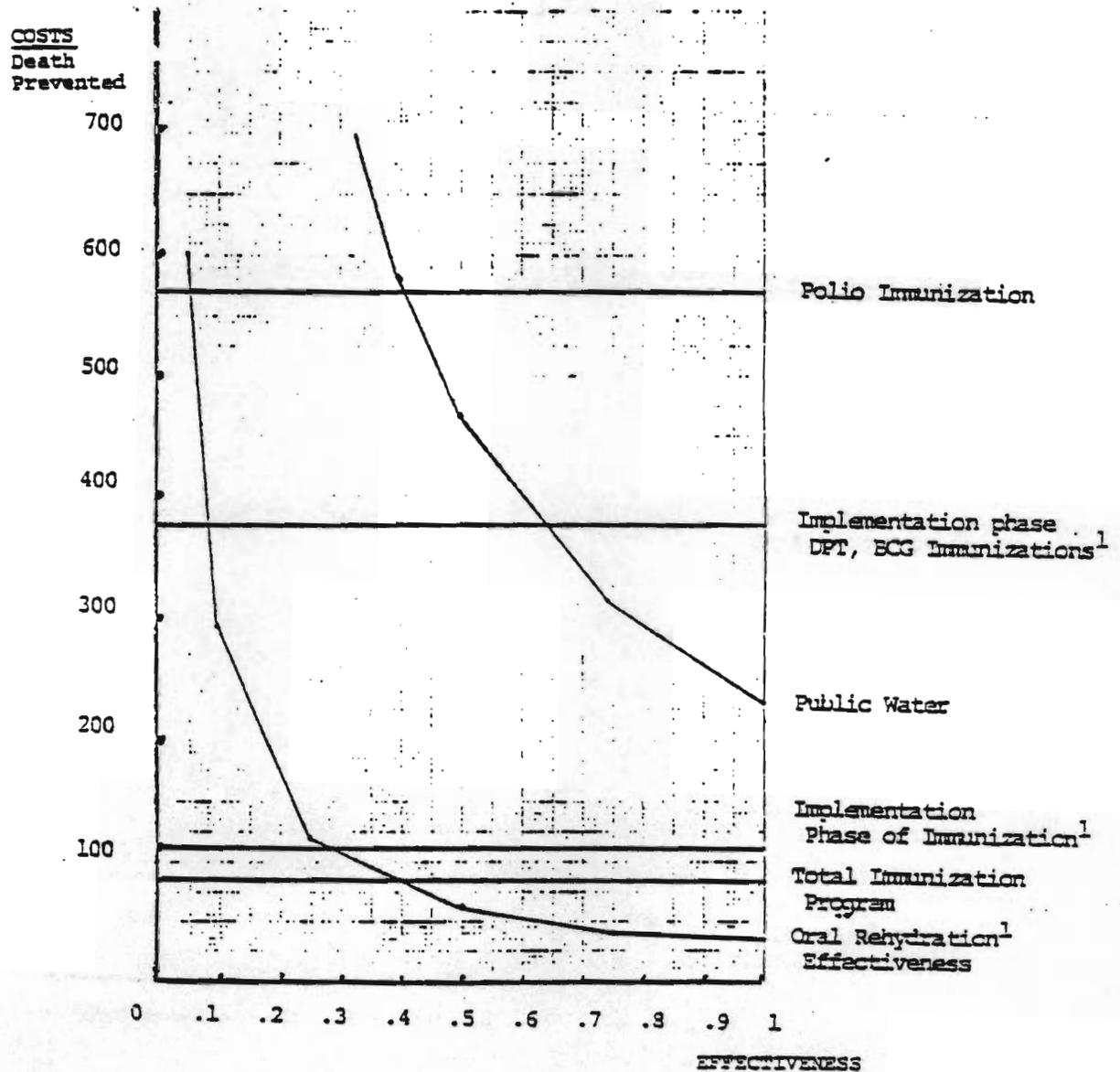
Immunizations. The cost of fully immunizing a child has been calculated in various programs from \$1.90 in Yaounde, Cameroon to \$9.25 in Sudan. ^{6/} In Table 2 below the costs of fully immunizing a child and providing tetanus immunizations for pregnant women are given for services delivered through (1) existing PHC facilities (fixed); (2) provision of outreach services from existing facilities (outreach); and (3) establishment of mobile teams to reach remote rural areas (mobile). The costs are largely based on previous immunization programs in Kenya.

^{5/} "The Social Value of Saving a Life," Nancy Dorfman in Health: What Is It Worth?, S. Mushkin and D. Dunlap eds., Pergamon Policy Studies, 1979.

^{6/} All cost data originate from "Cost Effectiveness of Programs to Combat Communicable Childhood Diseases in Kenya" by Howard Barnum, AID/SCC/PDC-C-0201, #2, 1980.

FIGURE 1

COMPARISON OF THE COST EFFECTIVENESS OF A
PUBLIC WATER PROJECT AND ORAL REHYDRATION PROGRAM
WITH SELECTED IMMUNIZATIONS



¹ Considered as added to an ongoing immunization program.

Source: Barnum, "Cost Effectiveness of Programs to Combat Communicable Diseases in Kenya"

TABLE 2
HYPOTHETICAL COSTS PER FULLY IMMUNIZED CHILD
WITH ALTERNATIVE DELIVERY MODES
 (1979 US DOLLARS)

Delivery Mode	Vaccine Supply ^{b/}	Cold Chain	Transportation	Salaries/Training ^{c/}	Other ^{d/}	Total Cost/Fully Immunized Child ^{e/}		Domestic Cost	Foreign Exchange Costs
Fixed	1.00	.20	.20	2.00	.25	3.65	(4.80) ^{f/}	2.20	1.45
Outreach	1.05	.30	.30	2.00	.25	3.90	(5.13)	2.20	1.70
Mobile ^{a/}	1.05	.30	4.75	2.50	.30	8.90	(11.70)	2.75	6.15

^{a/} Mobile teams require imported petroleum, explaining the high transportation and foreign exchange component of the mobile mode.

^{b/} Vaccine wastage is assumed 5% higher in Outreach, Mobile Modes.

^{c/} Salary and training costs are arbitrary and may be higher or lower depending on the salary scale in each location.

^{d/} Other costs include surveillance, evaluation and research.

^{e/} Includes costs of immunizing pregnant women as well.

^{f/} Total cost figure in parentheses indicates the fully immunized cost per child and mother immunized in 1982 U.S. dollars.

SOURCE: Barnum, Annex XXV

TABLE 3

ESTIMATED NUMBER OF IMMUNIZATIONS REQUIRED
UNDER LOW -VARIANT POPULATION GROWTH AND EXPECTED
INCREASE IN PHC SERVICE COVERAGE IN SUB-SAHARAN AFRICA

	Number of Births - Low Variant <u>a/</u> (Millions)	Number of Children to be Immunized <u>b/</u> (Millions)	<u>Fixed</u>	Project Growth of PHC Services <u>c/</u> Outreach + Fixed (% of Population with Access)
1980	15.3	13.3	25	50
1981	15.7	13.7	25.5	51
1982	16.1	14.0	26	52
1983	16.6	14.4	26.5	53
1984	17.0	14.8	27	54
1985	17.4	15.1	27.5	55
1986	17.9	15.4	28	56
1987	18.4	15.7	28.5	57
1988	18.8	16.0	29	58
1989	19.3	16.4	29.5	59
1990	19.8	16.7	30	60
1991	20.3	17.0	30.5	61
1992	20.7	17.4	31	62
1993	21.2	17.7	31.5	63
1994	21.8	18.1	32	64

a/ Starting from 350.2 million population in 1980. This is based on a 1979 estimated population of 340.5 million for sub-Saharan Africa. Projections based on United Nations estimates for low population growth.

b/ The number of children needed immunization in a given year is estimated as the number of births minus fifteen percent to account for an average infant mortality rate of 150 (150 infant deaths per 1000 live births).

c/ The projection assumes that growth of the fixed delivery system will be sufficient to stay abreast of a moderate growth in population plus an additional .5 percentage points a year.

SOURCE: Population Reference Bureau. 1979 World Population Data Sheet.

TABLE 4

**Projected Size of Population To Be Covered and
Estimated Total Annual Cost of Alternative EPI Delivery**

	Estimated Proportion of Target Population Receiving Immunizations	Number of Immunizations a/		Cost per Fully Immunized Child b/		Total Cost of Immunizations ^{d/}	
		Infants (^{'000,000})	Pregnant Women c/	Fixed Services (US \$)	Outreach Services	Fixed Services (US \$1,000,000)	Outreach Services
1981	10	1.37	1.57	4.42	4.66	6.05	6.38
1982	15	2.11	2.42	4.80	5.13	10.13	10.82
1983	20	2.88	3.32	5.28	5.64	15.21	16.24
1984	25	3.69	4.25	5.81	6.21	21.44	22.92
1985	30	4.54	5.22	6.49	6.83	29.46	31.01
1986	35	5.40	6.27	7.13	7.51	38.50	40.55
1987	40	6.29	7.36	7.84	8.26	49.31	51.96
1988	45	7.22	8.46	8.63	9.09	62.31	65.63
1989	50	8.02	9.65	9.49	10.00	76.11	80.20
1990	55	9.18	10.89	10.44	11.00	95.84	100.98
1991	60	10.22	12.18	11.48	12.10	117.33	123.66

a/ The figures are the number of immunizations, based on Table 3 and the proportion receiving immunization listed in Column 1.

b/ Implies 10% inflation rate, based on a 1979 figure of \$3.65 per fully immunized child. (Includes cost of immunization for pregnant women).

c/ Separate data on costs for immunizing pregnant women is not available.

d/ Total cost values include surveillance, evaluation and research, but not the costs of technical advisors, management training or health education all of which contribute to the immunization. These cost figures assume that the relevant population have access to existing fixed facilities and related outreach services.

Note: Column 6 = (Col. 2) x (Col. 4)

Column 7 = (Col. 2) x (Col. 5)

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Cameroon, Sudan and Somalia, and can only provide rough orders of magnitude. According to Table 2, providing immunization through fixed facilities is the most cost effective approach. On the basis of these calculations, the project should be implemented to initially serve those with existing access, only introducing outreach once the population of "fixed" services are covered. Use of mobile teams is not cost effective and should be a low priority. The latter is not discussed here as an alternative.

Roughly 25 percent of sub-Saharan Africa's population has access to public health care; household coverage can perhaps be doubled by adding outreach services. In Table 3 the extent and growth of fixed and outreach service is estimated. The same table indicates the total number of newborns anticipated in each year and the size of the immunizable infant population. The latter is about 15 percent smaller since infant mortality averages around 150 per thousand live births in sub-Saharan Africa.

Expansion of fixed service coverage is expected to exceed population growth by half a percentage point a year; outreach services will increase by one percentage point a year, maintaining the ratio of covering double fixed service coverage.

Annex provides cost and coverage figures for high, medium and low population growth rates with phased adoption of fixed, outreach and mobile services. Differences in population do not significantly affect total costs, especially in the first five years. Given the description and projections of the African demographic situation the following discussion will focus on the total costs under the low-population growth variant.

Table 4 provides cost estimates of immunization coverage applying the data compiled in Table 3 and the cost estimates for fixed and fixed/outreach immunizations from Table 2. The proportion of the population receiving immunizations in column 1 of Table 4 is based on anticipated expansion of immunization coverage given earmarked resources of AID and other donors and the extent of fixed and outreach service coverage. The cost of outreach is considerably higher than the fixed services alone, but as Table 3 indicates, coverage double as well. Given the lower relative costs associated with immunization delivery through reaching the fixed services, it is most efficient to reach this population completely before undertaking the more costly fixed plus outreach approach.^{1/}

The total costs of immunizations is based on the number of servicing children (Table 3), the proportion of that population which can be immunized and the cost of fully immunizing a child. This means that in 1982 15 percent the 14 million servicing newborns and the same percentage of the 16.1 million

^{1/} This argument weights efficiency at the expense of equity. A less efficient but more equitable approach would not concentrate exclusively on providing those with some health care services with immunizations, but would attempt to reach the currently unserved more promptly.

mothers will be fully immunized at a cost of \$10.13 million, or \$4.80 per child.^{3/} The cost of immunizing pregnant women is included in the per child costs in Table 4. Since cost breakdowns are not available for the latter, the validity of this assumption cannot be confirmed, nor can we compare the cost effectiveness of including or excluding it. The cost effectiveness of immunizing all versus only pregnant women cannot be explored either.

The proportion of children under one year of age receiving immunizations is expected to increase rapidly and exclusive use of fixed services will only be possible through 1984. The more costly outreach effort will be an important component of the CCID program through the life of the project. If fixed services could serve the total number of children immunized the total 8 years costs would be \$302.47 million; if only outreach services were used the total costs for 1982-1989 would be \$319.33 million.

Table 5 estimates the total costs if projected coverage is achieved and expansion of fixed and outreach services follows the anticipated growth path shown in Table 3. The first three years of the project fixed services can fully accommodate the EPI. From 1985 on the total costs include an increasing proportion of outreach services which leads to a rapid increase in costs. The total amount required to meet the target population between 1982 and 1989 is \$307.99 million, using outreach only when fixed services can no longer accommodate the entire target population. The total cost of rising fixed and outreach services exceeds the cost of only using fixed services by less than \$6 million; however, the costs savings are over \$11 million if a combination of fixed and outreach is used instead of just outreach.

Outreach services could be phased in stages, but most of the initial effort should be directed at meeting the capacity of fixed services. In this instance the extent of outreach provided would be a function of the percent of the population to be covered above those served by fixed services. The costs of these are shown in Table 5. Table 6 shows a hypothetical plan based on a goal of increasing program access by 10 percentage points a year, reaching full coverage by 1989. This is only provided for infants, but is indicative of the numbers involved and provides costs comparable to those of Table 4.

A. Alternative Immunization Packages:

The cost effectiveness of health intervention can be measured by comparing the costs per disease case and the costs per death prevented across programs. For example, it is useful to estimate and compare the costs per case and death prevented of separate programs versus package immunizations to identify the most cost effective approach to immunization.

Cost effectiveness comparisons can easily be calculated by dividing the total cost of each immunization programs, or combination program, by the appropriate number of recorded cases and deaths (attach rate). Data constraints often inhibit such analysis; however, below is an example of just such an analysis in Kenya. The results indicated a low attack rate for polio, contributing to

^{3/} The only cost figure available is the average per child cost. In applying this figure we assume a horizontal average cost curve. Any other approach would represent pure guesswork, so we have assumed a constant average cost and have compounded the per capita cost 10 percent annually to account for inflation.

TABLE 6

COST EFFECTIVENESS OF POSSIBLE IMMUNIZATION PROGRAMS
FOR KENYA

PROGRAM DESCRIPTION	COST 000's of K. sh.	COST PER CASE PREVENTED	COST PER DEATH PREVENTED
		K.sh. (\$)	K. sh. (\$)
1. Total Program	131999	36 (\$4.2)	641 (\$25)
2. DPT, TT, BCG only	93763	61 (\$8.1)	2058 (\$274)
3. Measles only	59291	28 (\$3.7)	374 (\$50)
4. Polio only	76902	9539 (\$1272)	47676 (\$6357)
5. DPT, TT, BCG as marginal program ^{1/}	23729	15 (\$2)	521 (\$69)
6. Measles as marginal program	31368	15 (\$2)	198 (\$26)
7. Polio as marginal program	6868	852 (\$114)	4258 (\$568)
8. New Births only	69470	33 (\$4.4)	527 (\$70)
9. Implementation marginal (ALL IMMUNIZATIONS)	62529	40 (\$5.3)	946 (\$113)
10. Implementation marginal (DPT, BCG, Polio)	39205	56 (\$7.5)	2815 (\$375)

^{1/} Marginal implies an add-on immunization effort to existing PFC system; otherwise a vertical immunization project is assumed.

Notes: These data were compiled from existing studies; missing data were extrapolated from other African studies. However, the data are not unrealistic.

Sources: "Cost Effectiveness of Programs to Combat Communicable Childhood Diseases in Kenya," Edward Barnum, AID/SCD/FDC-C-0201, #2. 1980.

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high per case and per death costs. Given limited resources, transferring financial support to immunization with lower costs per unit of effectiveness increases efficiency since the return on investment will be much higher.

Example: Table 6 provides the necessary comparative data for the seven immunizable diseases. The cost per death prevented by the entire immunization program is \$85. It is also estimated that the cost per death prevented by adding the immunization of children over one year of age in the implementation phase is 60 percent greater than the cost per death prevented from the immunization of new births only (in Table 6, #8 versus #9). While the absolute difference in cost is not great (\$70 versus \$113 per death prevented), the cost differential does imply that, it is more cost effective to concentrate on immunizing newborns rather than adding full immunization programs for older children to an existing PHC program. This discrepancy is attributable to the higher attack rates and case fatality rates, in the first year of life for many of the diseases.

Looking at the separate immunizations it can be seen that the measles immunization is the most significant component of the total program and, at \$50 per death prevented would be highly cost effective even if it were necessary to carry it out as a separate program. DPT, TT and BCG^{3/} together are somewhat costly (at \$274 per death prevented) as a separate program but are highly cost effective (at \$69 per death prevented) as a component of the total program.

