AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

PD-AAC0-591

1. TRANSACTION CODE: [ ] A = Add, C = Change, D = Delete — Amendment Number: — DOCUMENT CODE: 3

2. COUNTRY/ENTITY: WORLDWIDE

3. PROJECT NUMBER: 936-5115 — Doc #0002

4. BUREAU/OFFICE: S&T/N [ ]

5. PROJECT TITLE (maximum 40 characters): Combatting Iron Deficiency

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

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4)
A. Initial FY 87 B. Quarter 4 C. Final FY 92

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

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. Total	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. Total
AID Appropriated Total						
(Grant) CS	(805)	( )	( )	( )	( )	(805)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country						
Other Donor(s)						
TOTALS	805					805

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	C. PRIMARY TECH. CODE 2. Loan	D. OBLIGATIONS TO DATE 1. Grant	D. OBLIGATIONS TO DATE 2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	E. AMOUNT APPROVED THIS ACTION 2. Loan	F. LIFE OF PROJECT 1. Grant	F. LIFE OF PROJECT 2. Loan
(1) CS	320					805		805	
(2)									
(3)									
(4)									
TOTALS						805		805	

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

11. SECONDARY PURPOSE COD

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

A. Code							
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters).

To provide technical advice and assistance to government agencies, donor organizations, nutrition scientists and health professionals in developing countries interested in combatting nutritional anemia.

14. SCHEDULED EVALUATIONS
Interim MM 08 YY 92 — Final MM YY

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

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

17. APPROVED BY
Signature: Nicolaas Luykx
Title: Acting Director, Office of Nutrition
Date Signed: MM DD YY

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

AID 1330-4 (8-79)

PROJECT AUTHORIZATION

PROJECT TITLE: Combatting Iron Deficiency

PROJECT NUMBER: 936-5115

1. Pursuant to Section 104(c)(2)(b) of the Foreign Assistance Act of 1961, as amended, I hereby authorize the "Combatting Iron Deficiency" project involving centrally funded planned obligations of not to exceed $805,000 over a five year period from the date of authorization subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing foreign exchange and local currency costs for the project.

2. The project will provide technical advice and assistance to government agencies, donor organizations, nutrition scientists and health professionals in developing countries interested in combatting nutritional anemia. Much of this technical assistance will be provided by correspondence, but on occasion, will require travel of personnel from the recipient institution to developing countries or professionals from developing countries to the recipient institution. Activities will include but not be limited to design of pilot studies, monitoring of ongoing studies, provision of standards, provision of immunologic reagents, and hematologic evaluation.

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

a. Source and Origin of Commodities, Nationality of Services
Commodities financed by A.I.D. under the project shall have their source and origin in the cooperating country* or the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the cooperating country or the United States as their place of nationality, except as

*Each country in which a project activity is conducted shall be considered a "cooperating country" for the activity conducted there.

A.I.D. may otherwise agree in writing. Ocean shipping financed by A.I.D. under the project shall, except as A.I.D. may otherwise agree in writing, be financed only by flag vessels of the United States.

Signature

7-8-87
Date

Clearances:
S&T/N, N.Luykx M. G. Date 6/26/87
S&T/PO, G.Gower [illegible] Date 7/7/87
GC/CP, S.Tisa [illegible] Date 7/2/87

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

June 26, 1987

ACTION MEMORANDUM FOR THE AGENCY DIRECTOR FOR FOOD AND AGRICULTURE

FROM: S&T/N, Nicolaas Luykx

SUBJECT: Authorization for Combatting Iron Deficiency Project (936-5115)

Problem: Your approval is required for a five year project with the Kansas University Medical Center (KUMC) entitled "Combatting Iron Deficiency." The project would run through FY 1992 at an initial total funding level of $804,256.

Background: The International Center for the Control of Nutritional Anemia (ICCNA) at Kansas University Medical Center (KUMC) was established with A.I.D. support in 1982 to combat nutritional anemia, a significant nutritional deficiency that affects one billion people; principally young children and women of child-bearing age (especially pregnant women) in developing countries. A.I.D. currently supports ICCNA/KUMC under a cooperative agreement (C.A.) which will end August 31, 1987 and is authorized under project 931-0227 ("Iron Deficiency Program Support").

