

Dr. Gail Harrison's Field Report to Egypt;

May 25 - June 23, 1982

Functional Implications of Malnutrition

(CRSP), 931-1309

Trip Report

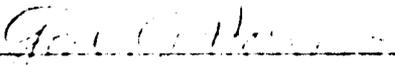
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TRIP REPORT

EGYPT AND W LAFAYETTE, INDIANA

May 25-June 23, 1982

NUTRITION CRSP



Gail G. Harfison

Principal Investigator, University of Arizona

July 26, 1982

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## I. INTRODUCTION AND OUTLINE OF SUBCONTRACT PROGRESS

The following is a report of activities and accomplishments resulting from a trip made to Egypt May 24-June 20, 1982 and West Lafayette, Indiana June 21-22, 1982. The purposes of the trip were A) to solidify relationships with relevant Egyptian scientists and institutions for conduct of the CRSP; B) to inform relevant Egyptian and local American scientists and administrators that the CRSP, long in the planning stage, had finally been funded and to bring them up to date on the current plans regarding scientific design and administration; c) to make concrete arrangements for the administration and structure of the CRSP project in Egypt; D) to select a field site; E) to assess the state of existing information relevant to nutritional status, food consumption, and related areas F) to make as much progress as possible toward concrete plans for the work to be conducted in Phase I.

The Egyptian Nutrition Institute had earlier made it clear that no work can be done on the project until an Egyptian subcontract is signed and funds are in Egypt for the conduct of the work. However, Dr. Hekmat El-Sayed Aly at the April meeting of the SCB invited me to travel to Egypt in May even if the contract was not yet signed in order to plan for the CRSP and to have a CRSP project representative in Egypt at the time she was scheduled to retire as Director of the Nutrition Institute, June 1.

At the time I left for Egypt, I had been told by Purdue University that the progress of subcontracts would be rapid; the Purdue-Berkeley contract was in final negotiations, and the Purdue administration anticipated sending a delegation to Egypt for signing of the Purdue-Egypt contract early in June. Thus I anticipated that the subcontract would be signed (or minimally, would be in Egyptian hands) during the time that I was in Egypt. Indeed, when I arrived in Cairo I found that a telex had been sent from Purdue to the USAID office in Cairo which indicated plans for a several-member delegation from Purdue to arrive for the contract signing "on or about June 1". This telex was passed on to the Nutrition Institute, which assumed that the telex meant what it said and had made appointments with the Minister of Health and with the Undersecretary for Minister's Affairs for signing of the contract on June 2 and 4. I communicated with Purdue University via telephone, on June 2-3, and was able to ascertain that there was no possibility of an Egyptian subcontract or Purdue visit at that time. The appointments were cancelled, and the work which I did during the rest of the trip remained predicated on the premise that a subcontract and funds would be in Egypt as rapidly as possible. Purdue requested by phone June 3 that a breakdown of the Egyptian portion of the budget for budget years 01 and 02 should be incorporated into the subcontract; therefore, I planned a detailed budget breakdown and justification with Egyptian senior scientists and telexed this to Purdue on June 6, including a request to incorporate the budget and telex the contract or contract draft back to me. A call from Purdue on June 9 informed me that the budget had arrived and queried the rationale for some specific items. At that time, it was clear that the Egyptian scientists did not feel a delegation from Purdue for the signing was necessary; what was necessary was a document. I suggested on June 9 that Purdue send the contract draft via TWA Courier Service; no promises were made. However, on June 11 I received a telex from Dr. Kirksey telling me that she had been able to send "an unofficial copy of a possible draft document", and it had been sent via Emery Air Freight to arrive by Monday, June 14. By that date I had been able to ascertain that Emery Air Freight is represented in Cairo by another firm (Express International); the package had not arrived and a tracer was put on it by Express International. By June 15 they were able to determine that the package had been misrouted and was in Brazil. It did not arrive by the time I left Egypt.