In contrast polio immunization, even when considered as marginal (that is, as an added program) cost almost twenty times more (\$114) per case prevented and seven times more (\$568) per death prevented than the overall program. It should be noted that this result is highly dependent on the low attack rate for polio and the estimated domestic recurrent costs. If the true attack rate is significantly underestimated or the additional personnel time and other recurrent costs are greatly overestimated the actual cost effectiveness of polio immunization would be greater. But, as calculated, the high cost of polio immunization per unit of effectiveness encourages a search for alternative, more cost effective interventions.

This example can easily be adopted in designing the country specific immunization efforts; if any of the relevant data are obtainable such analysis should be undertaken to identify the most cost effective immunization program.

3. Training and Technical Advisors:

Training is considered essential for upgrading management and administration of existing systems and for ensuring the proper implementation of a full immunization program. With the exception of adequate financing, the most

^{3/} Given the assumed low attack rate for tuberculosis it is possible that the BCG component is relatively expensive per unit of effect. However, the especially poor quality of the information on the costs and attack and case fatality rates associated with the BCG immunization precluded a separate analysis.

TABLE 7
THE COST OF A HYPOTHETICAL ORAL REHYDRATION PROGRAM
FOR KENYA
 000's K.sh. (000's \$)

COST C A T E G O R Y	Independent Program	The Program Considered as "added" or marginal
Vehicles ¹	1500	-
Packets ²	14000	14000
Other Equipment and Training ³	1500	1500
Contingencies ⁴	1700	1400
Administrative Expenses ⁵	5000	-
Personnel ⁶	18000	18000
TOTAL COSTS	41800 (\$5573)	34900 (\$4653)

Source: Bannum, "Cost Effectiveness of Programs to Combat Communicable Diseases in Kenya"

TABLE 7 (continued)

FOOTNOTES

1 Assumed the same as the transportation cost for an independent measles program.

2 The cost of a packet is \$.10. Two packets are needed per episode. The cost per episode is \$.20.

Based on the case incidence estimates for diarrhea in table it is estimate that there will be 18,290,000 cases over the seven years of the project life. It is assumed that half of the cases will require treatment. Therefore the total cost of the required packets is :

$$$.20 \times 18,290,000 \times .5 = \$1,820,000$$

Using an exchange rate of 7.5 K.sh. = \$1 the cost of packets is 13,718,000 K.sh.

Packet cost and frequency of cases requiring treatment are taken from: R.E. Black, "Mass Media and Health Practices Project, Report on Visit to Tanzania", September 1979.

3 Estimated at roughly 25% of the cost of training, manuals and technical assistance for the immunization program.

4 10% of the total of the three items above.

5 Estimated at 25% of the cost for the immunization program.

6 Estimated as roughly equivalent to the independent measles program. Personnel time is required for explanation of the use of the electrolyte solution in the home, motivation and distribution of the packets.

TABLE 8

COST EFFECTIVENESS OF A HYPOTHETICAL WATER PROJECT
IN THE PREVENTION OF CHILDHOOD DIARRHEA

1. Cost for a community of 10000.	\$ 7000
2. Number of Cases Prevented per Year. ¹	544
3. Number of Deaths Prevented per Year. ¹	5
4. Cost per Case Prevented	\$ 13
5. Cost per Death Prevented	\$ 1400

¹ In children 0-4 years of age. Assuming an efficacy of .15.

Source: Barnum, "Cost Effectiveness of Programs to Combat Communicable Diseases in Kenya"

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serious and common weakness of primary health care efforts is inadequate management and supervision. And, this becomes critical when vaccine storage and transportation are involved. Without an adequate training component for immunizers, supervisors and managers, EPI initiatives cannot be expected to be implemented properly or, therefore, to have any significant impact on the target population.

Alternative methods for ensuring competent manpower for EPI implementation do not exist. Adequate training is fundamental to the success of primary health care delivery in general and to EPI efforts in particular. Under such circumstances the issue becomes the adequacy, relevance and quality of training and the training needs of each level of health personnel.

The extent of technical assistance in Africa proper versus on-call from Atlanta is similar to the issue of training. Although the cost of full time African residence is three times the cost of Atlanta-based expertise it is not clear that the net benefits do not favor in-country residence as such assistance can prove essential to smooth functioning of the program. However, without further information, judgments on the extent of Africa-based assistance required cannot realistically be made. The cost differences are listed in the financial section, but benefits are impossible to quantify without information on the losses associated with Atlanta versus Africa based personnel. Careful assessment of this question is important, in the absence of quantifiable comparisons.

C. Diarrheal Disease

Oral Rehydration

This section considers the cost effectiveness of a program of oral rehydration for children suffering from diarrhea. The following section discusses alternative means of reducing child mortality, followed by a discussion of the relative cost effectiveness of immunization, oral rehydration and water supply. Several studies have shown that a glucose electrolyte solution can be taken orally and absorbed by children threatened with dehydration from diarrhea. Many of the studies were carried out in clinical trials but the evidence is growing that the solution is effective when administered by the mother in home therapy. There is, however, no experience to date with large scale rehydration programs, but there is no reliable data on the cost and effects of a large scale home therapy program in rural Africa.

The estimates for the hypothetical program, again for Kenya, considered here are conjectural. The estimates are made under the assumption that the program would grow, in terms of the proportion of total children having access to the service, at the same rate as planned for the Kenyan immunization program discussed under IV A above.

Two alternative estimates of costs are made. The first estimate gives the cost of mounting a separate, independent, rehydration program not drawing on personnel time or administrative expenses of the immunization program. The second estimate gives the cost of adding oral rehydration as part of an integrated child health program including immunization. In this case the instruction and motivation of the mother in the use of oral rehydration therapy would be given at the same time as a visit for immunization.

Table 7 provides estimates of the cost of an oral rehydration program under the two alternatives. The costs are approximated in each expenditure category by comparing the probable requirements of the hypothetical oral rehydration program with the requirements for the immunization program. It is assumed that the personnel time required for explanation of the use of the electrolyte solution in the home, motivation of the mother and distribution of the packets would approximately equal the time required for an independent measles program.

Calculation of the number of deaths prevented by an oral rehydration program is based on the case incidence and case fatality rates listed in Table 8. The program would cover eighty percent of children between birth and four years of age in districts with access to the program. The effectiveness of home administered oral rehydration is difficult to predict because of the many factors, such as water quality and the timing and control of quantities administered, any vary greatly in home therapy from clinic conditions. However, taking twenty five percent as a conservative estimate of the reduction in the case fatality rate for children receiving home therapy versus no therapy at all, then 37,928 deaths would be prevented by the hypothetical oral rehydration program over the first seven project years.

Given the costs and effects estimated above, it can be calculated that with an effectiveness of 25 percent the cost per death prevented by an independent oral rehydration would be (\$147) and for the "added" program the cost per death prevented would be (\$122). Twenty five percent effectiveness is not a well established figure — in clinical tests the indicated effectiveness is much higher and in home therapy under adverse conditions the effectiveness may be lower.

Community Water Project

In this section the hypothetical cost effectiveness of a low technology water supply project is estimated for a community of 10,000. This effort is an alternative means of reducing child mortality due to diarrheal disease.

The cost estimates are based on a 1975 study carried out in the Lushoto district of Tanzania. ^{10/} The project chosen is apt to be fairly

^{10/} G. Tschannerl and M. R. Mujwahuz: Impact of Rural Water Supply: Eight Self Help Schemes, University of Dar es Salaam, Bureau of Land Use Planning, Research Paper No. 37, May 1975.

typical of a project for a rural population in areas of Kenya, and thus comparable to the previous oral rehydration analysis. Previous to the project the water supply was a river downstream from other nearby towns. The new water supply source relies on boreholes. The capital costs of the project include the costs of the boreholes, pipe, tanks and one tap per 200 population. Other costs include transportation, the value of self help labor and outside labor. Correcting for differences in exchange rates and changes in the level of prices ^{11/} the total annual cost ^{12/} of providing public fountains within a short walk of each household in a community of 10,000 is estimated to be \$7000.

The projected effects of the water project are based on the case incidence and case fatality rates. The effect of public water taps and an adequate quantity of water in a community previously lacking an adequate source of water is estimated to be a fifteen percent reduction in diarrhea in all age groups from birth through five years. This estimate is based on the consensus of opinion among a small group of international health experts. ^{13/}

Multiplying the population in each age group times the case incidence rate times the expected percentage reduction gives an estimate of the number of cases prevented in children less than five in a community among children 0-5 is 544 per year. The number of child deaths prevented is estimated to be, approximately, five per year. These figures are shown in Table 8.

Based on the costs and effects calculated above the cost per case prevented in children 0-5 is \$13 and the cost per child death prevented is \$1400. Although the cost per death prevented, at reasonable levels of effectiveness, appears high it should be noted that the provision of adequate water would have effects on morbidity and mortality in older age groups as well as children. Thus, assigning all of the project costs to the effects on children alone underestimates the program's overall cost effectiveness.

To allow a comparison of the alternative programs, figure 1 provides, graphically, a summary of the calculations of the cost per death prevented of immunizations, water programs and oral rehydration therapy in Kenya. Because the efficiency of the program is not well established the cost effectiveness of the oral rehydration and the community water project are presented as functions of their respective levels of effectiveness. The efficiency of immunizations is more firmly established and the costs per death prevented are horizontal lines, indicating fixed levels of effectiveness which are based on the immunization effectiveness calculations above.

^{11/} The price indices are taken from Bank of Tanzania, Economic Bulletin, Vol. X, No. 3, December 1978.

^{12/} The total initial expenditure including the costs of capital is estimated to be \$33,204. Using an interest rate of .15 and an assumed life of seven years, the annualized cost is \$6273.

^{13/} See, H. Barnum, L. Fajardo and A. Praddilla, A Resource Allocation Model for Childhood Survival, report to USAID/Office of Health, June 1979, Chapter V.

Both polio immunizations and community water projects are much less cost effective, as measures to reduce child mortality, than are the other immunizations or oral rehydration. At a .25 level of effectiveness oral rehydration is a more efficient use of funds to reduce child deaths than water projects at any level of effectiveness and is approximately \$500 less per child death prevented than polio immunization. At a level of effectiveness above .1 the addition of oral rehydration to an immunization project is more efficient than the DPT, BCG immunization of children 1-4 in the implementation phase of the project (measle immunization is highly cost effective in both program phases); and, if the level of effectiveness of oral rehydration in home therapy is greater than .4 the cost per death prevented through the integrated program (immunization plus oral rehydration) will be less than for the total immunization program separately.

At implication of this is that a careful study needs to be made of disease incidence before designing an immunization program. A second, more specific implication is that oral rehydration administered in home therapy may be a justifiable alternative use of funds to polio immunization or, if the effectiveness of oral rehydration is high enough, to the immunization of children over one year of age with DPT, BCG in the implementation phase of the program.

It should be noted that there is more uncertainty in the calculation of the effects of the non immunization programs. Until the effectiveness of oral rehydration in home therapy is known with more certainty it is allocate funds first to immunizations, including the implementation phase with DPT, because of the more certain outcome.

This Kenyan example is representative and does not provide either a thorough analysis of the CCCC effort or a definitive guide to the individual country programs. However, it is indicative of the kinds of interventions which can be expected to show a high return and provides an analytic framework for similar country-specific assessments.

V. Complementary Sectoral Initiatives

The project description highlights some of the complementary interventions necessary to ensure significant reductions in mortality and morbidity. These complementary sectoral interventions are briefly outlined below.

Population: As discussed earlier, the fall in mortality anticipated by the general expansion of PHC and accelerated by the efforts of this project is expected to reinforce the upward trend in population growth in Africa. Kenya has experienced a significant reduction in mortality and now faces a population growth rate over 4 percent, implying a doubling of the population in roughly seventeen years. However, family planning efforts are few and the determinate of fertility are not well understood in Kenya which impede efforts to reduce fertility.

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A requirement for attaining swoller family norms is lower mortality, a goal directly addressed by the EPI project. Improved survival of infants due to immunizations and complementary programs in health education which promote infant and child health are critical to encouraging family planning use. Other factors are involved in promoting lower fertility, but improved infant and child survival are important components.

Family planning interventions along with information, educational and communication programs can make service known and available to couples who decide to limit their families. Without available supplies, family size may well exceed couples' demand, while contributing to high population growth on a national level. Efforts to integrate family planning programs or establish vertical programs should be encouraged to cope with this growing problem. Such programs cannot be dealt with effectively within the EPI framework, and should be developed as projects complementary to this one. The complexity of developing and implementing an immunization program in close to 40 countries precludes the addition of related but equally difficult programs. Family planning programs are important interventions in reducing fertility and those countries participating in the EPI should be provided with the technical and financial resources to develop acceptable and effective family planning programs.

Nutrition: The link between nutrition and infection is an accepted fact, although the degree to which malnutrition encourages infectious disease incidence is less well known. However, nutrition education, especially with respect to breastfeeding, weaning and food preparation practices can help to mitigate infectious disease prevalence. With infectious diseases, such as measles, it may serve as an effective deterrent, thereby contributing to health status and a lower incidence of infectious disease.

Water and Sanitation: The cost effectiveness of water projects outlined above indicates a higher return to oral rehydration therapy than to clean water supplies. However, water, along with sanitation facilities, contributes to better health and, although costly, does contribute to improved health. Over the long run, water programs should be contemplated as complementing the immunization and diarrheal control efforts, in the short run, however, less costly interventions should be the priority.

VI. Financing

The costs of continuing the immunization program once the donor input terminates have not been estimated. PHC costs are high and population pressures will exacerbate the problem; and, foreign exchange is a major constraint for most of the African countries. Hence, program continuation may well hinge on long term donor assistance, for even the marginal cost of adding immunizations to existing systems may be unaffordable for the low income countries of sub-Saharan Africa.

This project covers all foreign exchange purchases and 75 percent of costs for the duration of the project. At its termination some other funding mechanism will be essential to the continuation of the immunization program. Because immunizations are a preventive health measure, demand is likely to be low, hence user fees are difficult to collect; the tax base of most African countries is limited; and, health insurance schemes are scarce. The result of these circumstances is a severe financial burden on governments if the immunization program is to continue beyond the life of this project.

Other bilateral donors as well as AID should extend their assistance or involve WHO in coordinating continuation in the various countries. Without plans for such a shift the investments made by AID in particular and CADA in general will have very little pay off. However, a more relevant time for such an assessment may be at mid-project review, but it should definitely be an important consideration for CADA.

ANNEX D

COST - EFFECTIVENESS STUDY

BY

DR. HOWARD M. BARNUM

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INTRODUCTION AND SUMMARY

This report gives a comparison of the estimated cost per case and death prevented for several alternative programs, either existing or hypothetical, to combat communicable childhood diseases in Kenya. While there are other interventions that might be considered that are potentially effective in reducing morbidity and fatality from contagious diseases the report concentrates on immunization, oral rehydration and low technology water programs because previous experience with these programs has indicated that they are either low in unit cost or potentially highly effective means of reducing the impact of communicable diseases. The report is intended to provide a representative analysis of programs in a specific sub-Saharan country as an aid in the formulation of a larger project for sub-Saharan Africa. It is, however, obvious that the diversity of Africa prevents unrestrained extrapolation from experience in a specific country and the results of this study must be used cautiously to draw parallels for all of sub-Saharan Africa. Kenya was chosen for the analysis because several published studies give epidemiological information related to the incidence of immunizable childhood diseases and diarrhea in rural Kenya. Also, the Kenyan ministry of Health and DANIDA have completed a report¹ outlining the design of the ongoing childhood

¹ Republic of Kenya, Ministry of Health and DANIDA, Appraisal Report on The Expanded Programme on Immunization (EPI), November 1978.

immunization program for Kenya and giving details of donor costs.

Several caveats must be made. First, to enable the estimation of cases and deaths prevented it was necessary to extrapolate from studies for specific regions in Kenya (or, in some cases, from studies for other countries) to the entire country. Second, although donor costs for immunization were available in detail, domestic costs had to be estimated by analogy with other programs. Third, the cost of the low technology water program was estimated on the basis of a study made in Tanzania and is, therefore, only an approximation of the cost of implementing a comparable program in Kenya. Fourth, because there are no large scale operational programs to provide background data, the cost and impact of an oral rehydration program are based on tenuous assumptions concerning the required frequency of treatment, cost of materials and effectiveness of treatment. For all of these reasons the results of the study are speculative and must be applied cautiously.

The first section of the report estimates the impact and costs of the ongoing MOH/DANIDA program of immunization against childhood diseases. This section is intended to provide information that allows not only a comparison of the cost effectiveness of immunization with alternative interventions but also answers questions about the organization of the immunization program itself, such as: "Is it cost effective to immunize the backlog of non-vaccinated children during the beginning stages of an immunization program or would it be more efficient to limit the program to chil-

dren in the first year of life?" and "Given the low incidence of paralytic polio, is it cost effective to include polio immunization in the program?" The second section gives estimates of the cost and effects on childhood diarrhea of a low technology water program. The third section discusses a potential oral rehydration program. The final section of the report compares the cost effectiveness of the interventions discussed in the preceding sections and draws tentative conclusions.

The report finds that polio immunization is highly cost ineffective (given the estimated level of incidence) in comparison with other immunizations and oral rehydration. It is also estimated that oral rehydration is more cost effective than the DPT and BCG immunizations of the backlog of previously unimmunized children over one (1) year in the initial stages of the immunization program. Oral rehydration is especially cost effective when considered as added to an ongoing program of child health services. These findings are tempered by the knowledge that estimates of the cost effectiveness of immunizations are based on more firmly established assumed levels of effectiveness than are the alternative non immunization programs.