The ICCNA is recognized as the leading world center in iron deficiency anemia. No other group of this quality currently exists in the U.S. Funding during the last two fiscal years has been short term due to low funding availability and did not allow for any workable pipeline. Because of this, KUMC could not sustain professional staff since job security could not be guaranteed for periods of more than several months. There have been significant staff losses over the past-year.

Discussion: This new project would permit the Agency to enter into a five year cooperative agreement with KUMC so that ICCNA can be restaffed with top professionals. Once re-built, ICCNA would be able to retain needed core staff, and function as the technical underpinning to backstop Agency iron deficiency anemia activities, worldwide.

The proposed new project has received support from Senator Robert Dole who in a letter (Attachment A) to the Administrator pointed out his particular interest in ICCNA, in part because it is the only international health program of this nature in the State of Kansas. The Administrator, in his reply to Senator Dole, (Attachment B) wrote that the Agency would plan to continue support for the ICCNA. Child Survival funding has been identified to permit this.

Recommendation: That you approve the five-year "Combatting Iron Deficiency" project (936-5115) at an initial funding level of $804,256 in support of the activities of the International Center to Control Nutritional Anemia at Kansas University Medical Center by signing the attached project authorization.

Project Paper: Combatting Iron Deficiency

I. Summary and Recommendations

This project will support the International Center for Control of Nutritional Anemia (ICCNA) at the Kansas University Medical Center (KUMC). The broad objectives of this project are: a) to develop suitable techniques of iron delivery to populations with a goal of implementation at a national level, and (b) to provide technical guidance to investigators and governments in developing countries on methods to assess the prevalence of iron deficiency and techniques to combat it.

The ICCNA at KUMC is the technical underpinning of A.I.D.'s iron program. It is recognized as the best operation of its kind in the world. Other iron activities conducted under other related projects depend on ICCNA/KUMC for technical backup. It is recommended that the Agency fund this project and thereby sustain the needed leadership to combat iron deficiency anemia.

II. Background

A. Extent and Nature of the Anemia Problem

Iron deficiency anemia is the most prevalent nutritional deficiency. The World Health Organization (W.H.O.) estimates that a billion people are iron deficient anemic. It is more prevalent in women of child bearing age, particularly pregnant women, and young children. The problem is most prevalent in developing countries where more than 65% of women and half the young children are anemic. Iron deficiency is principally due to inadequate amounts of bioavailable iron in foods consumed. It is not restricted to certain geographic areas but found worldwide. Often iron deficiency anemia is aggravated by parasitic infection (e.g. hookworm) which causes loss of blood.

Iron deficiency anemia is known to: (a) impair work capacity and performance; (b) adversely influence the outcome of pregnancy and in severe anemia to effect both maternal and infant morbidity and mortality; (c) have an effect on the immune system; and (d) adversely effect cognition. The deficiency is pervasive and is a major associated cause for mortality and morbidity in LDCs.

Thus far, third world programs to combat anemia have not been effective. Lack of success can be attributed to a combination of biological, technical, economic, and bureaucratic constraints. This project will attempt to address key facets of the biological and technical constraints.

B. Chronology

In 1974 a mandate was given the Agency to focus on iron deficiency anemia by the then Secretary of State, Henry Kissinger when he announced the U.S. Government's intention to combat this worldwide problem at the World Food Conference convened in Rome. A project paper for the first iron project was approved by the Assistant Administrator in the then Bureau for Technical Assistance, April 30, 1976, at an initial funding level of $3,933,000 for a period from 5/76 through FY '81. The project's authorization (PAF) for continuation from FY '82 through FY '85 was approved August 28, 1981. It was further extended to June 30, 1986, and subsequently authorization was given by the Administrator to extend the project through September 30, 1988, at no increase in funding level.

In 1978, a major research contract was signed with Kansas University Medical Center. It ran five years and was succeeded by a cooperative agreement. During the period of the contract, emphasis was put on conducting iron bioavailability studies in male human subjects. This research, among other things, reported: (a) the inhibitory effects of certain important foods on iron bioavailability; (b) improvement of laboratory methods to assess iron status; (c) confirmatory data on the bioavailabe uniqueness of iron-EDTA as a fortificant; and (d) the initial clinical information on the new Hoffmann-LaRoche HBS sustained release iron product.