Nevertheless, I had with me a copy of the UCLA-Kenya contract, and used that as a basis for discussions. When I returned to the US, I had a detailed list of considerations which were desired to be in the document from the Egyptian side. It was therefore possible, during the two days spent at Purdue, to draft a subcontract document which I felt would be quite acceptable in Egypt. We did this, and before I left Purdue I was assured that that version (which was on their word processor) had only to be read by a few university officials and sent to Berkeley for approval before sending it to Egypt. I left with Mr. Menacher of the Purdue administration detailed instructions for what should go in the cover letter, to whom in Egypt the subcontract should be sent, and to whom in Egypt copies for information should be sent. I also requested that they send me a copy when it went to Berkeley, notify me if there were any substantive changes in it and notify me before actually communicating with Egypt about the subcontract signing, so that I could inform the key Egyptian scientists.

Dr. Jerome had plans to travel to Egypt on July 17; the Egyptian Ministry of Health had been quite firm that she should not travel, nor could actual work be done on the project, prior to the signing of a contract. The Purdue administration seemed to feel at the time of our meeting (June 22) that it would be possible for Dr. Jerome to keep her July 17 plans.

As of this date (July 26), the Egyptian subcontract still has not been sent. Dr. Jerome and Dr. Sieber (who planned to go to Egypt to work on Phase I in August) as well as the Field Coordinator have had to postpone their travel plans indefinitely.

## II. INFORMATION ABOUT NUTRITION CRSP IN EGYPT

Dr. Hekmat had requested that a brief description of the project be made available for senior Egyptian scientists and Ministry of Health officials, since the last official document relating to the project which many of them had seen was the original proposal made by Purdue University in 1979, and there have been many modifications and changes since that time. The Arizona group wrote a "Brief Description of the Egypt Project, Nutrition CRSP", which was reviewed and OK'd by the PI's at Purdue and Kansas. I took with me several copies of this document (*appendix C of this report*) and made numerous other copies while in Egypt. This document is now in the hands of all senior consultants and senior Egyptian scientists involved; the Undersecretary of Health for Minister's Affairs; several other senior Egyptian scientists who are advisory or otherwise significant to the CRSP; senior personnel of the Office of Population and Health, USAID/Cairo; the science office at the US Embassy; and the personnel of Catholic Relief Services in Cairo. Thus a general description of the project in a reasonably up-to-date form is available in Egypt and the administrative and scientific management arrangements, which are spelled out in this document, are well understood.

## III. STRUCTURE AND ADMINISTRATION OF EGYPTIAN PORTION OF NUTRITION CRSP

The following represent the results of many discussions with senior staff of the Nutrition Institute and with other key Egyptian scientists and officials, as well as with the USAID mission in Cairo and the scientific officer at the US Embassy. Items marked with a \* are those which should be incorporated in the subcontract.

A. Principal Investigator. During the planning phases of the CRSP, Dr. Mamdouh Gabr was Minister of Health and was listed as Principal Investigator for the Egyptian portion of the project. The primary collaborating Egyptian institution was the Nutrition Institute (NI), Ministry of Health, whose director, Dr. Hekmat El-Sayed Aly, was designated representative of the Minister for purposes of the project. Dr. Gabr is no longer Minister, and has resumed his position as Professor of Pediatrics, Cairo University. He will assume the headship of that department in October 1982, as well as the position as Director of the Childrens Hospital. Dr. Sabry Zaki is Minister of Health, and Dr. Ramses Gomah, Undersecretary for Minister's Affairs, is responsible for projects such as this one. Dr. Hekmat retired as Director of the NI on June 1, 1982. Neither she nor Dr. Gabr can serve as Egyptian PI, since neither is a Ministry of Health employee. \*The Director of the Nutrition Institute should be the Egyptian PI. This is appropriate from the local structural standpoint, and assures that the PI will be a scientist trained and experienced in nutrition. As of July 20, there had been no successor to Dr. Hekmat named by the Minister of Health. Therefore, the subcontract should simply indicate that the Director of the NI will be the Egyptian PI.

B. Senior Consultants. Both Dr. Mamdouh Gabr and Dr. Hekmat El-Sayed Aly will serve as Senior Consultants to the Project, and will give it a significant share of their time and guidance.