I. IMMUNIZATION

The immunization program for Kenya involves the delivery of BCG vaccination at birth or first contact with the child, DPT and

oral polio in three visits during the first year, measles vaccination after eight months of age and tetanus toxoid for pregnant women in two shots, four weeks apart, early in the pregnancy.

Access¹ to the program is limited during the first years of the program but the number of districts in the program is to be expanded rapidly over the planning period, 1979 to 1985, to include the entire population by the final year. Coverage² in the included districts is planned to increase from 75% in the first three program years to 80% thereafter. Table 1 summarizes the expansion of the program over the seven year planning period. The table distinguishes between the coverage of the backlog of unimmunized children in the 0-4 year age group during the implementation period and the coverage of new births in the programs maintenance phase. During the early years of the program the preponderance of children are covered in the implementation phase but towards the end of the program the majority of immunizations are carried out in the maintenance phase of the program.

A. Effectiveness of Immunization

An estimate of the number of cases and deaths prevented by the immunization program is made by following immunized

1 Access refers to population living within a reasonable distance of a point of delivery of the program service.

2 Coverage refers to population with access actually receiving the program service.

population cohorts over the life of the vaccine under consideration. After adjusting for attrition to the population cohort through other causes, the number of cases and deaths that would have occurred in the absence of the vaccine and attributable to the disease in question is calculated from the estimates of the disease incidence and case fatality rates given in table 2. The estimated cases and deaths prevented are based only on the direct effects of the vaccine and omit the effects of extended community protection as a result of reduced transmission. The estimates assume that the trends of disease are constant. Also, no adjustment has been made for a possible decrease in vaccine efficacy due to malnutrition. The estimates are conservative because the effects of protection beyond the early childhood years has not been calculated; nor has the effect of tetanus toxoid on maternal mortality been included.

The estimate of the effect of the total immunization program, given in table 3, is that the program will prevent a total of 205874 deaths. Broken into program components it is estimated that 73943 deaths are prevented by the implementation (children less than five not previously immunized) phase and 131931 deaths by the maintenance (new births) phase of the program.¹ Also, 45559 deaths are predicted to

¹ The number of deaths prevented by DPT, BCG immunizations in the maintenance phase is 13925.

be prevented by the tetanus toxoid, BCG and DPT components; 158702 deaths are predicted to be prevented by the measles immunizations and 1613 deaths prevented from polio immunization.

B. Program Costs

Program costs, broken down by type of immunization and implementation and maintenance phases of the project, are given in table 4. The costs for the total program, given in the MOH/DANIDA report, were used to construct the hypothetical costs if the various immunizations were delivered in independent projects. To do this, the costs of operating independent programs were obtained by estimating the proportion of total expenditures in each of the expenditure categories in table 4 that would be needed for the separate programs. Thus, the entire costs of the cold chain is included in all separate programs but vaccine costs, syringes and needles are broken into components directly related to the number of immunizations in each of the individual programs.

Of the cost information in the eight expenditure categories, the first six are taken from the donor cost projections for DANIDA and UNICEF given in the MOH/DANIDA report. The capital costs (primarily vehicles and cold chain) represent annual depreciation assuming a life of seven years. The final two cost categories, which constitute the domestic

Care should be taken that research into traditional health care systems not become an end unto itself. Too narrow a concentration into this area of indigenous health care can lead to an obfuscation of the larger picture which is the attitudinal and behavioral complex of traditional health care and the traditional specialist.

It is important not to lump traditional health specialists, into one indiscriminate group. Distinguishing between special categories, roles, statuses, and gender have implications for potentially effective incorporation and utilization of these people into health education and public promotion programs designed to raise the acceptance level of a new intervention. Specialty categories within the traditional hierarchy of specialists are as follows:

- 1). First, there are the women whose training, skills, and techniques "include such practices as the use of poultices, purgatives and emetics, inducing sweating by various processes, and all the traditional birth practices."¹

Women are generally considered to be very unspecialized people within the hierarchy of traditional health specialists. Their significant role and status is that of midwife and/or traditional birth attendant.

^{1/} Margaret Read. Culture, Health, and Disease. Social and Cultural Influences on Health Programmes in Developing Countries. London: Tavistock Publications, 19-6, p. 16.

Locally Familiar Health Structures: Indigenous Health Care

Insofar as it is possible to separate out the health component of targeted social systems from the rest of the cultural complex, the most significant and familiar local health structure is the indigenous or traditional system of health care. This system represents and reflects adaptive responses to mortality, morbidity, and the causes thereof.

Traditional medicine and health care is often viewed as ineffective, harmful, or both. It has been, in many instances, relegated to a position of negative images ranging from strange and exotic customs, to harmful magic and witchcraft. The African ethnographic record indicates that despite the existence and availability of modern health care services, belief in and adherence to traditional health care systems endures.

This being the case, it is incumbent upon the planner to understand traditional health systems, not as an odd collection of customs nor for the purpose of ridding a group of taboos, rituals, or witchcraft; but as a part of a complex of social relationships and cultural patterns of beliefs and behavior. Traditional health systems should be understood not solely for the purpose of pinpointing cultural resistances or obstacles, though this is important; but, rather, to identify and pinpoint positive aspects which can be strengthened and utilized in the fuller realization of the delivery of a CCCD Program.

Demographic and Social Unit Analysis

Demographic profiles of participating countries - migration and resettlement patterns, as well as birth rates, ethnic and language make-up; and income and educational levels should be available from WHO and other regional sources. This data is critical because it will provide the base for forecasting demographic configurations into the next decade when this intervention will impact population pyramids with consequences for economic policy. The location and clustering of important religious and political groups should also be determined. Being in a position to analyse population shifts and movements; as well as structural and behavioral patterns of family units, kin groups, political groups, and religious groups should facilitate planning and operations design. Knowledge of group structure and function, for example, could aid in the determination of identifying local health personnel. Health extension personnel brought from the outside runs the risk of not being accepted; not only because of possible language and communication barriers, but, because they would have no legitimacy and credibility within the traditional context. Lack of legitimacy and credibility would also mean the lack of influence in terms of garnering the attention of local populations. Membership in a local and popularly recognized kin group, political group, or religious group would greatly facilitate the entree of the health person and the intervention into the targeted area.

Health Interventions and Demands on Targeted Adult Populations

The ultimate demand on targeted adult populations, especially mothers, is that they assume full responsibility for the maintenance of the health of their children and that of their families. This demand implies modification and/or changes in individual and group beliefs, attitudes, and behavior about health, illness, and disease.

It is, however, precisely the beliefs, attitudes, and social and economic production behavior which define and cohere any human society. These social systems change slowly in terms of their beliefs, attitudes, and behavior. Care should be taken, therefore, not to single out African societies as being characterized by rigid adherence to conservative ideas and behavior. What appears to be rigid conservatism may very well be culturally adaptive ways of responding to the causation, treatment, and prevention of illness. An understanding of the culturally adaptive ways of responding to health, illness, and disease requires on-going appropriate social science research and information about groups targeted. The importance of some understanding of the cultural context of attitudes, beliefs, and behavior concerning health issues should be reflected in the design and implementation of health education and public promotion programs. Building on the familiar facilitates understanding and acceptance of a new intervention. New and/or modified changes in behavior will "make more sense" if case within familiar and normative cultural frames of reference.

ceived as an individual phenomenon, thus the sick person cannot be treated singly or outside the context of his cultural milieu.

This cultural view has serious implications for a periphery to center referral system since the first person or persons to whom a patient turns are household and neighboring kin. Depending on the kinship structure of the affected household, a sick child may be placed in the care of paternal or maternal kin. Relations in other villages who belong to the wider kin group are also consulted. The household kins and wider kin group consultation are at the very heart of indigenous health systems. Kin groups observe and diagnose the illness; comfort the patient; and represent a continuing source of support. If the illness does not yield to home remedies, a medical specialist from among the hierarchy of traditional medical personnel may be called in on a consulting/diagnostic basis. This specialist may or may not, after treatments produce no relief of the illness, refer the patient to a modern health service.

It is therefore important to be aware of the fact that the existence of public health services may not be perceived or accepted as efficacious or beneficial as the first line of diagnosis or referral. Treatment may very well be accepted within a modern health context as a last resort, the consequences of which may be a referral which comes too late to prevent death.

Benefit Incidence

A major sociocultural aspect of this project from the regional perspective is that the ultimate direct beneficiaries will not be the first to be impacted by external inputs. In this project design, inputs will first impact those responsible for managing health services in their countries. A project assumption is that EPI and CDD activities resulting in new and upgraded knowledge, techniques, and methods will be shared and transferred from the managerial or central level all the way to the local or peripheral level. A way of ascertaining that this is actually taking place would be through an evaluation mechanism of the impact of training, for instance, of managers beyond the managerial level.

Perception of Benefits: Donor vs Host Governments/Populations

What is assumed to be a benefit by the donor may not be similarly perceived by the host population. The perception and attitude concerning health and illness will have different cultural reference points which will impact the effectiveness of EPI and CDD activities. For example, the concept of "maintenance" may mean that whatever is running well needs no attention. This can apply to the human body, vehicles, and equipment. In this type of philosophical milieu, preventive medicine and care may have little success. Also of importance is the attitudinal configuration concerning illness; who diagnoses illness; and who ministers unto the ill. For the majority of the projected target populations, illness is not per-

bound to fail in its objectives if, simultaneously, provision is not made for growth and improvement in the economic field." Food security and employment opportunities will loom on the horizon as significant issues in development strategies as childhood mortality is reduced through EPI and CDD interventions.

III. SOCIOCULTURAL FEASIBILITY

Assessment of Host Government Strengths in Health

Host country requests for participation in EPI and CDD activities will be assessed within the context of the country health plan submitted to WHO/AFRO. These country health plans which set forth the primary health care strategy and implementation plan have a June 1980 deadline. During the CCCD team visit to WHO/Geneva, Dr. David Tambo, Regional Officer for Primary Health Care, pointed out that the primary health care action plan for the Gambia had been submitted and approved for 1980-86. Mauritania had also submitted a country health plan, but would require the assistance of an WHO/AFRO technical advisor in the preparation of an acceptable plan.

Regardless of the status of country health plans, countries will be eligible to participate in the regional CCCD activities such as training in EPI and CDD techniques and methods. However, if countries are interested in participating in CCCD component activities through, for example, an AIP or other bilateral program; they must have a WHO/AFRO approved country health plan which would set forth their strengths, priorities, and implementation schedules.

cations in the next two decades. To lessen the adverse impact of population growth resulting from reduced mortality, it will be of critical importance to confront land tenure problems, food production and food security issues, and expanded employment strategies and opportunities. In ten (10) years the targeted EPI and CDD populations will be between 10-15 years of age. The AID health sector policy paper points out that population growth is taking place among the dependent age groups, so that in many developing countries half of the total population is under 15 years of age. This in turn creates a tremendous strain on the productive segment of society, and other limited resources as well. (n.d.:41).

The policy implication of this demographic impact is the need for an intensification of food production to meet consumption needs in the next twenty years. Dialogue and operational collaboration between policymakers in health and agricultural sectors will be vital to the design and implementation of responsible development activities which will have consequences over the next two decades.

In an article on health education in developing countries, Navid and Priden (1962:157) point out that in the United States, Europe and other industrialized countries; the control of communicable diseases was accompanied by the gradual and parallel growth of several economic as well as medical and social services. They further state that "it has been repeatedly demonstrated that any public health programme, conducted anywhere in the world and in respect of any health or disease condition, is almost certainly

SOCIAL SCOUNDNESS ANALYSIS

I. INTRODUCTIONHealth and Cultural Contexts

The point of departure here is that a new public health intervention in a developing country is ultimately a cultural and social process. A public health intervention is therefore the interaction between or among a number of actors, each fulfilling a role or set of roles defined by the cultural context and normative behavioral patterns of the particular sets of actors involved in the process. Care should be taken not to assume that sociological inquiry applies only to host governments and populations. The situation is not one simply of catalyst versus responder. It is rather a complex interaction and communication among external donors and host governments representing different cultural, economic, educational, and ethnic backgrounds attempting to assist in the delivery of expanded public health services to populations with limited or nil access to modern health care services.

II. SOCIAL IMPACT AND POLICY IMPLICATIONS: A TWENTY YEAR PERSPECTIVE

The CCCD project goal of a reduction in morbidity and mortality among targeted sub-Saharan African populations aged 0-5 will have population, employment, and food production and consumption impli-

TABLE 8 (continued)

FOOTNOTES

- 1 Assumed the same as the transportation cost for an independent measles program.
- 2 The cost of a packet is \$.10. Two packets are needed per episode. The cost per episode is \$.20.
- Based on the case incidence estimates for diarrhea in table it is estimate that there will be 18,290,000 cases over the seven years of the project life. It is assumed that half of the cases will require treatment. Therefore the total cost of the required packets is :
- $\$.20 \times 18,290,000 \times .5 = \$1,820,000$
- Using an exchange rate of 7.5 K.sh. = \$1 the cost of packets is 13,718,000 K.sh.
- Packet cost and frequency of cases requiring treatment are taken from: R.E. Black, "Mass Media and Health Practices Project, Report on Visit to Tanzania", September 1979.
- 3 Estimated at roughly 25% of the cost of training, manuals and technical assistance for the immunization program.
- 4 10% of the total of the three items above.
- 5 Estimated at 25% of the cost for the immunization program.
- 6 Estimated as roughly equivalent to the independent measles program. Personnel time is required for explanation of the use of the electrolyte solution in the home, motivation and distribution of the packets.

TABLE 8

THE COST OF A HYPOTHETICAL ORAL REHYDRATION PROGRAM
FOR KENYA
 000's K.sh. (000's \$)

C O S T C A T E G O R Y	Independent Program	The Program Considered as "added" or marginal
Vehicles ¹	1600	-
Packets ²	14000	14000
Other Equipment and Training ³	1500	1500
Contingencies ⁴	1700	1400
Administrative Expenses ⁵	5000	-
Personnel ⁶	18000	18000
TOTAL COSTS	41800 (\$5573)	34900 (\$4653)

TABLE 7

COST EFFECTIVENESS OF A HYPOTHETICAL WATER PROJECT
IN THE PREVENTION OF CHILDHOOD DIARRHEA

1. Cost for a community of 10000.	\$ 7000
2. Number of Cases Prevented per Year. ¹	544
3. Number of Deaths Prevented per Year. ¹	5
4. Cost per Case Prevented	\$ 13
5. Cost per Death Prevented	\$ 1400

¹ In children 0-4 years of age. Assuming an efficacy of .15.

TABLE 6 (continued)

FOOTNOTES

- 1 By assumption based on reported infant mortality rate and life table; U.S. Department of Commerce, Country Demographic Profiles, KENYA, January 1978.
- 2 Approximated by reference to data in Puffer and Serrano, Patterns of Mortality in Childhood, PAHO, 1973. Although the Puffer and Serrano study was of Western Hemisphere countries, the importance of diarrhea as a leading cause of death was consistent over a large number of countries throughout South America. Their findings are also consistent with less comprehensive studies of the causes of childhood mortality in Africa and are likely to be valid for any communities with high levels of infant and child mortality and limited water and sanitation facilities.
- 3 $\text{Col.4} = \text{Col.2} \times \text{Col.3}$
- 4 From an extrapolation of the case rates per 2 week interval as reported in J. Leeuwenburg et al, 1978, "Machakos Project Studies: Agents affecting health of mother and child in a rural area of Kenya: The incidence of diarrhoeal disease in the under-five population." Tropical and Geographical Medicine. 30:3. p383-391.
- 5 $\text{Col.6} = \text{Col.4} \div \text{Col.5}$

TABLE 6

SUMMARY OF INFORMATION NEEDED TO CALCULATE CASES AND DEATHS
PREVENTED FROM DIARRHEA CONTROL

AGE	Number of children per 10000 total pop. (Col.1)	Mortality Rate from All Causes ¹ (Col.2)	Proportion of Mortality Attributable to Diarrhea ² (Col.3)	Mortality Rate Attributable to Diarrhea ³ (Col.4)	Cases per Year per Person ⁴ (Col.5)	Implied Case Fatality Rate ⁵ (Col.6)
0	453	.120	.33	.03	4.2	.01
1	398	.030	.40	.012	1.8	.007
2	386	.024	.25	.0075	.9	.006
3	376	.024	.25	.0075	.9	.006
4	367	.024	.25	.005	.9	.006

COST EFFECTIVENESS OF POSSIBLE IMMUNIZATION PROGRAMS
FOR KENYA

PROGRAM DESCRIPTION	COST 000's of K. sh.	COST PER	COST PER
		CASE PREVENTED	DEATH PREVENTED
		K. sh. (\$)	K. sh. (\$)
1. Total Program	131999	36 (\$4.8)	641 (\$85)
2. DPT, TT, BCG only	93763	61 (\$8.1)	2058 (\$274)
3. Measles only	59291	28 (\$3.7)	374 (\$50)
4. Polio only	76902	9539 (\$1272)	47676 (\$6357)
5. DPT, TT, BCG as marginal program	23729	15 (\$2)	521 (\$69)
6. Measles as marginal program	31368	15 (\$2)	198 (\$26)
7. Polio as marginal program	6868	852 (\$114)	4258 (\$568)
8. New Births only	69470	33 (\$4.4)	527 (\$70)
9. Implementation marginal (ALL IMMUNIZATIONS)	62529	40 (\$5.3)	346 (\$113)
10. Implementation marginal (DPT, BCG, Polio)	39205	56 (\$7.5)	2815 (\$375)

TABLE 4
 COST BREAKDOWN BY TYPE OF IMMUNIZATION PROGRAM
 (000's of K. sh.)

