PD-AAC-978-D1 9310927 (3)

NON-CAPITAL PROJECT PAPER (PROP)

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## I. PROJECT IDENTIFICATION

1. PROJECT TITLE

Inter-Regional Utilization (formerly Improving the Nutrition of Mandioca-Eating People)

APPENDIX ATTACHED ☐ YES ☐ NO

2. PROJECT NO. (M.O. 1095.2) 931-11-560-927

3. RECIPIENT (specify)

☐ COUNTRY

☐ REGIONAL ☒ INTERREGIONAL

4. LIFE OF PROJECT

BEGINS FY

ENDS FY

5. SUBMISSION

☐ ORIGINAL

☒ REV. NO. 1 12/16/71 DATE

CONTR./XXXXX

16p

## II. FUNDING ($000) AND MAN MONTHS (MM) REQUIREMENTS

| A. FUNDING BY FISCAL YEAR | B. TOTAL $ | C. PERSONNEL (1) $ | C. PERSONNEL (2) MM | D. PARTICIPANTS (1) $ | D. PARTICIPANTS (2) MM | E. COMMODITIES $ | F. OTHER COSTS $ | G. XXXX CONTR. (1) $ | G. XXXX CONTR. (2) MM | H. LOCAL EXCHANGE CURRENCY RATE: $ US ___ (U.S. OWNED) (1) U.S. GRANT LOAN | (2) COOP COUNTRY (A) JOINT | (2) COOP COUNTRY (B) BUDGET |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. PRIOR THRU ACTUAL FY | 28 | 28 | | | | | | 28 | | | | |
| 2. OPRN FY 72 | 21 | 21 | | | | | | 21 | | | | |
| 3. BUDGET FY 73 | | | | | | | | | | | | |
| 4. BUDGET +1 FY | | | | | | | | | | | | |
| 5. BUDGET +2 FY | | | | | | | | | | | | |
| 6. BUDGET +3 FY | | | | | | | | | | | | |
| 7. ALL SUBQ. FY | | | | | | | | | | | | |
| 8. GRAND TOTAL | 49 | 49 | | | | | | 49 | | | | |

9. OTHER DONOR CONTRIBUTIONS

| (A) NAME OF DONOR | (B) KIND OF GOODS/SERVICES | (C) AMOUNT |
|---|---|---|
| | | |

## III. ORIGINATING OFFICE CLEARANCE

| | | |
|---|---|---|
| 1. DRAFTER I Hornstein / H Rice | TITLE Research Advisor / Nutrition Advisor | DATE |
| 2. CLEARANCE OFFICER Martin J. Forman | TITLE Director, TA/N | DATE |

## IV. PROJECT AUTHORIZATION

1. CONDITIONS OF APPROVAL

Authorization is limited to $21,000 for funding the corn fortification conference. Future funding considerations for FY 1972 and 1973 are subject to a revised PROP, with Regional Bureau clearances, providing detailed specification of future activities to be implemented under this project.

2. CLEARANCES

| BUR/OFF. | SIGNATURE | DATE | BUR/OFF. | SIGNATURE | DATE |
|---|---|---|---|---|---|
| NESA/TECH | James Blume (memo) | 1/3/72 | LA/DP | Jack Heller R. Simpson (phone) | 1/27/72 |
| EA&SA/IR | Robert Johnson (memo) | 2/27/71 | TA/PM | Kenneth Levick | 1/27/72 |
| | | | AFR/TAC | Princeton Lyman (memo) | 1/4/72 |

3. APPROVAL AAs OR OFFICE DIRECTORS

SIGNATURE: [signature] DATE: 2/1/72

TITLE: Assoc. Assist. Administrator, AA/TA

4. APPROVAL A/AID (See M.O. 1025.1 VI C)

SIGNATURE DATE

ADMINISTRATOR, AGENCY FOR INTERNATIONAL DEVELOPMENT

Mary

January 21, 1972

MEMORANDUM TO: AA/TA, Mr. Samuel Butterfield

FROM: TA/PM, Kenneth S. Levick

SUBJECT: Request for Partial Approval of Revised PROP - Nutrition PROP No. 927 - Interregional Utilization

The first phase of this project was authorized in FY 1971. The objective of the project was to determine the feasibility of fortifying mandioca flour with protein and other nutrients to develop fortified products acceptable in terms of cost and taste to mandioca-eaters. FY 1971 funds were used to finance a mini conference held in Brazil for investigators from mandioca growing countries. Future funding of this activity beyond the mini conference was contingent on the submission of a revised PROP, with Regional Bureaus clearances, describing more definitively the future activities to be carried out under this project.