As follow-on, A.I.D. signed a cooperative agreement with KUMC in FY 1982 and in collaboration established at KUMC the International Center to Control Nutritional Anemia (ICCNA).

The activities and accomplishments of the ICCNA have been described extensively in progress reports submitted annually to A.I.D. There have been four key areas of activity: refinements of methods to assess iron nutriture; studies of iron bioavailability; training of overseas personnel and overseas technical assistance; and the development of field intervention strategies. The following is a brief description of the major accomplishments in each of these areas.

Assessment of Iron Status

A major obstacle in the assessment of the prevalence of nutritional anemia and its cause has been the inability to apply modern specific and quantitative measures of iron nutriture in prevalence studies in developing countries. The hemoglobin level which is the usual basis for estimating prevalence is a crude laboratory parameter and is affected by many disorders other than iron deficiency. Many intervention programs, particularly food fortification, induce changes in iron status only slowly and this improvement is often not reflected by changes in circulating hemoglobin levels. The major obstacle in applying modern laboratory techniques to assess iron nutriture under field situations is their high cost and complexity. A major activity of the ICCNA during the past five years has been the development of simplified inexpensive microtechniques that are suitable for use in the field. A battery of laboratory methods known to reflect iron status have now been developed, including serum iron, transferrin (iron binding capacity), serum ferritin and erythrocyte protoporphyrin. The cost of performing these techniques has been reduced from over $100 U.S. (current hospital cost) to less than $.50 U.S. The volume of blood required has been reduced from 5000 ul to less than 100 ul, enabling the entire set of measurements to be performed on a capillary specimen of blood. The laboratory time required to perform these assays has been reduced from one week to four hours. A major concern in conducting intervention programs and measuring their effectiveness is the high cost of laboratory monitoring. The development of these refined techniques has largely eliminated this obstacle in field work. Much of this progress has been accomplished by the use of monoclonal immunologic reagents for the measurement of transferrin and ferritin. These reagents are now prepared at the ICCNA and can be furnished at a fraction of the cost of commercially available immunologic reagents.

Another important obstacle in assessing iron nutriture relates to data interpretation and analysis. When each laboratory measurement is assessed in isolation, widely varying estimates of iron status are obtained in population studies because each parameter reflects changes in different body iron compartments. ICCNA has developed an algorithm by which the results of the entire battery of iron status measurements can be combined to obtain a single estimate of body iron in each surveyed individual. This technique has evolved from experience gained in analyzing the Health and Nutrition Examination Survey II (Hanes II) conducted in the United States from 1975-1980. With this method, it is possible to sharply reduce the number of surveyed individuals required to obtain a reliable measure of the changes in iron status induced by intervention programs. An extensive manual outlining the technical aspects of performing iron status

measurements including quality control and statistical evaluation has recently been prepared by ICCNA and distributed worldwide by the International Nutritional Anemia Consultative Group (INACG).

Iron bioavailability measurements

One of the obstacles in identifying effective food fortification programs in developing countries is the profoundly inhibiting effect of regional diets on iron absorption. For this reason, a heavy investment has been made over the past several years in defining the biochemical determinants of food iron absorption using isotopic measurements in human volunteer subjects. An important recent activity has been the development and refinement of *in vitro* techniques that can predict absorption in humans.

Human iron absorption studies have facilitated the development of workable fortification strategies in certain countries. For example, a variety of local food sources were evaluated for possible use in a prepared weaning food in Benin. Iron bioavailability from regional diets in several countries have been assessed including India, Egypt, Bangladesh, Philippines, Thailand, Guatemala, China, Indonesia, and Nigeria. In the course of developing an iron fortification strategy for Egypt, ICCNA has recently assessed iron availability from Egyptian flat breads. It was observed that traditional breads such as Baladi or Shami breads have a profound inhibiting effect on the absorption of added fortification iron as compared to typical American or European white breads. More importantly, ICCNA demonstrated that this inhibiting effect can be largely circumvented by adding EDTA (a unique chelating compound) to the bread prior to baking. During the past year ICCNA's emphasis has been directed to iron absorption from various weaning foods. Recently in conjunction with government and industry laboratories, ICCNA completed an extensive evaluation of animal techniques currently used to monitor the bioavilability of fortification iron compounds.