C O S T C A T E G O R Y	TOTAL PROGRAM (Col. 1)	INT, TT, & DYS Only (Col. 2)	MEASLES Only (Col. 3)	PCV10 Only (Col. 4)	INT, TT, & DYS Marginal (Col. 5)	MEASLES Marginal (Col. 6)	PCV10 Marginal (Col. 7)	INT, DYS Only (Col. 8)	IMMUNIZATION PROGRAM - MARGINAL (Col. 9)	IMMUNIZATION PROGRAM - MARGINAL (Col. 10)
INDIA, INDIA										
Exp. on Vaccines, Transportation	3141	3141	1571	3141	-	-	-	3141	-	-
INT. on Other capital exp.	1047	1047	1047	1047	-	-	-	1047	-	-
Syringes, Needles	2030	2030	-	-	2030	-	-	792	1230	1230
Vaccines	19538	8590	10653	295	8590	10653	295	7620	11918	5240
Contingencies	3719	1525	1413	701	1525	1413	701	1450	2269	930
Other Equip. & Sup.	6000	6000	6000	6000	-	-	-	6000	-	-
INDONESIA										
Adv. Overhead	19305	19305	19305	19305	-	-	-	19305	-	-
Other variable exp. (personnel)	77215	52125	19302	46133	11504	19302	5792	30115	47104	11797
TOTAL	131999	93763	59291	76002	23729	31760	6868	69470	62529	19205

Col. 10 = Col. 2 + Col. 9
 Col. 11

TABLE 3
 POTENTIAL NUMBER OF CASES AND DEATHS
 PREVENTED BY THE IMMUNIZATION PROGRAM

YEAR	DIPHTHERIA		PERTUSSIS		TETANUS		TUBERCULOSIS		KNOX		MOSQUITOES		TOTAL	
	C	D	C	D	C	D	C	D	C	D	C	D	C	D
1979-80	43	7	3780	52	86	17	34	7	21	4	6979	567	10943	654
1980-81	209	33	19490	281	527	149	175	35	107	22	35139	2727	55647	3247
1981-82	705	111	66435	972	1938	606	603	121	366	75	119702	9191	189749	11076
1982-83	1253	195	124268	1959	4795	1926	1019	204	704	138	195374	14261	327411	18683
1983-84	1817	288	173201	2812	7471	3172	1393	279	1011	192	272166	20568	457059	27311
1984-85	2555	416	236910	3916	10570	4501	1800	376	1406	265	375427	29299	628748	38775
1985-86	2688	445	252803	4325	12912	5065	2029	406	1549	283	408563	31453	680544	42777
1986-87	2500	425	215511	2974	5033	1006	1568	314	1206	254	337471	28684	563177	33657
1987-88	1495	209	179056	2512	3577	715	1180	236	879	198	201068	11740	387255	15610
1988-89	1811	101	123084	1496	2022	404	798	159	572	128	126542	6536	254829	8824
1989-90	560	56	64562	1162	1119	223	442	89	241	54	50365	3676	117209	5260
TOTAL	14924	2286	1459900	22461	50050	18586	11121	2226	8062	1613	2120796	158702	3672053	205874
TOTAL (only needs kit)	8536	1411	787633	13051	36697	15019	6252	1253	4760	889	1272432	99408	2116310	111911
TOTAL (only for implementation)	6388	875	672267	9410	13151	2667	4869	973	3302	724	856364	59294	1556593	71943

TOTAL - 1877, 1833 in implementation phase 696877 cases, 13925 deaths

TABLE 2 (continued)

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TABLE 2 (continued)

FOOTNOTES

- 1 Data for Kenya were not available. These estimates are roughly consistent with Bassett and Hadler (Sudan), Diop Mar, Sow and Rey (Senegal) and the assumptions used in Barnum, Tarantola and Setiady (Indonesia).
- 2 J.M. Mahieu, A.S. Muller, A.M. Voorhoeve and E. Dikken (Kenya).
- 3 Based on Bassett and Hadler (Sudan), Case fatality rates are as used in Barnum, Tarantola, Setiady (Indonesia).
- 4 Estimated from a statement in the MOH/DANIDA report (Kenya) that .03 of children aged 0-4 are tuberculin positive. It is assumed that .05 of children who are positive develop the disease. This is an especially weak estimate and for this reason the cost and effect of BCG immunization has not been broken out for separate analysis in the text. The case fatality rate is as used in a WHO report for Rwanda.
- 5 B.K. Nottay and D. Metselaar estimate that the attack rate per 100,000 in Kenya is approximately 12. Information in Nottay and Metselaar together with data in Bassett and Hadler (Sudan) permitted the construction of a hypothetical distribution of polio over age groups 0 through 4. (.23, .22, .21, .21 and .13 respectively). Assuming that all of the 12 cases per 100,000 occur at less than five years and deriving the population age distribution for Kenya from a model life table it is possible to estimate the attack rate. Case fatality rates are based on data in Bassett and Hadler (Sudan).
- 6 The estimates are based on the age distribution of measles cases given in Voorhoeve et al (Kenya) and the assumption that .80 of all children will have measles by the end of the 5th year. The estimates in Voorhoeve et al show approximately 50% of all children having measles by the end of year five. This estimate was felt to be conservative and the attack rates in Voorhoeve were adjusted upward to give the 80% figure. The case fatality rates are as given in Voorhoeve.

TABLE 2

SUMMARY OF ASSUMPTIONS USED IN THE CALCULATION
OF CAREER AND DEATHS PREVENTED

AGR	Probability of Surviving One Year	ATTACK RATE						CASE FATALITY RATE					
		D.1	P.2	T.3	ICC ⁴	PO.5	MR.6	D.1	P.2	T.3	ICC ⁴	PO.5	MR.6
0	.880	.0005	.158	.012	.0015	.00061	.147	.2	.032	.6	.2	.101	.064
1	.976	.002	.097	.003	.0015	.00066	.255	.2	.014	.2	.2	.101	.118
2	.976	.001	.139	.003	.0015	.00065	.156	.2	.016	.2	.2	.224	.064
3	.976	.001	.152	.002	.0015	.00067	.152	.1	.008	.2	.2	.224	.042
4	.976	.001	.137	.002	.0015	.00043	.090	.1	.010	.2	.2	.224	.073

TABLE 1
ESTIMATED COVERAGE OF THE IMMUNIZATION PROGRAM IN KENYA
(1979 - 1984)
(000's)

YEAR	Proportion of Total Population Living in Included Districts ¹	Number of children Living in Included Districts ²		Children to be covered during implementation phase ³ (Age 0-4)	Children to be covered during maintenance phase ³ (Newborn)	Total Children Covered
		Age 0-4 Not pre Immunized	Newborn			
1979	.02	60	0	45	0	45
1980	.10	251	16	180	12	200
1981	.34	764	80	573	60	633
1982	.56	701	265	563	212	775
1983	.75	641	460	513	368	801
1984	.98	800	655	640	524	1164
1985	1.00	170	900	136	719	855
	TOTAL	3390	2376	2658	1095	4553

¹ Derived by comparing Table 7 of the MOI/DANIDA report (cited earlier) with projected population for Kenya 1979-1985 (assuming a 2.8% population growth rate).

² By implication from Table 8, MOI/DANIDA report.

³ Assumes .75 coverage during the first three program years and .80 thereafter.

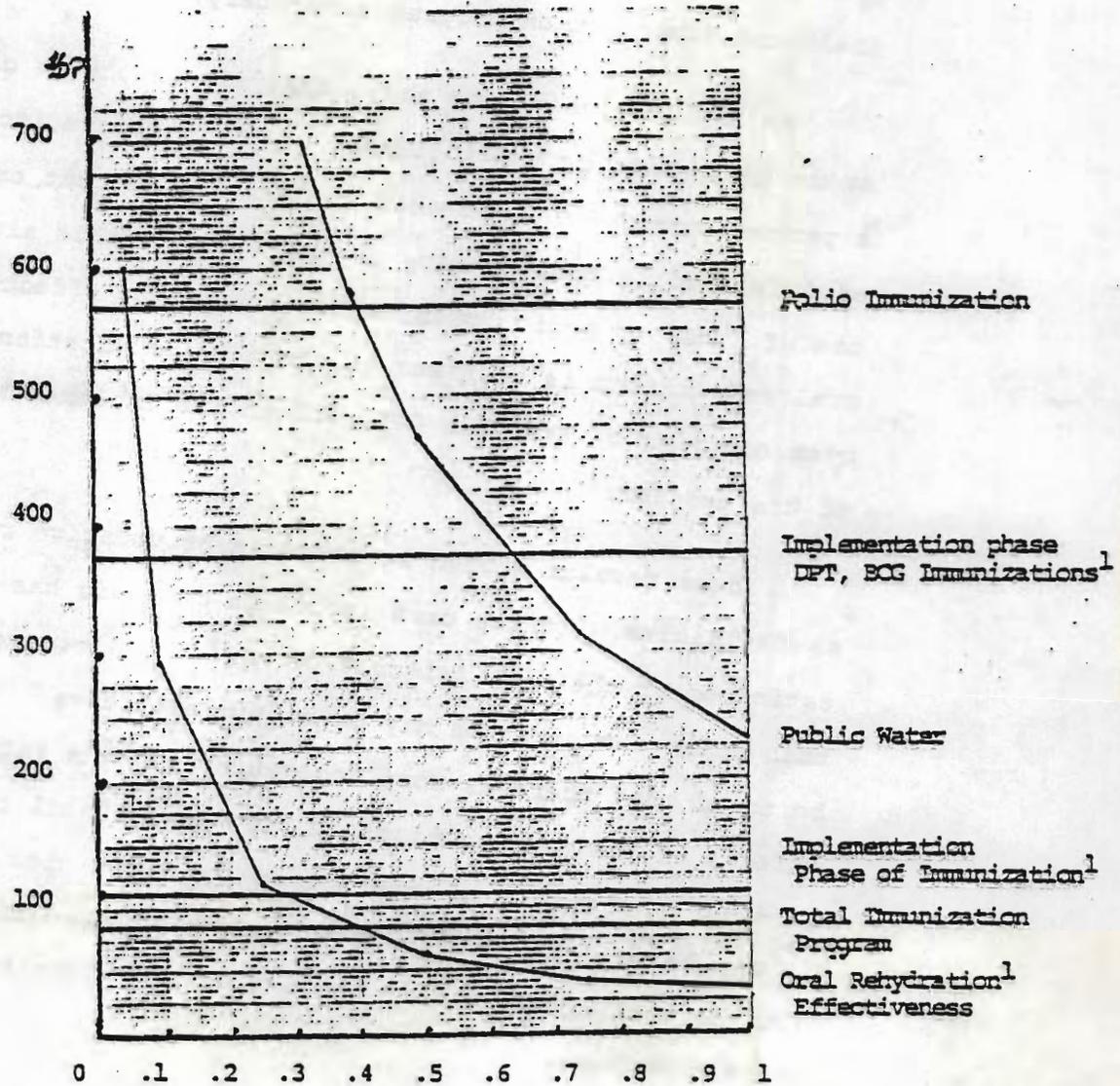
gram (immunization plus oral rehydration) will be less than for the total immunization program separately.

An implication of the above analysis is that a careful study needs to be made of the incidence of polio before including as a program component. A second implication is that oral rehydration administered in home therapy may be a justifiable alternative use of funds to polio immunization or, if the effectiveness of oral rehydration is high enough, to the immunization of children over one year of age with DPT, BCG in the implementation phase of the program.

These results should be taken as provocative rather than as definitive. If the case incidence of polio has been underestimated or the marginal cost of adding polio, overestimated, than polio immunization may be more competitive. Also, it should be noted that there is more uncertainty in the calculation of the effects of the non immunization programs. Until the effectiveness of oral rehydration in home therapy is known with more certainty it may be rational to allocate funds first to immunizations, including the implementation phase with DPT, because of the more certain outcome.

FIGURE THREE

COMPARISON OF THE COST EFFECTIVENESS OF A
PUBLIC WATER PROJECT AND ORAL REHYDRATION PROGRAM
WITH SELECTED IMMUNIZATIONS



¹ Considered as added to an ongoing immunization program.

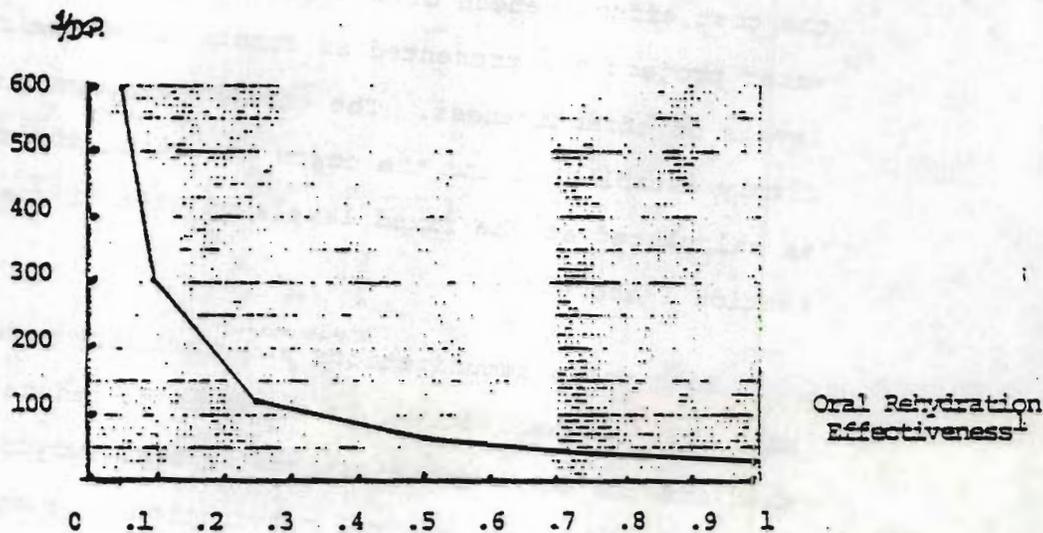
IV. COST EFFECTIVENESS COMPARISON

To allow a comparison of the alternative programs figure 3 provides, graphically, a summary of the calculations of the cost per death prevented in the previous three sections of the report. Because the efficacy of the program is not well established the cost effectiveness of the oral rehydration and the community water project are presented as functions of their respective levels of effectiveness. The efficacy of immunizations is more firmly established and the costs per death prevented are given as calculated at the fixed levels of effectiveness used in section 1 above.

Both polio immunizations and community water projects are much less cost effective, as measures to reduce child mortality, than are the other immunizations or oral rehydration. At a .25 level of effectiveness oral rehydration is a more efficient use of funds to reduce child deaths than water projects at any level of effectiveness and is approximately \$500 less per child death prevented than polio immunization. At a level of effectiveness above .1 the addition of oral rehydration to an immunization project is more efficient than the DPT, BCG immunization of children 1-4 in the implementation phase of the project (measle immunization is highly cost effective in both program phases); and, if the level of effectiveness of oral rehydration in home therapy is greater than .4 the cost per death prevented through the integrated pro-

FIGURE TWO

COSTS PER DEATH PREVENTED BY A
HYPOTHETICAL HOME THERAPY ORAL REHYDRATION PROJECT
AS A FUNCTION OF EFFECTIVENESS



¹ Effectiveness is measured as the proportional reduction in the case fatality rate versus no treatment.

because of the many factors, such as water quality and the timing and control of quantities administered, that, in home therapy, may vary greatly from clinic conditions. However, taking twenty five percent as a conservative estimate of the reduction in the case fatality rate for children receiving home therapy versus no therapy at all, then 37928 deaths would be prevented by the hypothetical oral rehydration program over the first seven project years.

C. Cost Effectiveness of Oral Rehydration in Home Therapy

Given the costs and effects estimated above it can be calculated that with an effectiveness of .25 the cost per death prevented by an independent oral rehydration would be (\$147) and for the "added" program the cost per death prevented would be (\$122). Because .25 is not a well established figure - in clinical tests the indicated effectiveness is much higher and in home therapy under adverse conditions the effectiveness may be lower - the cost effectiveness of oral rehydration under alternative degrees of effectiveness is given in the form of a graph in figure 2. The cost per death prevented by the oral rehydration program can be read off of the vertical axis for a chosen level of effectiveness indicated on the horizontal axis.

strative expenses of the immunization program. The second estimate gives the cost of adding oral rehydration as part of an integrated child health program including immunization. In this case the instruction and motivation of the mother in the use of oral rehydration therapy would be given at the same time as a visit for immunization.

Table 8 gives the estimates of the cost of an oral rehydration program under the two alternatives. The costs are approximated in each expenditure category by comparing the probable requirements of the hypothetical oral rehydration program with the requirements for the immunization program. It is assumed that the personnel time required for explanation of the use of the electrolyte solution in the home, motivation of the mother and distribution of the packets would approximately equal the time required for an independent measles program. The footnotes to table 8 explain the estimates in the individual categories.