The attached PROP amendment has been presented to us for review and clearance. This PROP amendment expands the scope of the project and now focusses on the nutritional improvement of a broader range of food staples, inter alia, corn and rice. In effect, TA/N has combined under one project all those ongoing and new activities that have as their major emphasis the utilization of nutrition and food technology developments, experience and information. The proposed two year funding (FY 1972 and 1973) will finance interregional workshops and conferences on the nutritional improvement of food staples for planners, scientists and managers who are concerned with the nutritional improvement of food staples. Consultant services to guide and advise the various fortification projects and market intervention studies will also be financed.

TA/PM is proposing only partial funding of this project ($21,000 for a corn fortification conference to be held in March 1972 in Guatemala) with subsequent approval to be determined on the basis of a revised PROP describing in more detail the future activities to be implemented under this project. The LA Bureau provided unqualified approval of the PROP. The Africa Bureau approved the conferences component (FY 1972 only) of the PROP.

PN-714

The NESA Bureau recommended regional rather than interregional funding. TA/PM's position is that activities encompassed in the project do possess reciprocal implications and benefits which are designed to affect more than a single region. While the SA memorandum indicates non-concurrence, a telephone conversation with Robert Johnson indicated that he has no objection to the project being implemented in the Africa and LA regions.

We recommend that you indicate approval of the PROP amendment on the above basis by signing the attached Project Authorization. This partial and interim action is necessary due to the necessity, for the local sponsor's convenience, to schedule the corn conference in March 1972. Action accordingly cannot await full approval of the revised PROP.

Approved
JHB
2/1/72

## Introduction

This PROP serves as an umbrella for a number of individual activities that have as a unifying theme inter-regional utilization of nutrition and food technology experience and information. Included in this PROP are both new and ongoing activities.

## Summary

A key problem receiving great emphasis in TA/N is the non-availabilit of low cost nutritious foods to the impoverished people in the LDCs. Of particular concern are the cereal grains whose protein utilization is low because of the containing 7-13% protein due to absence of essential amino acids and cassava which supplies calories at an extremely low cost, but offers little else in the way of nutrition. Fortification of cereals with amino acids and/or protein concentrates and of cassava with protein concentrates is being explored in a series of studies supported by TA/N.

To promote global use of the results of these studies TA/N plans to hold a series of workshops bringing together key researchers, managers, and planners concerned with improvement of nutrition in the LDCs.

## A. Project Goal

### (a) Statement of Goal

To assist the LDCs to meet their basic nutrition problems:

(1) by making available highly nutritious foods at low cost to low income consumer

(2) by developing techniques for increasing the availability of low-cost, nutritious, high protein foods

(3) by increasing an awareness on the part of governments and people of the importance of protein in the diet.

(4) by creating an awareness on the part of governments of the ill-effects of malnutrition on work productivity, intelligenc and health. And conversely by creating an awareness of the importance of good nutrition on these same parameters.

(b) Measures of Goal Achievement

1) More protein foods or fortified commodities available in the market place at low cost.

2) Modification of existing food practices as demonstrated by sales of high protein and/or fortified foods through both commercial and institutional markets.

3) Government incentives (tax subsidies, guaranteed markets e.g. school lunch programs, etc.) to industry to promote introduction of nutritious foods into the market place.

(c) Assumptions

1) That governments in the LDCs recognize that nutrition problems exist.

2) That the LDC governments are receptive to the concept of change in this area.

3) That an exchange of information and experience concerning nutrition programs worldwide can increase awareness concerning malnutrition and instill a greater desire to improve conditions.

B. Project Purpose

1) To promote the use in and by the LDCs of new developments in Food Technology, Food Science, and Nutrition.