Training of Overseas Professionals

One of the major activities of the ICCNA during the past 4 years has been the training of laboratory and professional personnel in methods to assess iron status and evaluate food iron availability. More than twenty trainees from developing countries have spent periods ranging from 3 to 12 months in the ICCNA laboratory where they gained extensive experience in these technical areas. As a result, iron assessment laboratories have been established in several developing countries including Philippines, Thailand, India, Egypt, Jamaica, Bolivia, and Guatemala. As a direct result of training and experience gained at ICCNA, the Caribbean Food and Nutrition Institute under PAHO support has now established a modern iron assessment laboratory at Kingston, Jamaica, and is now initiating prevalence studies. Similarly, an iron assessment laboratory recently has been

established at the National Instutite of Nutrition in Cairo, Egypt, to facilitate a pilot study of EDTA-iron fortified wheat flour products in that country.

Evolution of Field Programs

The level of support under the current cooperative agreement has not permitted direct funding of field intervention programs in developing countries. Nevertheless, ICCNA has been very active in the development of feasible strategies, and several protocols have been developed that can be initiated when financial support is identified. One project of particular importance will be conducted at the Carribean Food and Nutrition Institute (CFNI) and will involve the evaluation of a new pharmaceutical sustained release preparation for iron supplementation referred to as hydrodynamically balanced system (HBS) for iron. This study will evaluate HBS iron for supplementation during pregnancy. A similar protocol has been developed to assess this preparation in New Delhi, India.

The ICCNA has maintained close contact with officials in Quito, Ecuador, where meetings were recently held to review existing country nutritional survey data and discuss iron intervention strategies in this country. An important pilot study to assess the efficacy of fortifying wheat flour products in Egypt is about to be undertaken in Cairo. This pilot study has received initial A.I.D. funding through the U.S. FDA, and it is anticipated that the results of the study will lead to a national iron fortification program. If funding permits, similar projects could be undertaken in Indonesia, Philippines and Bangladesh.

III. Project Analysis

This project paper (PP) solely describes the activities to be carried out by the ICCNA at KUMC. It does not include, the activities of the International Nutritional Anemia Consultative Group and other activities which are authorized under the current project entitled: Nutrition: Iron Deficiency Support Program (931-0227). The ongoing project is authorized to September 30, 1988. Since the life of the current PP is past ten years, this new PP has been developed for the purpose of recasting a part of the Agency's iron deficiency anemia project into a new project activity with an initial life of five years. The new PP will specifically and only cover the Center at KUMC. Other activities will continue to be covered by the still active project 931-0227 thru 9/30/88. The reason for the new P.P. is to enable the Agency to develop a five year cooperative arrangement with KUMC. Centers such as ICCNA cannot be sustained by relatively short term funding arrangements because qualified staff will not consider such a tenuous arrangement. Funding during the past two fiscal years has been short term and did not allow for any workable pipeline. Because of this KUMC could not sustain professional staff since job security often could not be guaranteed more than several

months ahead in time.

This new project will permit the Agency to enter into a five year cooperative agreement with KUMC so that the ICCNA can be restaffed with top professionals and needed core activities retained. The proposed new scope of work will sustain a U.S. core operation that can still function as the technical underpinning to backstop Agency iron activities. Limited funds for specific services may come in to ICCNA from other donors and industry.

The project does not deal directly with large populations, therefore, socio cultural feasibility is not a factor for consideration.

IV. Implementation Plan

1. Scope of Work

The core activity of this proposal will be to provide technical advice and assistance to government agencies, donor organizations, nutrition scientists and health professionals in developing countries interested in combatting nutritional anemia. Much of this technical assistance will be provided by correspondence, but on occasion, will require travel of personnel from the ICCNA to developing countries. In other instances, professionals may travel to the ICCNA to obtain assistance in developing intervention programs.