B. Effects

Calculation of the number of deaths prevented by an oral rehydration program is based on the case incidence and case fatality rates listed in table 6. The program would cover eighty percent of children between birth and four years of age in districts with access to the program. The effectiveness of home administered oral rehydration is difficult to predict

on children alone underestimates the program's overall cost effectiveness.

III. ORAL REHYDRATION (HOME THERAPY)

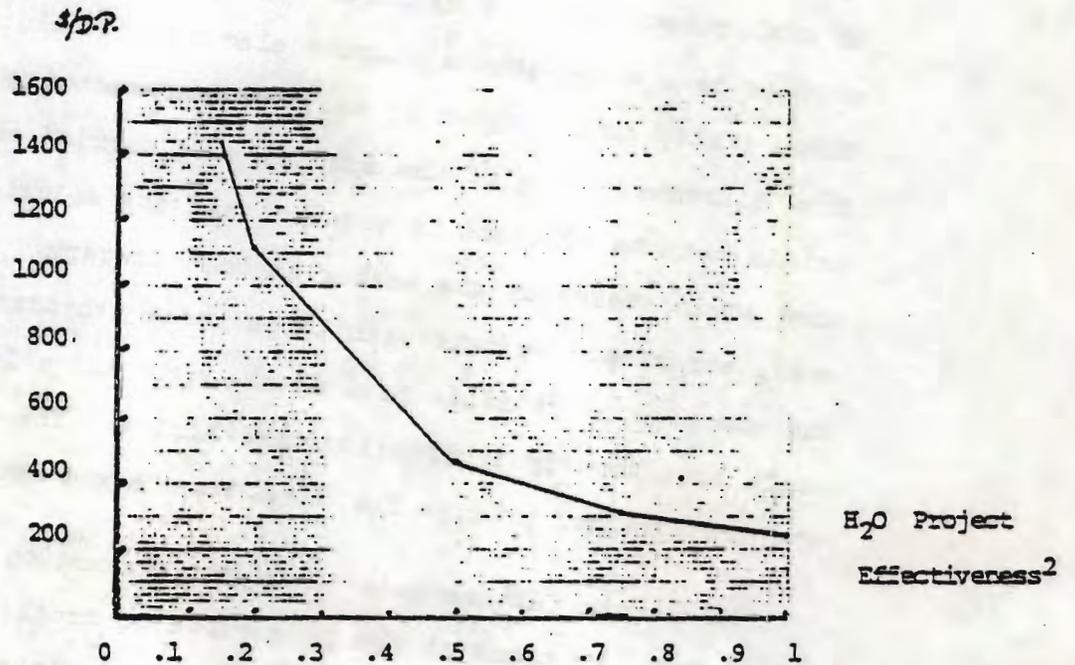
This section considers the cost effectiveness of a program of oral rehydration for children suffering from diarrhea. Several studies have shown that a glucose electrolyte solution can be taken orally and absorbed by children threatened with dehydration from diarrhea. Many of the studies were carried out in clinical trials but the evidence is growing that the solution is effective when administered by the mother in home therapy. There is, however, experience to date with large scale rehydration programs and there is no reliable data on the cost and effects of a large scale home therapy program in rural Africa. The estimates for the hypothetical program for Kenya considered here are conjectural.

The estimates are made under the assumption that the program would grow, in terms of the proportion of total children having access to the service, at the same rate as planned for the Kenyan immunization program. (See column 1 of table 1).

A. Costs

Two alternative estimates of costs are made. The first estimate gives the cost of mounting a separate, independent, rehydration program not drawing on personnel time or admini-

FIGURE ONE
COSTS PER DEATH PREVENTED¹ BY A
HYPOTHETICAL WATER PROJECT AS A FUNCTION OF
THE LEVEL OF EFFECTIVENESS



1 In children 0-4 years of age.

2 Effectiveness is measured as the proportional reduction in the incidence of diarrhea.

it is estimated that the total number of cases prevented in a community of 10000 among children 0-5 is 544 per year (table 7). The number of child deaths prevented is estimated to be, approximately, five per year.

C. Cost Effectiveness of the Hypothetical Water Supply Project

Based on the costs and effects calculated above the cost per case prevented in children 0-5 is \$13 and the cost per child death prevented is \$1400. Because the assumed level of effectiveness was determined subjectively and may be unrealistically low it is useful to calculate the cost per death prevented for other levels of effectiveness. Figure one given the cost per death prevented (on the vertical axis) by a low technology water supply project as a function of the level of effectiveness (on the horizontal axis). The graph shows, for example, that the cost effectiveness of the water intervention would increase to \$475 per death prevented if the effectiveness of the intervention in reducing diarrhea were fifty percent.

Although the cost per death prevented, at reasonable levels of effectiveness, appears high it should be noted that the provision of adequate water would have effects on morbidity and mortality in older age groups as well as children. Thus, assigning all of the project costs to the effects

providing public fountains within a short walk of each household in a community of 10000 is estimated to be \$7000.

B. Effects

The projected effects of the water project are based on the case incidence and case fatality rates given in table 6. The effect of public water taps and an adequate quantity of water in a community previously lacking an adequate source of water is estimated to be a fifteen percent reduction in diarrhea in all age groups from birth through five years. This estimate is based on the concensus of opinion among a small group of international health experts.¹ The estimate is not based on objective evidence and, therefore, the estimates of cases and deaths prevented by the provision of a public water supply are made with less confidence than in the estimation of vaccine effects.

Multiplying the population in each age group times the case incidence rate times the expected percentage reduction gives an estimate of the number of cases prevented in children less than five in a community of 10000 people. The case fatality rate can then be applied to get an estimate of the number of deaths prevented. Using this procedure,

¹ See, H. Barnum, R. Barlow, L. Fajardo and A. Fraddilla, A Resource Allocation Model for Childhood Survival, report to USAID/Office of Health, June 1979, Chapter V.

for alternative, more cost effective interventions.

II. COMMUNITY WATER PROJECT

In this section the hypothetical cost effectiveness of a low technology water supply project is estimated for a community of 10000.

A. Costs

The cost estimates are based on a 1975 study carried out in the Lushoto district of Tanzania.¹ The project chosen is apt to be fairly typical of a project for a rural population in areas of Kenya. Previous to the project the water supply was a river downstream from other nearby towns. The new water supply source relies on boreholes. The capital costs of the project include the costs of the boreholes, pipe, tanks and one tap per 200 population. Other costs include transportation, the value of self help labor and outside labor. Correcting for differences in exchange rates and changes in the level of prices² the total annual cost³ of

¹ G. Tschannerl and M.R. Mujwahuz: Impact of Rural Water Supply: Eight Self Help Schemes, University of Dar es Salaam, Bureau of Land Use Planning, Research Paper No. 37, May 1975.

² The price indices are taken from, Bank of Tanzania, Economic Bulletin, Vol. X, No. 3, December 1978.

³ The total initial expenditure including the costs of capital is estimated to be \$33204. Using an interest rate of .15 and an assumed life of seven years, the annualized cost is \$6973.

Looking at the separate immunizations it can be seen that the measles immunization is the most significant component of the total program and, at \$50 per death prevented would be highly cost effective even if it were necessary to carry it out as a separate program. DPT, TT and BCG¹ together are somewhat costly (at \$274 per death prevented) as a separate program but are highly cost effective (at \$69 per death prevented) as a component of the total program.

In contrast polio immunization, even when considered as marginal (that is, as an added program) cost almost twenty times more (\$114) per case prevented and seven times more (\$568) per death prevented than the overall program. It should be noted that this result is highly dependent on the low attack rate for polio and the arbitrary assignment of domestic recurrent cost in table 4. If the true attack rate is significantly underestimated or the additional personnel time and other recurrent costs are greatly overestimated the actual cost effectiveness of polio immunization would be greater. But, as calculated, the high cost of polio immunization per unit of effectiveness encourages a search

1

Given the assumed low attack rate for tuberculosis it is possible that the BCG component is relatively expensive per unit of effect. In addition a recent article reports new information that throws doubt on the efficacy of BCG in the prevention of tuberculosis. However, the especially poor quality of the information on the costs and attack and case fatality rates associated with the BCG immunization precluded a separate analysis.

C. Cost Effectiveness of Alternative Immunization Programs

The costs per case and death prevented for the alternative programs singled out for analysis are given in table 5. The values in the table were obtained by dividing the costs for each program, as given in table 4, by the appropriate number of cases and deaths calculated from the results given in table 3.

The analysis reveals that the cost per case and death prevented by the entire program is \$85. It is also estimated that the cost per death prevented by adding the immunization of children over one year of age in the implementation phase is 60 percent greater than the cost per death prevented from the immunization of new births only. While the absolute difference in cost is not great (the cost per death prevented for a new birth program only is \$70; the cost per death prevented by adding the implementation phase to a new birth program is \$113) the cost differential does imply that, if financial restraints limited the adoption of the entire program it would be more cost effective to concentrate on immunization of newborns for a larger area rather than the addition of an immunization program for older children to an existing newborn program for a smaller area. This result is attributable to the higher attack rates and case fatality rates, for many of the diseases, in the first year of life.

recurrent costs of the program, are rough approximations and depend on the assumption that the ministry of health domestic costs for personnel, overhead and other health delivery expenditures will be 21.2 K.shs. per fully immunized child.¹ Of this, twenty percent is assumed to be required for administrative overhead. The apportionment of domestic recurrent costs over the program categories is made on the basis of the number of visits required and arbitrary assumptions about the relative amount of time needed to deliver the service in each type of program.²

The total estimated cost of the entire program is 132 million K.sh. (\$17.6 million) of which 35 million K.sh. (\$4.7 million dollars) is the value of donor supplied inputs after subtracting the residual value of capital at the end of the seven year period. The cost per fully immunized child is 29 K.sh. (\$3.87).

¹ Calculated by implication from an MOH/DANIDA estimate of the unit cost of immunization. MOH/DANIDA Report, Op. cit.

² It is assumed that DPT, TT, BCG and Polio together require three times the number of visits needed for measles vaccination alone and involve 75% of the total domestic variable expenses (or 57,914,000 K.sh). Of this amount 10% (5,792,000 K.sh) is the marginal costs of adding polio. However, if polio were to be delivered separately, the three needed visits would require 80% of the recurrent domestic costs needed for delivering DPT, TT, BCG and Polio in the larger program. Similar assumptions were used to apportion the contingency category.

In many instances the presence of this person is not essential, since any female kin can assume this role if necessary. However unspecialized these women's skills may be defined in the traditional medical hierarchy, they are an integral part of the health system.

From the point of view of the planner, these women represent a first line indigenous cadre of personnel in the development or strengthening of a health referral system. A Johns Hopkins Population Center Marci. 1980 draft report on "Traditional Midwives and Family Planning" points out that data indicates that "traditional midwives are most effective when their program involves a technology that is easy to apply, effective, and without long term side effects." An example of the referral process is provided in this draft report by an example from Haiti where "using midwives to bring women to the hospital or clinic for a tetanus vaccination or to accept tetanus immunization at home by community workers contributed more to eliminating neonatal tetanus than training midwives to use sterile material for cutting and dressing the umbilical cord" (1980:14).

- 2). Second are the male specialists with ascribed or acquired skills and techniques in such areas as bone-setting and rudimentary surgery.
- 3). Next are the male religious-medical specialists whose roles are highly specialized. Their usually ascribed powers emanate from a supernatural source. In the diagnosis and treatment of illness supernatural powers are part of ritual healing.
- 4). Last are the herbalists or traditional pharmacists whose extensive knowledge of herbs, mixtures of herbs, and bark is utilized in such illnesses as headaches, rashes, and fevers.

These categories of specialists exert a tremendous amount of influence in their social systems, therefore, the identification and solicitation of their assistance in health education and public promotion is vital to the establishment and implementation of any new health intervention.

This constellation of indigenous health personnel represents the basic organizational structure through which a new health intervention could be channeled at the local level. There may be some initial reluctance at the national or regional level to 1) admit the existence of this system because of its negatively projected image or 2) agree to its efficacy in the implementation process due to political relations between the center and the

periphery. This possibility should not relieve the external planner of responsibility for acknowledging the existence of this indigenous structure and factoring it into the implementation strategy.

In a discussion of the importance of traditional health care and the traditional specialist, Margaret Read comments as follows:

The traditional practitioner, as he appears in recent studies by medical personnel and social scientists, is an essential link in the chain binding the patient and his kin group to the process of diagnosing and treating the illness. Local communities expect the practitioner to take a detailed and personal interest in the patient. He on his side considers it important to create an atmosphere of confidence and trust to allay the anxiety felt by the patient and his friends, and he establishes this atmosphere by an unhurried and patient question-and-answer process, as well as by the kind of inquiries he makes about the illness and its symptoms...Local practitioners are willing to be 'called' and to visit the patient in his own home, surrounded by his relatives. Even more important, the local practitioner speaks to the patient and his relatives about the illness and treatment in language and concepts that are familiar to them, and that they can understand...¹

It should not be assumed that traditional specialists are necessarily obstacles to a new health intervention. They may very well view a new intervention as a means of increasing their prestige and status in the community. Raymond Firth (1971:136) points out that among the Manus of New Guinea, "local practitioners, spirit-mediums or 'medicine men,' are...not antipathetic to the new therapy. They are happy to intermingle their own simple systems of leaf infusions, massage, and prayerful laying on of hands with

^{1/} Ibid., p. 21.

the administration of Western pills. These practitioners are almost pathetically anxious to gain Western approval. They are convinced that their spirit techniques are correct, but are under fire from modernists in their own community."

If the regional or local political structure permits the integral inclusion of traditional specialists in the new intervention, their power relationships in the community could be positively enhanced. The motivation, then, for participation in a new health intervention on the part of traditional specialists may be an enhancement within the culturally defined prestige and status complex. Since they enjoy legitimacy and credibility in their communities, they are in a position to influence wider acceptability.

Traditional Health Care and WHO

Despite the importance of the traditional health care system as the basic indigenous organizational structure linking the patient and his kin group to a process of diagnosis and treatment, its status in WHO is very low. At WHO/Geneva there is a staff of two people and no operational budget. Dr. Bannerman, a gynecologist-obstetrician and head of traditional medicine at WHO/Geneva informed this writer that DANIDA has provided funds for two African conference/workshops designed to bring modern and traditional practitioners together to explore their respective knowledge bases. Margaret Read notes in her discussion of traditional specialists that, as part of a field research project, she participated in a health education

IV. SPREAD EFFECTS: THE DIFFUSION OF INNOVATIONWomen as a Crucial Target Population

The population expected to ultimately benefit directly from EPI and CDD activities will be sub-Saharan African children aged 0-5. To get to this population, however, it will be necessary to go through the adult population, especially mothers. Exactly who these adults will be will depend on the specific kinship structure and organization of the targeted population. Biological mothers, for example, may not be the decision-makers concerning the health or illness of their children. Nevertheless, EPI and CDD activities will be greatly facilitated by an understanding of women's roles and status in their society.

Women, for example, have the daily task and responsibility of supplying water for all household needs. Contaminated drinking water is a source of illness in children and adults, yet boiling water may not be perceived as a sensible or practical solution to this problem; especially in light of the problem of a fuel supply for rural villages. A supply of fuel, usually firewood in the form of twigs and branches, is also the responsibility of women. The greater part of a day may be devoted to searching and gathering firewood. Using portions of the firewood to boil water, portions of which will be lost to evaporation, will make no sense to rural women. Other practical and adaptable ways of solving the contaminated water problem should be sought, for example, through the Ministry of Hydraulics, an accessible and safe water source should be part of over-all economic development.

Preventive and curative health measures for children aged 0-5 may be the sole responsibility of the biological mother; of patrilineal aunts, or of wider kin groups. Whatever the responsibility structure, mothers will rarely make a unilateral decision concerning modern medical care for their children.

For women as childbearers, the culture of sexual and childbirth practices, beliefs, and rituals dramatically impacts morbidity and mortality profiles in some African societies. For example, major health problems for women revolve around beliefs and practices of pregnancy, childbirth, chronic malnutrition, and female circumcision. Sterility, stillbirths, and brain damaged babies are often the result of clitoral surgery. It has been pointed out in the health sector policy paper that among certain African women "physical damage from clitoridectomy and genital infibulation range from shock, bleeding, and chronic pelvic infection to infertility, lengthened delivery, brain damage to the fetus and fetal wastage". (n.d.:5)

Cultural beliefs and practices in these areas will not yield easily to health education and public promotion activities. It is, nonetheless, important that the health planner have some knowledge and understanding of these beliefs and practices for two reasons:

- 1) training and health education of traditional midwives and birth attendants will have to be cast within this familiar and traditional belief and knowledge system, and

- 2) most births still take place within the confines of this cultural complex, where older, more traditionally-oriented women usually have recognized influence and authority.

The African traditional midwife of birth attendant is usually a woman beyond child-bearing age whose services generally do not extend beyond a specific geographic area. Her services may extend across generations of families because she is trusted and accepted. Generally, she is a respected source of information concerning the care and feeding of babies, sexual and childbirth behavior and practices. She is a tremendous potential channel for influencing attitudinal change concerning acceptance and participation in EPI, CDD, and where appropriate, YAWS, and other CCCD activities.