2) To increase protein utilizability of cereal grains by fortification with amino acids and protein concentrates.

3) To convert cassava from a calorie source, containing almost no protein, to a food staple containg adequate amounts of protein by fortification with protein concentrates.

4) To provide opportunities for the exchange of information and experiences among scientists, planners and managers who are concerned with improving the nutritional value of food staples worldwide.

Conditions Expected at End of Project

1) A fortified low cost mandioca flour would be on the market in Brazil and in the Congo.

2) The food industries in several of the LDCs will be producing and marketing low-cost protein foods.

3) New technologies (e.g. fortification of rice) pioneered in one region will be transferred to other regions.

4) Improved food practices in one region because of adaption of breakthroughs made elsewhere.

5) Introduction by food processors of beneficial new foods developed elsewhere.

C. Project Outputs

-1- 1) Workshop on improving the nutritional quality, production, processing and marketing of corn. Workshop proceedings to be published and disseminated.

2) Workshop on improving the protein utilization of cereal staples by fortification with amino acids and/or protein concentrates.

3) Workshop on nutritional quality improvement of cassava. Workshop proceedings to be published and disseminated.

4) A better understanding of cassava food market channels in Africa and in other regions.

5) Scope and impact analysis of cassava fortification determined in 2 pilot projects (Brazil, Congo).

-2- Basic assumptions about production of outputs:

a) That governments will be motivated to help implement the recommendation of the workshops.

b) The industry will be motivated to implement findings and conclusions of the workshop by developing new low cost high protein foods.

D. Project Inputs

1) Consultants to guide and advise on development of Cassava fortification program in Brazil and Congo.

2) Evaluation of possible protein isolates for improving nutritional quality of cassava.

3) Guidance and funds to carry out inter-regional workshops on improving nutritional quality of (a) corn, (b) food staples, (c) cassava - and to publish proceedings of all workshops.

4) Market channel and economic impact studies by contractors.

Budget

Inter-regional Funding

| | | FY '72 | FY '73 |
|---|---|---|---|
| 560-927: | Improving the Nutr. of Cassava Eating People | 15 | 60 |
| 560-new: | Conference on Corn Fortification | 21 | 0 |
| 560-new: | Conference on Implementing Fortification of Food Staples | 26 | 20 |
| | Grand Total | 65 | 80 |

Rationale

Plant proteins contribute about 70% of the world's protein supply, cereal grains alone account for 50% of the world's protein production. Some 2 billion people depend on cereal grain for most of their calories and protein; several hundred million more are dependent on cassava for their major calorie source. Since the protein content of this essentially carbohydrate food is in the neighborhood of 1-2%, protein deficiency is widespread in the cassava eating regions.

Cereal proteins normally range from 7-9% in rice and corn to about 13% in some wheats. Unfortunately, not all of this protein is utilizable. E.g. according to Hegsted, the percent of utilizable protein in what is only 3.2%. The basic problem lies in the concentrations of the essential amino acids in these cereal proteins. The essential amino acid patterns do not conform to mans requirements. Wheat is low in lysine, corn in lysine and tryptophan and rice in lysine and threonine. To a first

approximation the protein utilizability of these cereals is limited by the essential amino that is in least supply. E.g. if lysine is first limiting in an ingested cereal protein once the lysine is utilized other amino acids that are present and available cannot be used. It follows that the amount of utilizable protein in a food stuff with an unbalanced amino acid pattern can be increased by completing or at least improving the pattern. Adding the appropriate amino acid(s) is one way of accomplishing this. Another approach is to add a protein concentrate that has an excess of the deficient amino acid(s). This can be accomplished by "fortifying" the cereals with protein concentrates derived from legumes and oilseeds. E.g. fat free soy flour contains about 50% protein. This protein is reasonably high in lysine and other essential amino acids that may be lacking in wheat, rice, or corn. On the other hand, the soy protein is low in methionine which the cereal proteins contain in some excess. The net result of adding the proper amount of soy flour is the creation of an overall amino acid pattern that is more nearly compatible with man's requirements and the utilizability of the protein in the mixture is greater than the sum of their separate protein "utilizabilities"

In foods such as cassava that contain virtually no protein, fortification requires the addition of a protein supplement. The nature of the supplement is all important, it must not only be nutritionally sound and low in cost, but must not alter acceptability, functionality, etc.