C. \*Advisory Committee. As of mid-June, a Consultative Committee on Foreign Nutrition Research has been formed by the Ministry, to oversee all nutrition research projects involving foreign funds. Dr. Gabr has been named head of this committee, and will have an office in the NI for the carrying out of this function. Each research project will have an advisory committee. For the CRSP Project, Dr. Gabr will head the advisory committee. Other members will be appointed by him, and will very likely include all senior Egyptian scientists involved in the Project, Dr. Hekmat, the Chairman of the (advisory) Council of the Nutrition Institute, appropriate Ministry of Health officials, appropriate representatives of the health departments of the governorate and village community where the project takes place, and several outside advisors. The committee will meet at regular intervals, and will be advisory to the Egyptian PI in all phases of the work including the overseeing of the projection of human rights.

C. Senior Scientists. I was able to solidify relationships with several senior Egyptian scientists already involved in earlier planning of the CRSP, and to identify senior Egyptian scientists in areas not yet covered. Since a major objective of the CRSP is to strengthen the NI, scientists from the NI should be involved at all stages of the project. In those areas in which senior scientists exist in the NI but prior commitments have been made to other Egyptian scientists, (e.g., Nutritional biochemistry) collaborative working arrangements must be developed. In those areas in which no senior scientist at the NI is appropriate, outside consultants will work as much as possible with younger scientists on the NI staff to facilitate development and training of the NI staff in these areas. All senior Egyptian scientists have now been identified and are as follows (omits only Work Performance, for which Dr. Ismail has already established working relationships).

- Nutritional biochemistry: Dr. Ahmad M. Dakroury  
(Head of Dept. of Nutritional Biochemistry and Metabolism, NI)
- √Dr. Daisy Fleita, Dept. of Chemistry, American University of Cairo
- √Dr. Moustafa Mansour, NAMRU-3
- Immunology: √Dr. Esmat Ekkladios, Dept. of Chemistry, Cairo University
- Statistics & Data Management: Dr. Mohammed Hussein Khalil, Chairman, Dept. of Statistics, High Institute of Public Health, Alexandria University
- Cognitive Performance: Dr. Zeineb Bishry, Dept. of Psychiatry, Ein-Shams University
- Social Performance: Dr. Saneya Saleh, Social Research Center, American University of Cairo and  
Dr. Samia Mohamed Fahmy, Vice-Dean of the School of Social Work, Alexandria

Senior scientists in the areas of disease, reproduction and food intake will be drawn from within the NI. Several qualified and interested scientists in each area exist, and the Egyptian PI will designate these individuals.

E. Role of US Field Coordinator. Egyptian scientific and field staff will be under the direction of the Egyptian PI. Scientific management of the Egyptian CRSP project will be, as specified in the contractual memorandum of agreement, the responsibility of the four co-equal PI's (from Kansas, Purdue, Arizona, and Egypt). The US Field Coordinator will be responsible to the US PI's and will coordinate day-to-day aspects of the field work in cooperation with Egyptian scientists and field staff. The job description of the US Field Coordinator (Appendix D) has been agreed upon by the US PI's and was reviewed and approved by Dr. Hekmat.

F. \*Human Subjects Responsibility. Egypt has no standing committee on the protection of human rights in research. Rather, the Minister of Health assumes this responsibility when he approves a health-related research project. In order to monitor the protection of human rights, advise the Egyptian PI in this area, and fulfill contract specifications, the Advisory Committee to the project will take review of human rights protection as one of its ongoing tasks.

G. \*Handling of funds and accounting. Reimbursement of expenditures is not practicable. Rather, a 90-day advance based on estimated expenditures in the next 90 days is desirable. Accounting of funds expended can be every 30 days or less frequently as deemed desirable by Purdue. The NI or the MOH will assign appropriate accounting personnel to the project.

Funds should be transmitted directly to the Ministry of Health, which will set up a separate account for the project. It is desirable that two accounts be maintained, one in dollars and the other in Egyptian pounds (L.E.), with funds converted from dollars to L.E. only as needed. Should there be a contractual requirement that currency exchange be made through the US Embassy, the Embassy is willing to do so on behalf of the Egyptian PI. However, each exchange accomplished in this manner takes 2-4 weeks. If there is no such contractual requirement, the MOH can accomplish currency exchange using its usual banking arrangements. The

√Designates scientists to whom commitments had earlier been made by Purdue.

maintenance of some of the funds in dollars protects somewhat against the accelerated inflation of the Egyptian pound and provides flexibility for purchases in whichever currency is advantageous to the project.