The utilization of these indigenous channels for communicating information about new health interventions will not happen automatically. The spread effect of diffusion of the ideas and new practices will depend on the capability of the health education and promotion personnel to develop information to be shared or transmitted within the context of the existing and familiar knowledge and learning base. Without the familiar base from which to absorb new information destined to ultimately change or modify behavior, the natural channels for diffusion will assume no potency.

Allocation of Time and Implications for EPI and CDD Activities

A valuable working tool for health planners would be a record of how women plan and allocate their time during the day. The daily routine will vary according to seasonal production activities and mobility. In addition to the above mentioned responsibilities of supplying water and fuel for domestic needs and tasks, many rural women also have agricultural responsibilities, namely, sowing, weeding, and assistance in harvesting. The implications of this kind of daily schedule for EPI and CDD activities are threefold:

- 1) women may not be able to fully participate in programs which conflict with their daily routines,
- 2) their inability to participate may be misinterpreted as lack of interest or lack of acceptance of the intervention, and
- 3) before the particular health measures can be operationalized, it may be necessary to provide labor saving amenities such as easily accessible and safe sources of water (this would theoretically, increase a woman's discretionary time).

Since a rural woman's time and daily routine is so inextricably interwoven with her role and status as a wife and mother, it is important to understand the regularized social and economic production behavior of these women if their acceptance and participation

in CCCD related activities is to be expected. These women cannot be expected to halt or interrupt their daily routine to participate in or listen to health education information concerning EPI and CDD.

The limitations and demands of the rural woman's time present a special consideration constraining the spread of a new health intervention unless the necessary information concerning the intervention is communicated to women within the context of familiar surroundings and routine schedules.

Language, Women and Spread Effect

Unlike a number of development interventions where the primary target population is usually males, this CCCD health intervention, has as its primary target population the mother/child complex. Across sub-Saharan Africa, socioeconomic profiles of women bear out the fact that they have less proficiency in the official language of the country (usually English or French) than do males. Women, especially rural women, will communicate most proficiently in the major indigenous language of their country. It will therefore be important to design materials, both written and audiovisual, which are the language and culture specific.

Field Research, Health Education and Diffusion

Field research activities, including data collection and analysis, by the social scientist and health educator should be designed with-

in the theoretical framework that health education is essential for both individual and group understanding, acceptance, and participation in EPI, CDD and related CCCD activities. The importance of health education should first of all be communicated to national authorities. Through the regional WHO/CDC Management I and Management II training courses in EPI, the proposed health educator and social scientist can design and incorporate units or modules on health education for EPI and CDD.¹ The critical role of women and traditional medical specialists as natural and indigenous channels for diffusion of information (which will hopefully lead to acceptance and participation in project activities) would be the focus of these education modules.

A simultaneous EPI and CDD education effort in the design and preparation of written and audiovisual materials should be undertaken approximately mid-1982 after appropriate baseline data has been gathered by the health educator and social scientist.

Leadership/Authority and Diffusion

Identifying and soliciting the support of respected leaders from the center to the periphery would be a first step in the diffusion process. At the center, for example, a logical start would be the Ministry of Health; but it is important to bear in mind that the locus of power and influence for operationalizing a new health

^{1/} The Office of International Health Volume 4 on "Guidelines for Analysis of Socio-Cultural Factors in Health", is a useful document.

intervention may lie outside the Ministry of Health. It may be in the Ministry of Rural Development, Ministry of Planning, or Ministry of Finance. The entry point for a new health intervention may be through an agricultural extension program or through a Ministry of Education extension program. The need for tactful diplomacy would be in order if and when the Ministry of Health is not the locus of power in a country-specific situation.

At the periphery, local religious, political, or traditional family leaders may have more power, influence, and authority than Ministry of Health civil servants. Traditional medical specialists, depending on the degree of specialization and whether powers are ascribed or acquired, will enjoy a legitimacy and credibility not possible for outsiders. It is important here to point out that outsiders refers equally to nationals and foreigners. An impediment to the spread of EPI, CDD and other CCCD information and techniques could be the national who may have no understanding of the intricacies of behavior and attitudes which define and cohere a social system. Often, if he speaks the language, it is assumed that he will fit right in and be readily accepted. Difference in educational, ethnic, and economic background may in fact completely separate this person from the rest of the community. The consequences of this is reduced communication and a poor spread effect. Indigenous leadership, therefore, represents the best source for insuring support and spread of a new idea or intervention.

Identification of active special interest groups, factions, and informally structured groups (groups which may form only when there is an issue or problem of importance to them. Their existence parallels the life of the issue or problem, after which they dissolve the group) is very important in securing wide support and participation. Determining who these groups are, how they are organized, where they are located, and how they exercise power, influence, and authority will facilitate the implementation and diffusion process.

Patterns of Mobility

A complete study of the regularized and established cyclical patterns of mobility of regional donor personnel, government Ministry personnel, extension personnel, and local populations will provide some indication of the cross-fertilization of ideas. Attention should not focus only on the mobility patterns of local populations because the exchange of information and feedback is a complex of all involved in the process. Local populations are involved daily and seasonally in social and production activities which do not necessarily permit them to have or give much time to dialogue with visiting personnel about a new intervention. A record of the pattern of movement and mobility into and out of an area would permit planning which meshes with the flow of normal mobility and production activities. Communication and information points of entry may be most effective at known leisure periods or during peak market periods. Again, diffusion has the possibility of covering a wider area when

exposure to new ideas and information takes place at times when targeted populations, particularly women, are in the "captive audience" role.

Previous Project Design, Execution, and Diffusion

Although this proposed CCCD project is larger in scope than on-going WHO/EPI and AID/AIP/EPI activities, the latter, an example of which is operational in Somalia, provides some insights into the problems of diffusion. The Foster¹ assessment of the Somalia WHO/EPI does not indicate that the intervention demonstrates any diffusion or spread effect. Team interviews with the WHO/EPI physician assigned to the Ministry of Health indicated that assessments of critical weaknesses in the implementation process were being strengthened through an AID/AIP. It may be inappropriate from the point of view of design and scope as well as from the point of view of length of project operating time to use this AIP/EPI as an example of a possibility for diffusion. However, it seems important to look critically at this activity because the problem of language and communication represents a barrier to diffusion.

This is a critical barrier because the significant targeted population of women speak almost no English, nor do health auxiliaries outside Mogadishu. During an interview with the gynecologist

1/ See the AID Assessment July 1979 of the Expanded Program of Immunization by Stanley Foster and Mike Marty.

working with the program (she is the wife of the WHO/EPI director and assisting in the MCHs on a volunteer basis as a means of remaining professionally active), she acknowledged, interestingly, that a number of the health workers under her direction speak no English. The fact that she speaks no Somali did not seem to be an issue.

V. SOCIAL CONSEQUENCES AND BENEFIT INCIDENCE

Differential Spread Effect: Direct and Indirect Beneficiaries

EPI, CDD and other CCCD project activities will impact different groups in different ways. The ultimate direct beneficiaries will be rural and urban children aged 0-5 in sub-Saharan Africa. Among this population cumulative mortality is 300 to 500 per 1000 births and infant mortality rates vary from 100 to 200 deaths per 1000 births.

Immediately impacted targets, however, will be Ministry of Health managerial and mid-level personnel participating in EPI and CDD training courses. The knowledge, techniques, and methods gained from these courses will be shared with and formally communicated to lower echelons in Ministry of Health personnel structures. Methods for relating this technical information to mothers who represent the intermediate target population will be researched by the health educator and social scientist.

The distribution of EPI led CDD project activities and benefits among geographical, ethnic, and socioeconomic levels cannot be determined from the regional vantage point. The benefit incidence will be at the bilateral level.

Time Frame, Project Results, and Culture Change

While the reduction of mortality and morbidity in sub-Saharan children aged 0-5 is the ultimate project goal, a concomitant goal is the development of a commitment to health maintenance and infectious disease prevention among ever-widening sub-Saharan populations. Because newly introduced public health measures mean changes and modification in beliefs, attitudes, and behavior; all of which define and cohere any social system, EPI and CDD measures cannot be expected to have any long-term benefits over the remaining budget life of this project.

Health education, for example, is a slow and complex process designed to change attitudes, habits, and practices. Improved health as a benefit accruing to the larger social group may not be a visible result for a generation. Activities, then, in a CCCD project should be phased over a twenty year period.

Indeed, in keeping with AID's strategy for improving the health populations in sub-Saharan Africa, selected disease control such as EPI and CDD activities is approached as part of a four-part program. One of the cornerstones of this four-part program is a primary health

care delivery system. The other two components are health planning and the provision of clean water and improved sanitation. The need to move simultaneously on all four fronts will require a timeframe beyond the budget life of this CCCD activity. The remaining three years of the proposed project should therefore be viewed as a start-up phase I with a commitment to continue this activity over the next two decades.

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ANNEX F

OVERVIEW OF AID SUPPORTED HEALTH
ACTIVITIES IN SUB-SAHARA AFRICA RELATED
TO THE COMBATTING OF CHILDHOOD
COMMUNICABLE DISEASES (CCCD)

This paper presents in tabular form and brief narrative summaries an overview of AID supported health projects in sub-Saharan Africa that involve immunization and other activities to control diarrhea and childhood communicable diseases. Also included are primary care and rural health development projects since in most instances these are or will incorporate communicable disease control.

The information provided has been extracted from AID files and from a draft report prepared by the American Public Health Association under contract to AID entitled "Tracking Report on AID Supported Primary Health Care Projects, Volume III-Africa," dated December, 1980. These data have been updated from from a series of cable responses provided by USAID field missions.

The tracking report is expected to be updated periodically and the full report or more complete information on a particular program can be made available upon request by contacting the Office of Regional Affairs, Bureau of Africa, Room 3325, Agency for International Development, Department of State, Washington, D.C. 20523.

April, 1981

USAID ACTIVITIES IN COMBATTING CHILDHOOD COMMUNICABLE DISEASES
AND ASSISTANCE IN RURAL HEALTH SERVICES AND
PRIMARY HEALTH CARE DEVELOPMENT
IN SUB-SAHARA AFRICA

COUNTRY	PROJECT NAME AND NUMBER ¹	PROJECT DATES	FUNDING LEVEL AND SOURCE	LOCATION	REMARKS
Botswana	Health Services Development No. 633-0078	FY 1978-1981 with probable extension to 1983	US \$5.5 Million HG ² \$1.7 Million Other donors	Nation Wide	Basically a project to develop primary health care through training of various category of health workers. No CCCD acti- vities identified.
Burundi	Expanded pro- gram on Immu- nization (EPI)	3/81-3/83	US \$0.5 Million	Nation Wide	Full program support including EPI expert to establish and/or improve various aspects of the program including cold chain logistics, vaccine procurement, distribution and control, immu- nization scheduling, equipment maintenance and repair, data and evaluation. Vehicles, commodi- ties and cold chain equipment are provided.
Congo	EPI	3/81-3/83	US \$0.5 Million	Nation Wide	Full program support as in Burundi
Central African Republic	Ouham Province Rural Health Project No. 676-0002	9/7	US \$2.0 Million	Ouham Province	Project was designed to strengthen management capability and to extend basic health services to a rural area. Project had only limited success. No CCCD activi- ties identified.
Ghana	Management of Rural Health Services No. 590-068	1/75-10/79	US \$1.3 Million	Nation Wide	Project established a national health planning unit and developed a primary care strategy for the country. A follow on project to deliver rural health services including CCCD activities is con- templated.

COUNTRY	PROJECT NAME AND NUMBER	PROJECT DATES	FUNDING LEVEL AND SOURCE	LOCATION	REMARKS
Ghana	Yaws and yellow fever control No. 698-0410.25	1/81-12/82	US \$0.50 Million	Nation Wide	Technical aid and commodities are provided. This project very likely will develop into a national EPI project.
Guinea	Maternal and Child Health	1/81-12/82	US \$0.46 Million	Nation Wide	Project includes EPI activities on a limited basis in the context of an MCH project. Consultations on EPI and commodities are provided.
Kenya	Kitui Primary Care Project No. 615-0185	FY 1979-81	US \$0.413 Million HG \$0.275 Million	Kitui District	Project comprised of four mobile health units serving remote areas with antenatal care, immunization and simple curative care.
	Kibwezi Rural Health Scheme No. 615-0179	FY 1979-81	US \$0.816 Million	Makindu District at Kibwezi	An experimental primary care project emphasizing training of village health workers. Major funding of EPI in Kenya is being provided by Denmark
Lesotho	Rural Health Development Project No. 690-0058	1978-1983	US \$3.254 Million HG \$0.454 Million	Nation Wide	A two phased project, first to improve MOH planning and health manpower development, second to deliver health services. No specific CCCD activities are identified.
Liberia	EPI		US \$0.500 Million	Nation Wide	Full program support as in Burundi.
Mali	Rural Health Services Development No. 688-0208	FY 1979-83	US \$3.890 Million HG \$0.870 Million	Mopti and Kayes Regions	Pilot projects to develop model of rural health care for Mali. No specific CCCD activities identified.

COUNTRY	PROJECT NAME AND NUMBER	PROJECT DATES	FUNDING LEVEL AND SOURCE	LOCATION	REMARKS
Mauritania	Rural Medical Assistance No. 682-0202	FY 1979-83	US \$1.93 Million HG \$0.224 Million	Tarza Region	Project will develop and test a model of rural health outreach by community health workers.
	EPI	3/80-3/82	US \$0.4 Million	Nation Wide	Full program support as in Burundi.
Niger	Public Health Services No. 683-0214	6/78-3/81	US \$1.47 Million	Diffa Department	Project trains health workers, establishes vehicle and medical equipment repair, provides services of sanitary engineers and other health care specialists.
	Rural Health Improvement No. 683-0208	1/78-12/82 extension to 12/84 expected)	US \$14.029 Million	Nation Wide	Provides general support for training all categories of rural health workers, building of rural health facilities, provision of commodities including vaccines and cold chain equipment. Incorporation of CCCD activities is anticipated.
Rwanda	EPI	8/80-8/82	US \$0.5 Million	Nation wide	Full program support as in Burundi.
Senegal	Rural Health Services Development No. 685-0210	7/77-12/83	US \$3.3 Million HG \$1.6 Million	Sine Saloum	Project serves 225,000 rural inhabitants. Recently redesigned, project will focus on infants, children and pregnant women and will emphasize CCCD activities including immunization and diarrhea control.

COUNTRY	PROJECT NAME AND NUMBER	PROJECT DATES	FUNDING LEVEL AND SOURCE	LOCATION	REMARKS
Somalia	EPI	8/79-8/81	US \$0.2 Million	Nation Wide	Provides commodity support, vehicles, etc.
Sudan	Northern Sudan Primary Health Care Project No. 650-0011	FY 1979-82	US \$5.8 Million Af. Dev. Bank \$8.0 Million HG \$0.89 Million	Four provin- ces in north- ern Sudan.	Project aims to implement the national primary care programs in four of Sudan's poorest provinces. Specific CCCD activities have not been indentified.
	Southern Pri- mary Health Care Project No. 650-0019	FY 1979-83	US \$3.2 Million HG \$1.3 Million	Southern Region	This is related to the above project and extends coverage to the Southern Region. The US is also contemplating a third project, Health Sector Support, for which \$32.0 million has been requested over five years (1980-85) to augment the Government of Sudan's health programs.
Tanzania	Hanang Ujamaa Village Public Health Program No. 621-0138	FY 1977-1979	US \$0.499 Million	Hanang District	This model primary health care project focuses on village organization to support first aid boxes, village leaders (health educators) and village health workers. Communicable disease prevention at the village level is stressed.
	Tanzania School Health Program No. 621-0150	FY 1980-83	US \$5.7 Million	Dodoma and Singida States	In eighty schools, a standard-ized program of health instruc-tion, health services and nutri-tion and environmental improve-ments are being implemented. Health records, including immun-ization are emphasized.

COUNTRY	PROJECT NAME AND NUMBER	PROJECT DATES	FUNDING LEVEL AND SOURCE	LOCATION	REMARKS
Zaire	Health Systems Development No. 660-1980	1978-1980	US \$0.675 Million HG \$0.44 Million	Kinshasa, Kongolo and Maluku	This project, designed to improve Zaire's capability to plan and implement health programs, had only limited success. However, AID has an endemic disease control project underway which includes an EPI component. Use of oral rehydration salts in diarrheal disease control will be stressed in two projects which are scheduled to be implemented over four or five years. These are the Basic Family Health Services project (No. 660-0067) to begin in 1981 and the Area Nutrition Improvement project (No. 660-0079) to begin in 1982.
20 Central and West African Countries	Strengthening of Health Delivery Systems in Central and West Africa (SHDS)	Phase I 9/77 Phase II 1/78- 12/82	US \$20.00 Million WHO		<p>The broad goal of this project is to increase the capability of 20 countries in this region to plan and manage their health delivery systems emphasizing a primary health care strategy.</p> <p>The 20 countries participating are Benin, Cameroon, Central African Republic, Chad, Congo, Guinea, Guinea Bissau, Gabon, Gambia, Ghana, Ivory Coast, Liberia, Mali, Mauritania, Niger, Senegal, Sierra Leone, Togo and Upper Volta.</p> <p>A major objective of the program is to improve regional and national disease surveillance and health information systems. Demonstrations and training with respect to EPI are carried out</p>

COUNTRY	PROJECT NAME AND NUMBER	PROJECT DATES	FUNDING LEVEL AND SOURCE	LOCATION	REMARKS
20 Central and West African Countries					<p>in three countries: Cameroon, the Gambia and Ivory Coast. The US, through Center for disease Control, is providing EPI management training. In 1981, the US will provide approximately 1.3 million doses of measles vaccine, divided among 14 countries: Benin, Cameroon, Central African Republic, Congo, Gambia, Ghana, Guinea, Ivory Coast, Mali, Niger, Senegal, Sierra Leone, Togo and Upper Volta. In 1982, measles vaccine will continue to be supplied these countries and Congo will commence receiving aid to start an EPI program.</p>

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1. Refers to USAID Project Name and Number.
 2. HG refers to Host Government.