(a) Technical Advice to Governmental Agencies

In some regions, it may be feasible to introduce an intervention strategy without undertaking a formal preliminary trial to determine efficacy. On several past occasions, personnel from the ICCNA have advised governmental agencies interested in iron supplementation or fortification programs. Questions have commonly arisen with regard to the optimal form of fortification iron and the possible inhibiting effect of other nutrients such as calcium, phosphorous or zinc, on iron bioavailability. Advice in regard to iron supplementation during pregnancy has been sought in relation to frequency of tablet administration, optimal source and bioavailability of iron supplements, techniques of increasing compliance, etc. Several countries are considering iron supplementation in school age children. The experience gained in one country when designing intervention strategies in another will enhance the overall effectiveness of world wide efforts to combat iron deficiency.

(b) Designing of Evaluation Protocols

A key proposed activity for the ICCNA is to design pilot studies that will determine the effectiveness of a given intervention strategy. This is often a very time consuming effort that requires prolonged discussions in the LDC. The development of a protocol entails compromise between various governmental, institutional and external funding agencies. The development of these protocols requires definition of target groups, estimates of the number of subjects required, estimates of the duration of the proposed intervention, methods and techniques of monitoring, development of suitable budgetary guidelines, description of needed personnel, a schedule of operations, etc. Coordination of protocols in different LDCs is important to avoid duplication of effort and to determine what aspects of a particular strategy can be optimally evaluated in a particular

country setting. ICCNA has developed several protocols during the past 3 years to evaluate iron interventions. Part of this effort has centered on the evaluation of hydrodynamically balanced system (HBS) for iron supplementation in pregnancy. By delaying the release of iron within the stomach, it has been possible to increase iron absorption 2 to 3 fold while reducing gastrointestinal side-effects. Detailed protocols have been drafted for a study in Kingston, Jamaica, at the new PAHO laboratory. Another study has been designed for pregnant women in Delhi, India. Both these protocols are in an advanced stage of development and could be implemented promptly when financial support has been identified. A similar study of HBS efficacy is presently being considered by UNICEF in Tanzania and preliminary discussions with the ICCNA personnel will be held in that country in early July, 1987.

(c) Monitoring of Ongoing Studies

The ICCNA will provide technical support for ongoing studies of iron interventions. A pilot study in Cairo, Egypt, will be initiated during the latter part of 1987 to assess the efficacy of iron EDTA fortified wheat products in school age children. Interim evaluation of this program will be an important activity. For this and other ongoing intervention studies, regular visits by personnel from the ICCNA will be important to ensure that the objectives of the proposed study are being achieved and that the maximal amount of information from such ongoing trials is being obtained.

(d) The ICCNA has been called upon on several occasions to assist in the analysis of data that has been obtained in a completed study. Dr. Cook, principal investigator, has recently been invited to travel to Quito, Ecuador, to assist in the analysis of an iron supplementation study in pregnant women. This type of consultation is particularly valuable because it facilitates the transition between a successful pilot study and implementation at a national level. It is important to ensure that all pilot studies are critically assessed, that the information is prepared for dissemination, and that the results of the study are used as the basis for a country strategy.

2. Technical Assistance in Monitoring

A key facet of any field evaluation of an intervention strategy is the laboratory measurement of efficacy. In many prior trials, the change in hemoglobin levels is used as the sole criteria of efficacy. The use of a combination of precise, sensitive measurements will detect smaller gains in iron nutriture than studies based only on hemoglobin change. By using more refined techniques to measure iron status, the number of sampled subjects

can be sharply reduced, the duration of trials shortened and relatively small differences in efficacy between various interventions can be detected. Only a few laboratories in LDCs are familiar with available microtechniques to assess iron nutriture. The following activities are required to provide technical support to laboratories engaged in ongoing intervention trials:

(a) Provision of Standards

For many of the iron status measurements, availability of well-defined standards is a critical facet of laboratory monitoring. ICCNA has extensive experience in the preparation and purification of standards, and has supplied reference material for laboratories throughout the world. The Principal Investigator, Dr. Cook, is chairman of the Iron Panel of the International Committee for Standardization in Hematology (ICSH), of the International Society for Hematology. This committee has been engaged in standardization projects for several years and meets annually to evaluate progress in standardization efforts. the committee is currently evaluating immuno assay methods developed at the ICCNA laboratory for standardization purposes.