H. Equipment purchase and shipping. Some items of equipment should be bought in Egypt (e.g., vehicles) because of availability, shipping time and cost from overseas, and easier service when locally bought. Other items should be bought in the US and shipped. \*Funds from the Egyptian portion of the budget should be held in a separate account by Purdue for purposes of purchasing and shipping this equipment. Neither the US Embassy nor NAMRU-3 is willing or able to receive equipment shipments on behalf of the project. Therefore, we are to use commercial channels (or for small items, send them with travelers), with the item(s) accompanied by letters indicating that the equipment is purchased by US Government funds and is donated as a gift to the NI, Ministry of Health. The Egyptian PI should have a copy of these letters in order to avoid duty of these items and to facilitate customs clearance. Further advice can be obtained by Stephanie Sagabiel, the member of the US Embassy Science Office who is responsible for biomedical research.

I. Communications. The Ministry of Health maintains a telex office which, in my experience, was more satisfactory in terms of prompt notification of receipt of communications than was the US Embassy. The person in charge is: Dr. Hassan El-Ghawab; Director - General, Department of Foreign Health Relations, Ministry of Health. The U.S. Embassy, through the USAID office, is also available for sending and receiving telex messages.

J. Relations with USAID/Cairo and with US Embassy. The local AID mission has no line authority over this project and therefore does not expect to administer funds, etc. However, Dr. Oldham (Director of the Health and Population Office) would like his office to be kept informed of CRSP activities and travel of US personnel. Mr. John Wiles is the Nutrition Officer (new as of May 1982) and both he and Ms. Keys McMannis (In charge of Human Resources) are actively interested in the CRSP and willing to be of assistance however they can. Likewise, the Science Attache at the Embassy is interested, informed and helpful.

K. Subcontracts from MOH. It appears that only the American University of Cairo will require a formal subcontract. Negotiation of this will be the responsibility of the Egyptian PI and the MOH. Other involved Egyptian senior scientists are of the opinion that no formal subcontracts are required with their institutions.

#### IV. PLANS FOR PHASE I

A. Selection of a Field Site. Possible field sites were discussed with a variety of senior Egyptian Scientists. The possibility of locating the study in the governorates of Bihera, Fayoum, Menofiah, Giza, and Qualub were discussed in some detail. Several of these were also visited. It was decided to work in the governorate of El-Bihera, primarily due to the following major considerations:

1. Bihera is the site of a field facility belonging to the Nutrition Institute in the city of Damanhour. This facility is staffed with a social worker, an administrator, two dietitians and several helpers. The facility has been in existence since the mid-60's; .. as a result the NI has detailed information about communities in the area. The facility is inexpensive to maintain and can be given over to the needs of the project. It consists of four apartments each capable of sleeping 4 persons, adequate office and conference room space, a telephone, electricity and water, space for a small laboratory, a storage area and an apartment for drivers. A number of suitable field communities exist within 15-30 minutes drive from Damanhour.

2. Bihera is far enough from Cairo (2 hours drive) to make daily commuting impracticable for NI field workers. Therefore, we may expect field workers to live in Damanhour for three weeks of each month, working more than the usual hours/day and have one week/month off. Additional field workers can be recruited and trained locally.

3. Bihera is near enough to Alexandria (1-1½ hours) to facilitate the involvement of senior scientists there (data management and social performance).

4. There appear to be no major projects going on or planned for Bihera which would interfere with the CRSP.

5. The distance from Cairo is not so far that personnel cannot come and go frequently as needed.

Based on information from the National Nutrition Survey conducted in 1978, the governorate of Bihera is not different from the rest of lower Egypt in prevalence of mild-to-moderate undernutrition. The following two tables compare the data from the 1978 Nutrition Survey for preschool children in rural Bihera to the country as a whole and to rural areas of Lower and Upper Egypt in terms of weight & height for age.