Addendum - May 1981

COUNTRY	PROJECT NAME AND NUMBER	PROJECT DATES	FUNDING LEVEL AND SOURCE	LOCATION	REMARKS
Swaziland	Rural Water Borne Disease Control 645-0087	FY 79-84	U.S. \$3.2 million	Nation-wide	Emphasis on bilharzia and other water borne disease. Snail control and mass treat- ment campaigns, health educa- tion.
Swaziland	Health Manpower Training 645-0062	FY 77-82	U.S. \$4.3 million	Nation-wide	Institutionalizing nursing, and other paramedical programs. Establishing locally-staffed health services support syst.
Liberia	Primary Health Care	FY 81-85	U.S. \$10.0 million (planned)	Nation-wide	National Primary Health Care project now under design.
Ghana	Primary Health Care Support	FY 82-85	U.S. \$15.6 million	Nation-wide	To be designed.

ANNEX G

Selected Demographic Data

ANNEX G-1 Sub-Sahara Africa-Selected Demographic Data 1/

COUNTRIES	Estimated Population Mid-1980 (million)	Birth Rate	Rate of Nat. Increase (annual %)	Inf. Mort. Rate	Population 0 to 15 (%)	Total Fertility Rate
ANGOLA	6.7	48	2.4	203	44	6.4
BENIN	3.6	49	3.0	149	46	6.7
BOTSWANA	0.3	51	3.4	97	50	6.5
BURUNDI	4.5	47	2.7	140	44	6.3
CAMEROON	8.5	42	2.3	157	41	5.7
CAPE VERDE	0.3	28	1.8	105	36	3.0
CENTRAL AFRICA	2.8	42	2.2	190	41	5.5
CHAD	4.5	44	2.3	165	42	5.9
COMOROS	0.3	40	2.2	148	43	5.2
DJIBOUTI	0.4	48	2.5	132	46	6.6
EQUATORIAL GUINEA	0.4	42	2.3	165	42	5.7
ETHIOPIA	32.6	50	2.5	162	45	6.7
GABON	0.6	33	1.1	178	33	4.5
GAMBIA	0.6	48	2.4	217	41	6.4
GHANA	11.7	48	3.1	115	47	6.7
GUINEA	5.0	46	2.5	175	44	6.2
GUINEA BISSAU	0.6	41	1.8	208	39	5.5
IVORY COAST	8.0	48	2.9	154	45	6.7
KENYA	15.9	53	3.9	83	50	8.1
LESOTHO	1.3	40	2.4	111	40	5.4
LIBERIA	1.9	50	3.2	148	48	6.7
MADAGASCAR	8.7	45	2.6	102	43	6.1
MALAWI	6.1	51	3.2	142	44	7.0
MALI	6.5	49	2.7	190	48	6.7
MAURITANIA	1.6	50	2.8	187	42	6.9
MAURITIUS	0.9	27	2.0	35	37	3.1
MOZAMBIQUE	10.3	45	2.6	148	45	6.1
NAMIBIA	1.0	44	2.9	142	44	5.9
NIGER	5.5	51	2.9	200	47	7.1
NIGERIA	77.1	50	3.2	150	47	6.9
REUNION	0.5	26	1.9	36	38	2.8
RWANDA	5.1	50	3.0	127	47	6.9
SAO TOME & PRINCIPE	0.1	45	3.4	64	43	6.0
SENEGAL	5.7	48	2.6	160	44	6.5
SEYCHELLES	0.1	26	1.8	43	42	4.5
SIERRA LEONE	3.5	46	2.6	136	41	6.4
SOMALIA	3.6	48	2.8	177	44	6.1
SUDAN	18.7	48	3.1	141	44	6.6
SWAZILAND	0.6	47	2.8	168	48	6.4
TANZANIA	18.6	47	3.1	125	46	6.5
TOGO	2.5	49	3.0	163	46	6.7
UGANDA	13.7	45	3.0	120	45	6.1
UPPER VOLTA	6.9	48	2.6	182	44	6.5
ZAIRE	28.9	46	2.8	160	43	6.1
ZAMBIA	5.8	49	3.2	144	46	6.9
ZIMBABWE	7.4	47	3.4	129	47	6.6
CONGO	1.6	45	2.6	180	43	6.0
TOTAL	348.1					

1/ Source, 1980 World Population Data Sheet, Population Reference Bureau.

ANNEX G-2 Number of Children Under Age Five Years in Selected Sub-Saharan African Countries

COUNTRIES	Estimated No. of Children Under Age One Year (000)				Estimated No. of Children 1 - 4 Years (000)			
	1980	1985	1990	2000	1980	1985	1990	2000
ANGOLA	309	331	388	398	1062	1237	1407	1579
BEWANA	143	160	198	216	504	578	680	815
BOTSWANA	33	39	42	50	116	136	154	190
BURUNDI	167	191	212	236	588	665	742	864
CAMEROON	249	300	329	396	885	1062	1201	1492
CAPE VERDE	9	9	9	9	31	32	33	32
CENTRAL AFRICA REPUBLIC	75	85	96	115	273	314	348	421
CHAD	151	166	176	181	532	587	635	684
COMOROS	15	15	18	24	57	60	69	90
CONGO	53	56	66	83	202	226	252	314
DJIBOUTI	N.A.							
EQUATORIAL GUINEA	11	12	13	14	37	42	47	54
ETHIOPIA	1300	1422	1584	1806	4505	5095	5686	6686
GABON	N.A.							
GAMBIA	20	22	24	26	73	79	87	97
GHANA	504	561	572	567	1674	1914	2107	2251
GUINEA	243	276	307	345	850	968	1123	1413
GUINEA - BISSAU	19	22	23	25	71	78	85	95
IVORY COAST	303	345	410	507	1165	1294	1464	1838
KENYA	717	768	806	993	2435	2836	3101	3701
LESOTHO	47	43	37	40	167	170	176	157
LIBERIA	65	67	72	90	238	261	282	341
MADAGASCAR	437	459	494	596	1517	1683	1849	2208
MALAWI	248	283	311	355	830	874	1108	1316
MALI	270	299	329	375	929	1053	1176	1358
MAURITANIA	49	53	62	71	181	202	230	274
MAURITIUS	21	22	23	22	74	76	83	85
MOZAMBIQUE	399	421	428	458	1396	1541	1632	1769
NIGER	239	281	320	370	810	956	1111	1361
NIGERIA	2985	3309	3611	4069	10423	11786	13133	15294
REUNION	14	14	14	14	49	48	49	53
RWANDA	207	247	288	323	726	849	995	1206
SAO TOME & PRINCIPE	N.A.							
SENEGAL	231	269	304	335	798	924	1063	1250
SEYCHELLES	N.A.							
SIERRA LEONE	128	144	153	176	439	501	559	654
SOMALIA	181	207	211	227	579	687	767	847
STAN	708	805	910	1105	2564	2938	3335	4136
SWAZILAND	23	26	28	29	81	94	103	107
TANZANIA	765	829	905	1090	2689	3031	3364	4052
TOGO	110	128	148	167	381	444	517	626
UGANDA	527	564	601	707	1870	2092	2284	2679
UPPER VOLTA	223	266	304	326	823	930	1057	1227
ZAIRE	1072	1150	1200	1289	3808	4205	4507	4920
ZAMBIA	265	303	342	418	916	1074	1234	1541
ZIMBABWE	355	406	433	500	1163	1398	1505	1911
TOTAL	13683	15404	16744	19141	48562	55020	61540	72009

1/ Source, "Illustrative Functional Projections 1975-2000", Community and Family Study Center, The University of Chicago, 1979. Base data was primarily obtained from the World Bank and the Population Reference Bureau. In developing projects, a cohort women aged 15-49 was taken from each country and age specific fertility rates were applied. This gives the number of births in a given year. Next, survival ratios from model life tables (Coale and Demang) were applied to the births to derive the figures for surviving births.

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM : AFR/RA, Donald F. Miller, Director

SUBJECT: Combating Childhood Communicable Diseases 698-0421 - Request
for a Source/Origin Waiver for Certain "Cold-Chain" Refrigeration Equipment

Problem: To obtain your approval for a procurement source and origin waiver from A.I.D. Geographic Code 000 (U.S. only) to A.I.D. Geographic Code 935 (Special Free World) for refrigeration units described below:

- A. Cooperating Country: Africa Regional
- B. Authorizing Document: Project Paper
- C. Project: Combating Childhood Communicable Diseases
- D. Project Number: 698-0421
- E. Nature of Funding: Grant (FY 81-88)
- F. Description of Commodities: Refrigeration Equipment and supplies and electrical generators and spare parts for the establishment and maintenance of the vaccine "cold chain"
- G. Approximate Value: \$500,000
- H. Procurement Origin: Sweden
- I. Source: Various African Countries

Primary Justification for Waiver: The subject commodities are critical to the success of project objectives and the exclusion of procurement from free world countries other than the cooperating country and countries included in Code 941 would seriously impede the attainment of U.S. foreign policy objectives and objectives of the foreign assistance program.

Discussion: As part of the Combating Childhood Communicable Diseases (CCCD) Project 698-0421, AID will assist various African Nations to begin or improve immunization programs to reduce morbidity and mortality in children from six common diseases (measles, T.B. polio, tetanus, pertussis, and diphtheria). It is critical that the vaccines used in the program be kept refrigerated (some must be kept frozen) until they are used. The refrigerated state is commonly referred to as the "cold chain". If the "cold chain" is broken, that is, if the refrigerated state is not maintained, disease immunity might not be established in the child vaccinated due to the loss of potency caused by heat. Vaccines are shipped refrigerated and are stored that way until used.

The Expanded Program for Immunization of the World Health Organization (WHO) to which this project relates, has standardized on European primarily Swedish, refrigeration equipment such as refrigerators and freezers. The type of equipment used, especially in the rural areas, is not available from U.S. manufactures. As the program expands to the more remote areas, the need to assure vaccine potency at the time of its use becomes acutely critical to the success of the immunization effort and the creditability among the recipients of this approach to public health.

During the eight (8) year life of the CCCD project, AID anticipates providing \$4,000,000 worth of vaccine to various African Countries. In addition, other vaccines used in the program, but not provided by A.I.D. will be protected through the use of the equipment.

A.I.D. Handbook 1B Chapter 5A 1C (2), states that the procurement source for all grant-funded projects (except for Relatively Least Developed Countries, RLDC's, is Code 000 - United States). In accordance with A.I.D. Handbook 1B, procurement of commodities from Code 935 (Special Free World) sources under a grant-financed project requires a waiver. Under A.I.D. Handbook 1B, Chapter 5B 4b (7), a waiver may be granted if there are, "Such other circumstances as are determined to be critical to the success of project objectives." Authority for making the determination and waiver has been redelegated to the Assistant Administrator for Africa under AID Handbook 1B 5B 4d (1) (a). Units similar to some of those proposal for purchase might be available from the United States but there are a number of reasons why a waiver is requested to purchase the units of European origin in Africa:

- (a) Local purchase will permit installation by refrigeration experts and keep warranties valid;
- (b) Spare parts and service are available locally;
- (c) maintenance manuals would have to be in the French language in order to assure proper maintenance in francophone countries; and
- (d) The normal time required to select, purchase and deliver the units is from 12 to 18 months after receipt of the PIO/C in AID/W. That time requirement to procure the equipment from a U.S. manufacturer would have a detrimental affect on the project.

Recommendation: Based on the above justification, it is requested that, by your signature below, you (1) approve a procurement source/origin waiver from Geographic Code 000 to Geographic Code 935 and (2) certify that circumstances critical to the success of project objectives warrant such a waiver under A.I.D. Handbook 1B, Chapter 5B 4b (7) and that exclusion of procurement 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 of the foreign assistance program.

Approved _____

Disapproved _____

Date _____

Clearances:

AFR/RA: EGRuoff _____
AFR/RA: NMarsh _____
SER/CCM/ALI: PHagan _____
GC/AFR: LDFinney _____

AFR/RA: JRCummiskey: jo
6/30/81: Ext. 22928

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5C(2) - PROJECT CHECKLIST

A. GENERAL CRITERIA FOR PROJECT

1. FY 79 App. Act Unnumbered; FAA Sec. 653 (b); Sec. 834A. (a) Describe how Committees on Appropriations 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) FY 80 Congressional Presentation
b) Yes
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?
- a) Yes
b) Yes
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 79 App. Act Sec. 101. 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.
- COO is a regional project.

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A.

7. FAA Sec. 507(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.

a) No
b) No
c) No
d) Yes
e) No
f) No

8. FAA Sec. 607(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.

9. Approximately two-thirds of the costs associated with the country-specific programs will be paid in local currencies; the regional programs will be supported primarily by foreign exchange.

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

Yes

12. FY 79 App. Act Sec. 608. 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); 171; 173; 231a. Extent to which activity will (a) effectively involve the poor in development, by expanding 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

a) Immunizations and improved health care will benefit the poor.

B.1.a.

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?

- b) N.A.
- c) Project will respond to country requests for improved health care.
- d) Women play an important role in the implementation of the project.
- e) Major part of the project is a regional effort.

b. FAA Sec. 103, 103A, 104, 105, 106, 107.
Is assistance being made available: (include only applicable paragraph which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.)

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

N.A.

(2) [104] for population planning under sec. 104(b) or health under sec. 104(c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition and family planning for the poorest people, with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics and health posts, commercial distribution systems and other modes of community research.

Yes, project emphasizes low-cost health delivery system.

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

N.A.

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

N.A.

(i) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

No

(ii) to help alleviate energy problems;

No

(iii) research into, and evaluation of, economic development processes and techniques;

NO

(iv) reconstruction after natural or manmade disaster;

No

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B.

3. Project Criteria Solely for Economic Support Fund

a. FAA Sec. 531(a). Will this assistance support promote economic or political stability? To the extent possible, does it reflect the policy directions of section 102? N.A.

b. FAA Sec. 533. Will assistance under this chapter be used for military, or paramilitary activities? No



WORLD HEALTH ORGANIZATION
GENEVA

ORGANISATION MONDIALE DE LA SANTÉ
GENÈVE

WEEKLY EPIDEMIOLOGICAL RECORD RELEVÉ ÉPIDÉMIOLOGIQUE HEBDOMADAIRE

Epidemiological Surveillance of Communicable Diseases
Telegraphic Address: EPIDNATIONS GENEVA Telex 27821

Service de la Surveillance épidémiologique des Maladies transmissibles
Adresse télégraphique: EPIDNATIONS GENÈVE Telex 27821

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Telex 28150 Geneva with ZCZC and ENGL for a reply in English

Service automatique de réponse
Télex 28150 Genève suivi de ZCZC et FRAN pour une réponse en français

23 JANUARY 1981

56th YEAR — 56^e ANNÉE

23 JANVIER 1981

DIARRHOEAL DISEASES CONTROL PROGRAMME

Training Course for Programme Managers

Forty participants from 27 countries, representing all six WHO Regions, attended the first WHO Diarrhoeal Diseases Control Programme (CDD) Training Course for National CDD Programme Managers, which was held in Bangkok, Thailand, from 27 October to 7 November 1980. The participating countries were: *Africa*: Ethiopia, Gambia, Ghana, Nigeria, and Zambia; *Americas*: Argentina, Colombia, and Jamaica; *Eastern Mediterranean*: Afghanistan, Egypt, Pakistan, and Sudan; *Europe*: Turkey; *South-East Asia*: Bangladesh, Burma, India, Indonesia, Nepal, Sri Lanka, and Thailand; and *Western Pacific*: China, Fiji, Guam, Malaysia, Papua New Guinea, Philippines, and Tonga. The teaching staff of Course Facilitators included WHO country, regional, and global staff, as well as developing country nationals and staff from the Center for Disease Control, United States of America, and the International Centre for Diarrhoeal Disease Research, Bangladesh.

Organization of the Course

Participants are given an Introduction and a description of a hypothetical developing country—"Fictitia". They then work through a series of seven "modules", as if they were the CDD Programme Manager in Fictitia. The titles of the modules are:

Priorities
Objectives and Targets
Delivery Systems
Sub-Targets
Logistics
Evaluation
Problem Solving

Teaching Methodology

The methodology used in the course is similar to that employed in the Expanded Programme on Immunization (EPI) courses on management and supervision. That is, participants are encouraged to work at their own pace, they can consult with a course facilitator whenever they wish, and they have frequent opportunities to demonstrate whether or not they have acquired the particular skills being taught. The participants are divided into groups, each of which also includes two or three facilitators. Most of the work in the groups is done on an individual basis, each participant discussing the exercises individually with a facilitator. Group discussions are also included in each module so that participants can share experiences and discuss the application of the training material to their particular country CDD programmes.