(b) Provision of Immunologic Reagents

Some of the modern techniques of iron status require a continuous supply of highly specialized immunologic agents. In some instances these can be purchased commercially, but often at a cost that exceeds funds available for laboratory monitoring in LDCs. In 1982, a monoclonal laboratory was established at ICCNA to prepare reagents for serum ferritin and transferrin assays. This set-up offers advantages with respect to both cost and sensitivity of employing monoclonal reagents. By providing a constant supply of these reagents, the comparability of measurements has improved and the cost of performing assays in LDCs is reduced.

(c) ICCNA Training

While the training of LDC professionals will be curtailed under the new cooperative agreement some technical training in iron status methods for periods ranging up to three months may still be required. In most countries where field activities are planned (Egypt, Jamaica, India) technical training has already been obtained by key personnel. However, when future projects are developed in LDCs where this experience is not available for key personnel, additional training will be necessary.

(d) On-site Assessment and Training

Despite a period of training at the ICCNA, difficulties are encountered in establishing iron methods in LDCs. Some of these technical difficulties can be corrected by exchanging specimens or reagents, but it will be necessary at times for personnel from the ICCNA to travel to the LDC laboratory and determine the source of difficulty.

(e) Data Evaluation

An important component of technical support is assistance in analyzing country data. Computer programs have been developed that provide estimates of iron status in individually sampled subjects. However, because of differences in computer hardware in LDCs, difficulties have arisen in using these programs. Technical assistance will be provided in LDCs in the use of these newer assessment techniques.

(f) Hematologic Evaluation

Another aspect of technical assistance is in determining the cause of anemia in LDCs when country data indicates that it may be due to other contributing factors in addition to iron deficiency. Personnel at the ICCNA have been contacted frequently in regard to optimal techniques for detecting malaria, sickle cell anemia, thalassemia, anemia of chronic inflammation, etc. and their effect on iron measurements. In certain instances, this may require detailed hematologic evaluations.

3. Strategy Development

It is planned to continue efforts to develop novel strategies to combat iron deficiency. In most instances this will involve measurements of iron bioavailability in human subjects. Iron absorption measurements were used recently to define the potential efficacy of HBS supplementation and to predict the benefits of adding EDTA to iron fortified Egyptian flat bread. Sufficient funds will not be available to perform extensive bioavailability measurements, but these will be performed to the extent that additional support can be obtained.

Emphasis will be placed on determining the optimal composition of weaning foods and the appropriate iron fortification compound. Weaning foods proposed for iron fortification often contain several components, some of which profoundly inhibit iron availability. Evaluation of proposed weaning foods and the effect of varying their composition on iron bioavailability is an important facet of developing intervention strategies for infants

in certain LDCs. Recent studies indicate that many forms of fortification iron are not relatively well absorbed and therefore are biologically unavailable. The ICCNA will continue to collaborate with the appropriate industry organizations to solve these problems.

International consultants in the field of iron nutrition have repeatedly emphasized the importance of charcterizing the regional diet before selecting an intervention strategy. Many regional diets contain such a high concentration of iron inhibitors that any reasonable level of added fortification iron will not produce significant benefits. Baseline studies of bioavailability from regional diets were particularly important in designing a fortification strategy for Egypt. The ability to conduct radioisotopic studies in human subjects to better study diet-iron interaction so as to develop novel intervention strategies is an important capability at the ICCNA.

B. Joint Funding

Budget projections for the cooperative agreement reflect costs for core support of the ICCNA at KUMC. This cooperative agreement does not include a KUMC cost share. The recipient (KUMC) has an international reputation and has, in the past, been able to attract funds from other sources (e.g. other donors and industry) to support specific activities which are complementary to the cooperative agreement. For example, W.H.O., UNICEF and IAEA have funded training of LDC professionals. Grants from industry have supported studies of specific iron substances and products and also have contributed some equipment. Although KUMC has assisted several USAID missions to develop strategies and planning operational activities, to date no fiscal support has been forthcoming from missions. It is hoped that under the new Cooperative Agreement mission buy-ins will become a reality.