HEIGHT FOR AGE

<u>AREA</u>	<u>N</u>	<u>Severe (<math>&lt; 85\%</math> median)</u>	<u>Moderate (85-89.9% median)</u>
All of Egypt	8016	4.5%	16.7%
Upper Egypt-rural	1784	6.7%	20.8%
Lower Egypt-rural	3552	4.6%	17.2%
Bihera-rural	884	4.9%	17.1%

WEIGHT FOR AGE

<u>AREA</u>	<u>N</u>	<u>GOMEZ CLASSIFICATION</u>		
		<u>III</u>	<u>II</u>	<u>I</u>
All of Egypt	9794	0.8%	8.0%	38.5%
Upper Egypt - rural	1784	1.0%	11.9%	41.9%
Lower Egypt - rural	3552	0.6%	7.8%	37.4%
Bihera - rural	884	0.8%	8.5%	37.4%

The NI conducted a nationwide food consumption survey in 1981. The results of that study have not yet been submitted to the National Assembly; therefore they may not be utilized publicly at this time. However, the raw data were kindly made available to me and I was able to ascertain that rural Bihera was typical of other rural areas of lower Egypt in food consumption, with the only major exception being that substantial rice is consumed in this (and one other governorate) while it is not in most of the country.

Once decided on the governorate, I visited with Dr. Amin Kamel Said of the NI and with the social worker from the Damanhour field facility, several potential villages all of which met our criteria of 300 families + in the central village, no other research projects in progress, and no major daily commuting to cities. We eventually selected (pending further investigation by the NI) the village of Nediba.

✓The World Bank plans a water project for Bihera, but has agreed to avoid our study site.

This community is located 8 km west of Damanhour on a paved road. The central village has about 3000 inhabitants, and the total area including about 75 outlying hamlets has a population of about 22,000 (1981 census). There were 120 births in the central village and 431 in the total community recorded between January 1 and June 18, 1982.

The Health Center in the village sees about 18 patients/day. The doctor lives in a house adjacent to the Health Center and has been there two years. A dentist visits every other day. The Health Center has electricity, water, and a phone as well as sufficient space to accommodate project needs. A small inpatient unit and a limited surgery are included, as well as a laboratory for stool and urine screening for parasites and a limited pharmacy. Seven nurses and six clerical staff are included in the Health Center. About 6-12 births/month are attended by the Health Center staff, with the remainder being attended by native midwives. Health Center staff know the native midwives and have good relationships with them.

The village has a primary and a preparatory school; the nearest secondary school is in Damanhour. The village has safe water through a common spout; some houses have running water but most do not.

Examination of clinic parasite screening records (only on symptomatic patients) reveals common presence of Schistosoma mansoni, Schistosoma hematobium, and Ascaris.

So far as I have been able to ascertain, no one can remember any research project utilizing this village in any way for description, intervention, or control.

If possible, during the time while the contract negotiations are awaited and finalized, the field facility staff will undertake to update the census, map the village, and to do preliminary social information-gathering. This will depend on the ability of NI in Cairo to supply a vehicle to the field facility staff.

B. Community Benefits. It was decided that during Phase I, since the entire central village would be involved in a "nutritional census" and preliminary data collection, a community service would be provided. Preliminary work is underway to determine what would be locally desirable and appropriate. In Phase II, an amount will be set aside in the budget (approximately L.E. 10/month/household) to benefit study households. These funds will be used to help households solve problems as they arise (not timed to be contingent on participating on particular project activities), used at the discretion of the Egyptian PI for this purpose but not to include food or direct monetary gifts.

C. Plans for Phase I. In consultation with Dr. Hekmat and Drs. Amin Kamel Said, Wafaa Antonius Moussa and Farouk Ghoneim, Phase I forms for community description, household description, morbidity/reproduction, and food intake protocols were adapted for local conditions and translation was planned to begin on those forms for which it will be necessary. Availability of existing equipment was assessed. Dr. Amin was given a copy of the anthropometry training manual and the WHO reference standards. It was decided that it would be possible to initiate Phase I with minimal lead time, since most necessary equipment can be borrowed temporarily and the NI staff is experienced both in food intake and anthropometry.