PROGRAMME DE LUTTE CONTRE LES MALADIES DIARRHÉIQUES

Cours de formation destinés à des directeurs de programme

Quarante participants originaires de 27 pays représentant les six Régions de l'OMS ont assisté au premier cours de formation destiné à des directeurs de programme de lutte contre les maladies diarrhéiques organisé par le Programme OMS de lutte contre les maladies diarrhéiques, qui s'est tenu à Bangkok (Thaïlande) du 27 octobre au 7 novembre 1980. Les pays participants étaient les suivants: *Afrique*: Ethiopie, Gambie, Ghana, Nigéria et Zambie; *Amériques*: Argentine, Colombie, et Jamaïque; *Méditerranée orientale*: Afghanistan, Egypte, Pakistan et Soudan; *Europe*: Turquie; *Asie du Sud-Est*: Bangladesh, Birmanie, Inde, Indonésie, Népal, Sri Lanka et Thaïlande; et *Pacifique occidentale*: Chine, Fidji, Guam, Malaisie, Papouasie-Nouvelle-Guinée, Philippines et Tonga. Le personnel enseignant et les moniteurs comprenaient du personnel OMS des pays, des Régions et du Siège ainsi que des nationaux de pays en développement et du personnel du *Center for Disease Control* des Etats-Unis d'Amérique ainsi que du Centre international de recherche sur les maladies diarrhéiques du Bangladesh.

Organisation du cours

Le cours a commencé par un exposé introductif et une description d'un pays en développement hypothétique — la « Fictitie ». Les participants travaillent ensuite dans une série de sept « modules », comme s'ils avaient la responsabilité du programme de lutte contre les maladies diarrhéiques en Fictitie. Ces modules s'intitulent:

Priorités
Finalités et objectifs
Systèmes de prestations
Sous-objectifs
Logistique
Evaluation
Résolution des problèmes

Méthodologie d'enseignement

La méthodologie utilisée dans le cours est analogue à celle employée pour les cours de gestion et d'encadrement du Programme élargi de vaccination (PEV). C'est-à-dire que les participants sont incités à travailler à leur propre rythme, qu'ils peuvent consulter un moniteur chaque fois qu'ils le désirent et qu'ils ont fréquemment l'occasion de montrer s'ils ont ou non acquis les compétences particulières qui leur sont enseignées. Les participants sont divisés en groupes comprenant chacun deux ou trois moniteurs. La plus grande partie du travail dans les groupes s'effectue de façon individuelle, chaque participant discutant individuellement des exercices avec un moniteur. Des discussions de groupe font également partie de chaque module, de telle sorte que les participants puissent partager leurs expériences et débattre de l'application des éléments de formation qui leur sont donnés au programme de lutte contre les maladies diarrhéiques de leur propre pays.

Epidemiological notes contained in this number:

Cholera Surveillance, Dengue Fever Surveillance, Diarrhoeal Diseases Control Programme, Enterovirus Surveillance, Influenza Surveillance, Legionnaires' Disease Surveillance, Rabies Surveillance, Surveillance of Nosocomial Infections, Tuberculosis Surveillance.

Informations épidémiologiques contenues dans ce numéro:

Programme de lutte contre les maladies diarrhéiques, surveillance de la dengue, surveillance de la grippe, surveillance de la maladie de l'*American Legion*, surveillance de la rage, surveillance de la tuberculose, surveillance des entérovirus, surveillance des infections nosocomiales, surveillance du choléra.

In addition, plenary sessions were held so that the following subjects could be presented and discussed:

Oral Rehydration Therapy
Health Education
Social Marketing
Oral Rehydration Salts Production (ORS)
Surveillance and Epidemic Control
CDD and Primary Health Care in Thailand

Course Content

1. Priorities

The material on "Fictitia" includes information on a number of health problems, and participants assess (a) the importance of each problem as measured by morbidity, mortality, and severity; and (b) the feasibility of control programmes, as measured by technical capability, cost, and public response. These two assessments are then used to determine the relative priority to be given to the different health problems within the context of Fictitia's primary health care system.

2. Objectives and Targets

Having decided to include diarrhoeal disease control among its priorities, Fictitia establishes both general objectives and quantified targets. The advantages and constraints of each of the CDD strategies are considered, following which medium and long-term targets for reductions in diarrhoeal disease mortality are established by estimating the potential access to and coverage of oral rehydration therapy. The importance of establishing objectives for reductions in morbidity, using maternal and child health and environmental sanitation strategies, is also emphasized.

3. Delivery Systems

Since Fictitia is committed to the primary health care approach to Health for All by the Year 2000, CDD activities will be carried out as an element of primary health care rather than as a separate programme. Thus, each of the strategies is implemented by using existing personnel, both within and outside the health sector, insofar as possible. Participants examine the current responsibilities, interests, and effectiveness of a variety of types of potential health providers, and integrate CDD tasks into their work.

4. Sub-Targets

Having established national objectives and targets for morbidity and mortality reduction, participants now determine the phasing of the programme for each of Fictitia's four regions. They also write quantified regional sub-targets for the Programme strategies of case management, maternal and child health, and environmental sanitation. That is, they project, through the use of questionnaires and visits to health facilities and villages, the extent to which services will be available and used. They then compare the potential reduction in mortality using this "bottom-up" approach with the reduction estimated by the central level in the "Objectives and Targets" module. In the last section, the detailed activities necessary to achieve sub-targets and targets are defined, and a method for establishing work outputs is presented.

5. Logistics

A logistics system for delivery of ORS in Fictitia is developed. The quantity of ORS needed to begin the programme is calculated, a system for distribution is developed, and sufficient quantities are ordered. A re-examination of the elements of the system is carried out at the beginning of a second phase. A method for determining whether or not local production of ORS would be cost/effective is presented.

6. Evaluation

Ways of evaluating activities and progress in attaining sub-targets, targets, and objectives are discussed. Methods for determining what data are needed, and for collecting, analysing, and acting upon such data are presented. The advantages and disadvantages of routine collection systems (including routine disease surveillance systems), sentinel systems, and special studies are

En outre, des séances plénières ont été organisées de manière à pouvoir présenter et discuter des questions suivantes:

Réhydratation par voie buccale
Éducation sanitaire
Prospection sociale
Production de sels de réhydratation par voie buccale
Surveillance et lutte contre les épidémies
Lutte contre les maladies diarrhéiques et soins de santé primaires en Thaïlande

Contenu du cours

1. Priorités

La documentation relative à la « Fictitie » comprend des renseignements sur un certain nombre de problèmes sanitaires et les participants analysent a) l'importance de chaque problème telle qu'on peut le mesurer d'après la morbidité, la mortalité et la gravité; et b) la réalisabilité des programmes de lutte, telle qu'on la mesure d'après la capacité technique, le coût et les réactions du public. On se sert ensuite de ces deux évaluations pour déterminer l'ordre de priorité à donner aux différents problèmes de santé dans le contexte du système de soins de santé primaires de la Fictitie.

2. Finalités et objectifs

Ayant décidé de faire figurer la lutte contre les maladies diarrhéiques parmi ses priorités, la Fictitie définit à la fois des objectifs généraux et des objectifs quantifiés. Les avantages et les contraintes de chacune des stratégies de lutte sont envisagés et des objectifs à moyen et long terme sont ensuite fixés pour la réduction de la mortalité par maladies diarrhéiques en évaluant l'accès potentiel à la réhydratation par voie buccale ainsi que le degré de couverture de cette forme de traitement. On insiste également sur l'importance qu'il y a de définir des objectifs pour la réduction de la morbidité en appliquant des stratégies de protection maternelle et infantile et de salubrité de l'environnement.

3. Systèmes de prestation

La Fictitie ayant adhéré au principe de la santé pour tous d'ici l'an 2000 grâce aux soins de santé primaires, les activités de lutte contre les maladies diarrhéiques s'accompliront dans le cadre des soins de santé primaires et non sous la forme d'un programme distinct. Ainsi, chacune des stratégies est mise en œuvre en utilisant autant que possible le personnel existant, tant à l'intérieur qu'à l'extérieur du secteur sanitaire. Les participants examinent les compétences, les centres d'intérêt et l'efficacité des différents types d'agents de santé éventuels tels qu'ils se présentent actuellement, et intègrent les tâches de lutte contre les maladies diarrhéiques dans leur travail.

4. Sous-objectifs

Ayant défini des finalités et des objectifs nationaux en matière de réduction de la morbidité et de la mortalité, les participants déterminent alors l'échelonnement du programme pour chacune des quatre régions de la Fictitie. Ils rédigent ensuite des sous-objectifs quantifiés régionaux pour les stratégies du programme concernant le traitement des cas de diarrhée, la santé maternelle et infantile et la salubrité de l'environnement. C'est-à-dire qu'ils projettent, grâce à l'utilisation de questionnaires et de visites dans des établissements sanitaires et des villages, la mesure dans laquelle les services seront fournis et utilisés. Ils comparent alors la réduction de mortalité susceptible d'être obtenue en utilisant cette approche ascendante avec la réduction évaluée par le niveau central dans le module « Finalités et objectifs ». Dans la dernière section, on définit les activités détaillées nécessaires à la réalisation des sous-objectifs et des objectifs et l'on propose une méthode pour l'établissement des productions.

5. Logistique

On élabore un système logistique pour la distribution en Fictitie des sels de réhydratation par voie buccale. La quantité de sels nécessaire pour entreprendre le programme est d'abord calculée puis on élabore un système de distribution et l'on commande des quantités suffisantes. Un réexamen des éléments du système s'opère au début d'une seconde phase. Enfin, on présente une méthode permettant de déterminer si la fabrication locale de sels de réhydratation serait ou non rentable.

6. Évaluation

Les différents moyens qui s'offrent d'évaluer les activités et les progrès réalisés en matière de réalisation des sous-objectifs, objectifs et finalités sont successivement examinés. On présente ensuite des méthodes pour déterminer de quelles données on a besoin et pour recueillir, analyser et exploiter ces données. Les avantages et les inconvénients des réseaux de recueil systématique des données (y

compared. In the exercises, participants assess surveillance forms, draw up a plan for data collection, analyse surveillance data, calculate changes in mortality and case-fatality rates, and determine cost-savings attainable through the introduction of oral rehydration therapy.

7. Problem Solving

In evaluating activities it is pointed out that many programme difficulties occur because of sub-optimal staff performance. A method of identifying performance problems, describing them, identifying their causes (i.e., a lack of skill or knowledge, a lack of motivation, or a barrier), and developing possible solutions is presented. After familiarizing themselves with the system through examining sample problems in Fictitia, participants discuss actual problems that are occurring in their health programmes, and members of the group suggest possible solutions.

Future Availability of the Course

The response of the participants suggests that they will use the skills taught in this course in planning and developing CDD programmes in their own countries. Future evaluation will verify the extent to which this is actually done. Based on the suggestions of the participants, the course is now undergoing revision. Early in 1981 the modules will be translated into French and Spanish, and will then be available for use on a country, regional, or inter-regional basis. It is hoped that all senior national health staff responsible for CDD programmes will participate in the course during the next three years.

compris les réseaux de surveillance systématique des maladies), des systèmes-sentinelles et des études spéciales sont tour à tour comparés. Au cours des exercices, les participants évaluent les formulaires de surveillance, élaborent un plan de collecte des données, analysent des données de surveillance, calculent des modifications dans les taux de mortalité et de létalité, déterminent les économies de coûts susceptibles d'être réalisées grâce à l'introduction de la réhydratation par voie buccale.

7. Résolution des problèmes

Dans l'évaluation des activités, on fait observer que de nombreuses difficultés qui apparaissent dans l'exécution des programmes sont dues à un comportement professionnel sous-optimal du personnel. On présente une méthode permettant de cerner les problèmes de comportement professionnel, de les décrire, d'en déterminer les causes (c'est-à-dire un manque de compétence ou de connaissances, un manque de motivation ou un blocage) et d'élaborer des solutions possibles. Après s'être familiarisés avec ce système en examinant des problèmes types qui se posent en Fictitia, les participants débattent des problèmes réels qu'ils rencontrent dans le fonctionnement de leurs programmes de santé, et les membres du groupe proposent des solutions possibles.

Autres possibilités de pouvoir suivre le cours

La réaction des participants incite à penser qu'ils utiliseront les compétences acquises à l'occasion de ce cours dans la planification et la mise en place des programmes de lutte contre les maladies diarrhéiques poursuivis dans leurs pays. Une évaluation ultérieure permettra de vérifier dans quelle mesure cela s'est concrétisé. On procède actuellement à une révision du cours en fonction des suggestions formulées par les participants. Au début de 1981, les modules seront traduits en français et en espagnol et pourront alors être utilisés au niveau national, régional ou interrégional. On espère que tout le personnel sanitaire national de niveau supérieur chargé des programmes de lutte contre les maladies diarrhéiques participera au cours dans le courant des trois prochaines années.

TUBERCULOSIS SURVEILLANCE

BOTSWANA. — The National Tuberculosis Programme started in 1975, with the Epidemiology Unit of the Ministry of Health responsible for surveillance activities.¹ Table 1 shows the number of newly diagnosed cases of tuberculosis reported from 1975 to 1979. The figure for 1975 represents the first year of programme operation, when the notification system was streamlined.

SURVEILLANCE DE LA TUBERCULOSE

BOTSWANA. — Le programme national antituberculeux a commencé en 1975, le service d'épidémiologie du Ministère de la Santé étant responsable des activités de surveillance.¹ Le Tableau 1 montre le nombre de cas nouveaux de tuberculose notifiés de 1975 à 1979. Le chiffre donné pour 1975 correspond à la première année d'exécution du programme, au cours de laquelle le système de notification a été mis au point.

Table 1. Newly Diagnosed Cases of Tuberculosis, Botswana, 1975-1979
Tableau 1. Cas de tuberculose récemment diagnostiqués, Botswana, 1975-1979

Year — Année	Number of Cases — Nombre de cas		
	Respiratory Tuberculosis Tuberculose respiratoire	Extra Respiratory Tuberculosis Tuberculose extra-respiratoire	Total
1975.			3 534
1976.			2 797
1977.			2 598
1978.	2 303	365	2 668
1979.	2 416	469	2 885

The rates per 100 000 population were 506, 388, 349, 347 and 353 for the years 1975-1979 respectively, although notification is still considered to be far from complete. More detailed information is available for 1979. Out of a total of 2 416 cases of pulmonary tuberculosis registered, 1 535 or 63.6% had their sputum examined, and 984 or 40.7% of the total or 64.1% of those examined were found positive; 23.3% of the total number of registered cases and 18.0% of pulmonary tuberculosis were in the age group 0-14 years. There were 13 cases of tuberculosis meningitis reported, ten of which were in the 0-14 year age group. Out of 469 cases of extra-respiratory tuberculosis, 7.10% were reported as tuberculosis of the glands.

Les taux de morbidité pour 100 000 habitants ont été de 506, 388, 349, 347 et 353 pour les années 1975 à 1979 respectivement, mais il semble que les notifications sont encore loin d'être complètes. On dispose d'informations plus détaillées pour 1979. Sur un nombre total de 2 416 cas de tuberculose pulmonaire enregistrés, un examen des crachats a été fait dans 1 535 cas (63,6%) avec des résultats positifs dans 984 cas (soit 40,7% du total ou 64,1% des cas examinés); 23,3% du nombre total des cas enregistrés et 18,0% des cas de tuberculose pulmonaire se sont produits dans le groupe d'âge 0-14 ans. Treize cas de méningite tuberculeuse ont été signalés, dont dix dans le groupe d'âge 0-14 ans. Sur 469 cas de tuberculose extra-respiratoire, 7,10% ont été notifiés en tant que cas de tuberculose glandulaire.

There are still quite wide variations in the number of reported tuberculosis cases in the different regions of the country. No data on mortality are as yet available.

Le nombre des cas de tuberculose notifiés varie toujours beaucoup d'une région du pays à l'autre. On ne dispose encore d'aucune donnée concernant la mortalité par tuberculose.

¹ See No. 42, 1980, pp. 321-323, for data on BCG coverage.

INITIAL ENVIRONMENTAL EXAMINATION

OR

CATEGORICAL EXCLUSION

Project Country: Africa Regional

Project Title and Number: Combatting Childhood Communicable Diseases
Project No. 698-0421

Funding: FY 1981 - 1988 \$47,000,000

IEE/CE Prepared by: AFR/RA, James R. Cumiskey

Environmental Action Recommended:

Positive Determination _____

Negative Determination _____

or

Categorical Exclusion X

This activity meets the criteria for Categorical Exclusion in accordance with Section 216.2 (C)(2)(viii) and is excluded from further review because: this project is concerned with the control of childhood communicable diseases and the care and health maintenance of the target population. It will not involve spraying, construction or other physical activities which might have a negative effect on the physical environment. No pesticides will be used and no vector control methods such as draining of swamps will be involved.

Action Requested by: DF Miller Date: September 15, 1981
AFR/RA Director Donald F. Miller

Concurrence:
Bureau Environmental Officer

Approved James S. Hester

Disapproved _____

Date 17 September 1981

Clearance: AS
GC/AFR _____

Date September 15, 1981