C. Time Frame

Table I is an illustration of the implementation time table for this project. At this time it includes only the activities of ICCNA/KUMC. It is planned that at the conclusions of the current project 931-0227 (Nutrition: Iron Deficiency Program Support) in FY '88. The appropriate activities of that project will be amended into this new project.

V. Financial Plan

The proposed five year budget for this project is outlined in the accompanying table II. The total project costs for the first year are $150,000 of which $106,383 represent direct costs. The project costs are listed under categories of personnel, travel and supplies. Personnel include: a half-time nutritionist, who will assist in dietary evaluations in ongoing programs overseas, and will conduct studies of iron bioavailability at ICCNA; a half-time biochemist, who will purify reagents required for iron status measurements, oversee training, and provide technical assistance

overseas in laboratory monitoring, as required; a half-time technologist to conduct iron assays at the ICCNA and to prepare needed reagents; and an administrative assistant. Twenty percent fringe benefits are requested for all personnel support. Personnel costs are inflated at a rate of 5% annually.

The budget includes a total of $13,000 in travel costs annually, of which $10,000 will be used for overseas travel. The reagents/supplies are needed to perform iron status measurements at ICCNA, for training purposes, for the preparation of standards and immunologic reagents, and for the conduct of bioavailability measurements. Also included is support for maintenance contracts (50% of total costs) on laboratory equipment including liquid scintillation count, gamma counter, centrifuges, freezers and spectrophotometer. The total project cost over a five year period is $804,256. Funds are provided for this amount in the current FY 1987 and FY 1988 S&T/N budgets.

Buy-ins are not projected in the illustrative budget since, though anticipated, they are not a current actuality. When and if they develop these buy-ins would be to support in-country program activities conducted by KUMC, and the cooperative agreement will be amended to incorporate the in-country activities.

Other activities now in the current project 931-0227 are not included in budget projections for FY '89 through FY '92. They will be included, as appropriate, when this new project is amended in FY 1988.

VI. Evaluation Plan

The current project (931-0227) underwent an external evaluation in 1985 and an end-of-project evaluation will be conducted during FY 1988. The outcome of the evaluation of project 931-0227 will influence which current activities will be folded into this new project in FY 1989. A comprehensive evaluation will be undertaken in FY 92 for 936-5115 and management reviews will be undertaken during each of the 5 years of the project.