Fortification of plant proteins with amino acids or protein concentrates is most useful if a proper mix of vitamins and minerals is also added. It is inevitable that populations suffering from protein-calorie malnutrition will also be deficient in other food constituents To derive the benefits of amino acid or protein fortification these other nutrients must be present in the needed concentrations.

AID is supporting a number of nutrition research programs that are directly concerned with the improvement of protein utilization by fortifying cereals with amino acids and/or protein concentrates. AID is also supporting programs designed to improve the nutritive value of food staples such as cassava that are essentially protein free. In these studies up to 10% protein concentrates are being added. These projects are designed to (a) evaluate nutritional impact, (b) develop the logistics of fortification, (c) determine acceptability and functionality of fortified products, and (d) determine the cost of fortification. Ongoing AID nutrition research projects related to utilization include: (a) the fortification of rice with lysine and threonine plust a mineral-vitamin mix The study is unique in that the fortificants are added in the form

of synthetic rice grains. This study is being carried out in Thailand. (b) The fortification of wheat flour with lysine and minerals and vitamins. This field study is under way in Tunisia. (c) The fortification of corn with about 0.1% lysine and 8% soy protein concentrate plus minerals and vitamins. This study is underway in Guatemala. (d) Studies designed to improve the nutritional quality of bread(s) by incorporating protein concentrates are under way at Kansas State University, and (e) the feasibility of fortifying cassava with protein concentrates is being evaluated in Brazil and in the Congo.

In addition to the technological research it is necessary to carry the studies of utilization into the socio-economic area to asssess the potential for implementation and impact, for without the latter there is little motivation for application of the research results and for transfer of the technologies to the lesser developed countries.

To promote and expedite the utilization of the results that are forthcoming from these studies and to create an opportunity for the interchange of experiences it is proposed to hold a series of workshops to be attended by the researchers, managers, and planners involved in these fortification studies.

AID would provide the guidance and funds required to carry out inter-regional workshops and conferences. It is planned to hold during FY '72 workshops on (a) improving the nutritional quality of corn, (b) improving the nutritional quality of food staples, and (c) improving the nutritional quality of cassava. In addition, funds would be made available to publish and distribute all workshop proceedings.

As a result of these conferences recommendations and plans for initiating field studies or regional fortification projects involving staples such as corn, rice, cassava, etc. can be expected. Recommendations for increasing government involvement in programs designed to improve the nutritional quality of food staples can be another significant output.

In the long run this interchange of information and experiences can lead (a) to fortification projects arising in regions where such programs are non-existent, (b) in the beneficial modification of existing food practices in a given region because of an increased awareness of developments elsewhere and (c) the introduction by food processors of useful new food products developed in other regions.

# PERT PLAN

## Corn Conference

| | | | |
|---|---|---|---|
| 1) | Arrange for chairman and conference organizer | Sept-Oct | 1971 |
| 2) | Select Conference Site | Sept-Oct | 1971 |
| 3) | Develop Agenda | Oct-Nov | 1971 |
| 4) | Invite Participants | Nov-Dec | 1971 |
| 5) | Hold Conference | March | 1972 |
| 6) | Edit and Print Proceedings | April | 1972 |
| 7) | Distribute Proceedings | May | 1972 |

## Food Staples Workshop

| | | | |
|---|---|---|---|
| 1) | Arrange for chairman and Conference Organizer | Oct-Nov | 1971 |
| 2) | Select Conference Site | Oct-Nov | 1971 |
| 3) | Develop Agenda | Oct-Nov | 1971 |
| 4) | Invite Participants | Nov-Dec | 1971 |
| 5) | Hold Conference | Feb | 1972 |
| 6) | Edit and Print Proceedings | Mar-Apr | 1972 |
| 7) | Distribute Proceedings | May | 1972 |

Appendix A

Improving the Nutrition of Mandioca Eating People

This PROP and Amendment serves as the planning document for Project: Inter-regional Utilization #560-927, section of mandioca (cassava) utilization.

Background

The original PROP was authorized June 10, 1971 and under it two PIO/Ts were prepared and approved. The subject of these PIO/Ts were (a) to supply USAID/Rio and GOB (Brazil) the financial assistance in organizing and arranging for and carrying out a world-wide mini-conference on mandioca status and problems. This is now scheduled for March 1972, (b) the investigation by University of Colorado of market channels and food use characteristics in sub-sahara Africa, emphasizing the Democratic Republic of the Congo as exemplary of the typical use environments. A first phase report of the investigator has been submitted, and field data collection is still continuing in Congo. The original PROP was designed as a general planning document for mandioc and projected the need to dedicate at least five years of effort to cassava problems. The PROP has been criticized because it was not specific and in a memorandum (April 26, 1971) from TA/PM recommended approval of the PROP and the funding for 1972 be conditional upon an approved revision of the PROP.

Upon re-examination of the PROP, there is actually little substantive revision needed except to change the format to include new manual order specifications about PROP structure and to specify a few activities that will be the subject of the PIO/Ts. What follows, therefore, is basically a revision laid out in accordance with M.O. 1025.1.

A. Goals

The goals of this project are:

1. To assist mandioc using populations to meet their basic nutritional needs, and

2. To create an attitude among consumers and governments conducive to adoptions of practices and policies favoring the increased use of more nutritious foods.

## Goals Achievement

The achievement of these goals depends upon the aggregation of existing and dependent on new knowledge about mandioc, its history of use and spread of use in the economic, commercial, and cultural patterns, as well as technologic and health aspects plus the development of suitable fortificants and their application The degree to which the goals can be reached will be measurable in terms of the demonstration activities either as changes in dietary consumption patterns, or growth in the production of more nutritional products based on cassava. Eventually, but beyond the terms of the project, it should be possible to relate a change in the well being of the cassava consumer to the change in his nutrition pattern.

## Assumptions

In addition to the overall assumptions in the Interregional PROP above here we assume implementation of the findings of this project will affect needy population groups, and that this project itself will be instrumental in initiating the implementation Also it is assumed that the questions answerable by the project will be sufficient to affect the feasibility of intervening will remain constant enough to enable us to actually demonstrate the feasibility.

It must be assumed, moreover, that the changes in consumption not under our management control will be neutral to the beneficial outcome of this project. With proper attention to policy and regulatory measures in this project we would hope and assume that this project itself will contribute to sound nutrition policy formation in cassava eating nations.

It must also be assumed that the primary characteristics of mandioc will change but slowly, e.g. through marginal changes in its agronomic characteristics rather than in giant strides, changes that would instantly alter its use patterns. Thus for example, a high protein cultivar, if it were discovered, might alter the possibility of storing the root in the soil as it is now, as well as alter the technology of cultivation, perhaps even adversely. There are continuing reports of high protein manioc, but so far none have not proven out.

Measures of Goal Achievement

1. Nutritionally enriched manioc products will be available in local markets at low cost.

2. Patterns of food preparation and use by manioc eaters will be changing.

3. Incentives to both produce and to consume more nutrified forms of manioc will be measurable.

B. Project Purpose

The over purpose of the sub-project within inter-regional utilization is to encourage the application of principles of food science and technology and nutrition to cassava, a low cost calorie resource that has high availability to both rural and urban poor of the developing countries.

Conditions at the End of the Project

1. Fortification of manioc products and diets will be under way in Brazil and in Congo and beginnings will have been made in other regions where manioc is growing in importance.

2. A new understanding of the potential of fortifying low cost calorie resources will have been created.

3. The potential for using technological approaches to augment the nutritional status of the people to whom manioc will continue to supply significant calories will be outlined.

4. Furthermore, it is expected that methods for introducing these approaches to LDC populations will have been tried and a good estimate of variations in cost from different intervention approaches investigated will have been determined in various regions.

5. It is also expected that the market intervention studies contemplated will yield estimates of the potential impact of the various intervention methods.

Project Outputs

Besides the general project outputs, we expect to learn and disseminate what the best protein supplements under various cultural and cost circumstances will be, and how to introduce them.