Drafted by:S.G. Kahn:sbd:2497E:6/10/87

TABLE I

Implementation Time Table - Combatting Iron Deficiency

Cooperative Agreement - ICCNA/KUMC

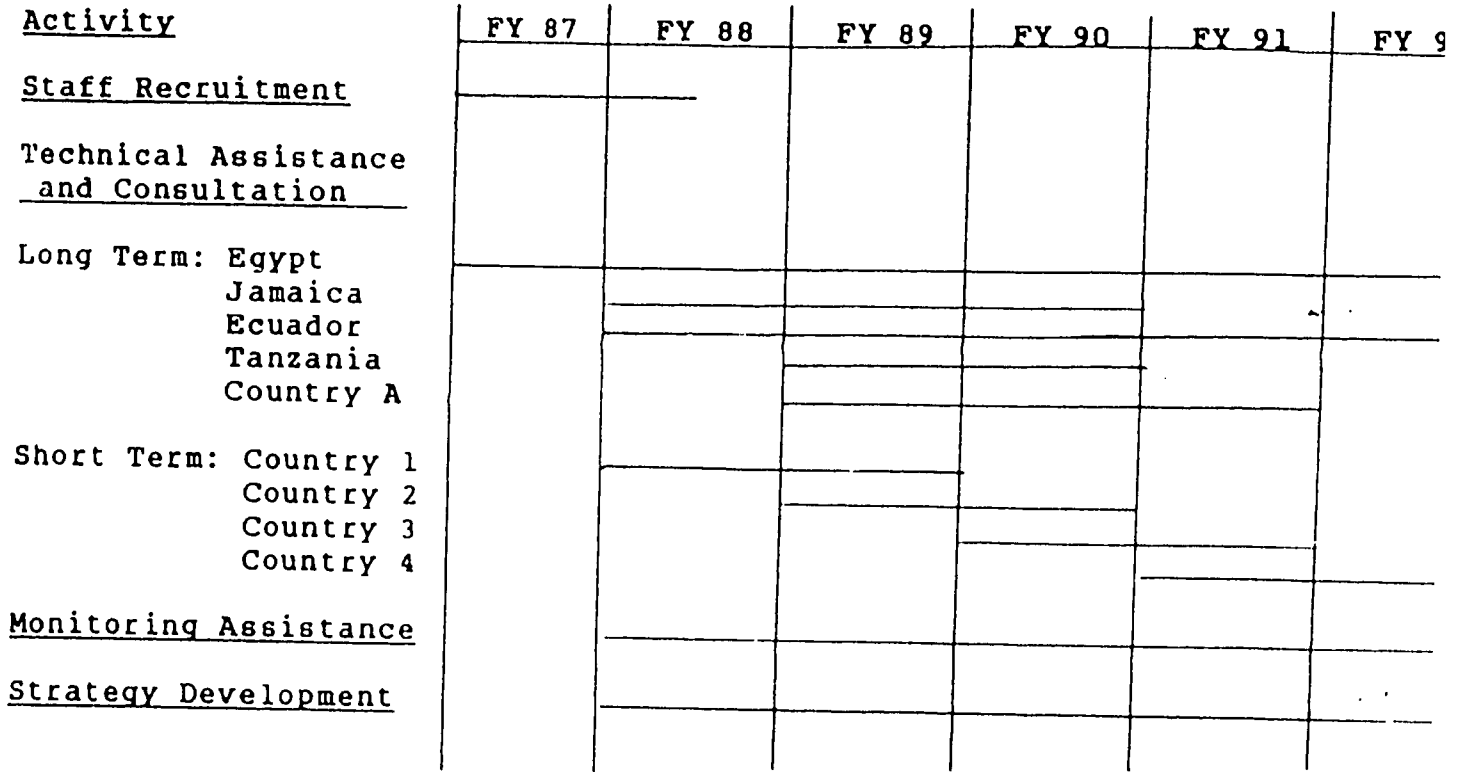

TABLE II

PROPOSED BUDGET

INTERNATIONAL CENTER FOR THE CONTROL OF NUTRITIONAL ANEMIA (ICCNA)

	Time %	Man Months	Year 1	2	3	4	5	TOTAL
A. PERSONNEL								
Director	20	2.2	15,000	15,750	16,538	17,365	18,233	82,886
Nutritionist	50	5.5	16,000	16,800	17,640	18,522	19,448	88,410
Biochemist	50	5.5	16,000	16,800	17,640	18,522	19,448	88,410
Technologist	50	5.5	10,000	10,500	11,025	11,576	12,155	55,256
Adm. Assistant	20	2.2	4,000	4,200	4,410	4,631	4,863	22,104
Fringe	(20)		12,200	12,810	13,451	14,123	14,829	67,413
SUBTOTAL		(20.9)	73,200	76,860	80,704	84,739	88,976	404,479
B. TRAVEL								
Foreign			10,000	10,000	10,000	10,000	10,000	50,000
Domestic			3,000	3,000	3,000	3,000	3,000	15,000
SUBTOTAL			13,000	13,000	13,000	13,000	13,000	65,000
C. SUPPLIES								
Glassware, plastic			8,000	8,000	8,000	8,000	8,000	40,000
Reagents, isotopes			6,000	6,000	6,000	6,000	6,000	30,000
Maintenance contracts			4,000	4,000	4,000	4,000	4,000	20,000
Office supplies			2,183	2,183	2,183	2,183	2,183	10,915
SUBTOTAL			20,183	20,183	20,183	20,183	20,183	100,915
Total Direct Costs			106,383	110,043	113,887	117,922	122,159	507,394
Indirect Costs (41%)			43,617	45,118	46,964	48,348	50,085	233,862
TOTAL PROJECT COSTS			150,000	155,161	160,581	166,270	172,244	804,256