We expect to find methods for and levels of nutrient addition in various regions and to estimate the potential impact on the nutritional status, to learn what type of area (geographically and urban or rural) is amenable to manioc fortification; to identify and resolve technical problems of mixing nutrients into manioc; to determine the cost of nutrifying manioc; to learn and propose solutions to problems of storage and marketing; to determine the potential acceptability in through pilot testing programs; to discover alternatives other than fortification for improving the nutrition of manioc eating people.

An output that is difficult to categorize is that of causing scientists and leaders around the world to look upon manioc as an important food calorie resource upon which sound nutrification programs might be based. Present opinion tends to classify it in developed country terms as an "empty calorie" food.

It should be recognized that the findings of manioc investigations funded by other regions, countries, missions, international agencies and as well as our own will make up the total information package that this project will stimulate, draw together, organize assist, disseminate, and promote.

Region by region it is expected that it will be possible to activate projects important to alleviating the malnutrition in areas that are manioc consuming. The nature of the outputs of all of these will vary in accordance with the priorities of the area, the capabilities of the local institutions, the funding potentials, and the leadership who will be making inputs of various kinds and levels discussed below. Specific outputs in the area of dissemination are such things as world-wide conferences of experts, literature and library studies of remotely available experiments and experiences and field trials. A different sort of stimulation but none the less appropriate to record as an output would be the initiation and institutionalization of nutrition economic studies within local government entities.

It is intended herein to convey a picture of the diversity of both inputs and outputs in a project that spans regions of the world as well as laboratory, clinical, controlled field evaluations, food technology, pilot market testing, large scale acceptability, economic studies, general technical assistance, training and education, and assistance to policy formation. The extent to which local regions move toward cassava fortification, and food system interventions will be the basic output indicators.

Inputs

Elaborating on the input section of the inter-regional utilization PROP, it is the results from the various regional projects that will be among the primary inputs to the manoic project.

Course of Action

At present Brazil has most of the necessary components to carry forward cooperatively with USAID and AID/W an integrated series of projects focused on the goals and purpose of this manioc project. There are, however, certain places in the Brazil effort, where additional inputs are needed, either because that particular manpower element is in short supply or because the timing is not appropriate for them to take initiative and supply financial support, or because our experience indicates that an extra effort is needed to achieve the appropriate output for a world-wide as compared to simply a Brazilian purpose. An example of this is our sponsorship of a world-wide conference on manioc, where Brazil USAID in cooperation with GOB will carry out the organization invitations and conduct of the meeting followed by reporting and translation into Spanish, English, and French. Dissemination will be through AID/W in cooperation with USAID and GOB. This year, 1971-1972, an input to USAID/GOB cooperation is expected to be made to initiate the development of new lines of cooperation on nutrition policy development to the establishment of a market elasticity study on manioc to be carried out by a Brazilian who would report to and be on the staff of some Brazilian Planning entity. Arrangements will be made for this individual to follow up on the progress of the Ecuador systems study and the Tamil Nadu nutrition model development to serve as a foundation for his continuing work beyond the manioc elasticity effort.

Inputs to the African region, however, can be expected to be different because of the level of development as well as the unavailability of waived manpower. In this case cooperating institu-

tions such as U.S. universities are sought to assist. A project already begun is a market channel analysis coupled with a bionomics of manioc use survey carried out in D.R. Zaire by the University of Colorado. Findings in this project indicate the desirability of extending and modifying the work plan to permit the blending of findings important to world-wide progress and those useful to planning for expansion of an already ongoing pilot manioc diet fortification effort. The present program has successfully introduced a corn-soy meal to the market and has taught the buyer how to fortify manioc foods with it. Inputs will be through cooperative program development among GOZ, USAID/Kinshasa, AID/W, U.S. University and a contractor or a consortum of universities. The plan thus is to extend the University of Colorado contract and amend it, subject to GOZ and Mission approval to investigate a current utilization project on the successful marketing of a soy-corn mixture for use in Cassava based foods. It enables us to begin to determine the extent of various population groups dependence on cassava foods and the economic potential to displace or supplement cassava in diets with more nutritive basic foods. The Mission, TA/N, and University of Colorado coordinated report recommend that a plan for expansion of the Luluaborg effort be drawn up, but this would be done with Mission funding.