D. Time Schedule. As soon as the contract is signed and funds are in Egypt, Phase I can begin. Dr. Jerome should arrive first, finalize arrangements for a bilingual research assistant, and begin ethnographic data collection. The NI staff will immediately begin plans for a nutritional census of the village based

upon forms now being adapted and translated and anthropometry and other methods discussed. Dr. Sieber should plan to be in Egypt for several weeks after the beginning of the nutrition survey of the village in order to pull together the morbidity data. The US Field Coordinator should arrive as soon as is feasible, but there is not a great hurry as the NI staff is well prepared to initiate Phase I. It is more important for the Field Coordinator to arrive prepared to stay than it is for her to arrive early in Phase I. The recent news that the fall SCB meeting is to be postponed until November makes it possible for the Egyptian project to have the minimal necessary data in hand at that time. In order for this to occur, however, further delays must not be experienced.

If possible, both Dr. Hekmat and the new Egyptian PI should attend the November SCB meeting, in order to facilitate continuity on the Egyptian side of the project.

Field testing of methodology for Phase II (and thus, travel of Drs. Watson, Wachs, Ismail, Weber and Stini) should be postponed until after the completion of the preliminary survey and the November SCB meeting.

IV. MEETING WITH PARTIAL GROUP OF US PERSONNEL, W. LAFAYETTE, INDIANA

On June 21 and 22, I met with the following persons in West Lafayette, Indiana:

- Dr. Norge Jerome, Kansas PI
- Dr. Avanelle Kirksey, Purdue PI
- Purdue scientists: Dr. Ron Watson
- Dr. A. Ismail
- Dr. Ted Wachs
- Purdue Administration: Richard Smith
- D. Woods Thomas
- Jay Menacher
- Larry Pherson

We accomplished the following:

- 1) Drafting of an Egyptian subcontract, which was left on their word processor.
- 2) Detailed review and discussion of the Egyptian portion of the budget for years 01 and 02.
- 3) Preliminary planning for the Egyptian and US portions of the year 03 budget.
- 4) "Debriefing" regarding the NI, MOH, other relevant networks in Egypt, the field site, and other relevant information from Egypt.
- 5) Integration of individual scientists' plans for Phase II, in preparation for Dr. Jerome's representing the project at the meeting in Berkeley in late June.

Appendix A

Persons with whom discussions were held and general topics addressed  
\*Connotes scientists who will be significantly involved in the CRSP.

A. STAFF OF THE NUTRITION INSTITUTE, MINISTRY OF HEALTH, Cairo

\*Dr. Hekmat El-Sayed Aly  
Director (retired June 1, 1982)  
Detailed planning of CRSP and local arrangements, many ongoing discussions. Will serve as senior consultant to the CRSP.

\*Dr. Amin Kamel Said  
Head, Department of Clinical Nutrition  
Detailed planning of CRSP operations and budget and selection of field site, many ongoing discussions

\*Dr. Wafaa Antonius Moussa  
Head, Department of Surveys, Surveillance and Programs  
Detailed planning of Phase I dietary, community and household survey protocols and arrangement of data control and training procedures for food intake protocols for Phase II, many ongoing discussions

\*Dr. Farouk Ghoneim, Dept. of Surveys, Surveillance & programs  
Detailed conversations on adaptation of community description, household description, morbidity forms for Phase I and on nutritional status methodology and equipment, many discussions

\*Dr. Farouk Shaheen, Dept. of Surveys, Surveillance and Programs.  
Several discussions about overall CRSP and about selection of field site

Dr. Mohammed Aar Hussein  
Head, Department of Growth and Requirements  
Overall discussion of CRSP and relationship to a project he plans to conduct with Dr. Scrimshaw on functional effects of anemia

\* Dr. Ahmad M. Dakroury,  
Head, Department of Nutritional Biochemistry and Metabolism  
Planning of relationships between NI laboratories and other participating biochemistry laboratories (NAMRU, AUC, CU), many ongoing discussions

Dr. Fahmy Seddik  
Director, Food Microbiology Project, Food Science & Chemistry Dept.  
General information about CRSP

Dr. M.M. Abdel-Kadr  
Chairman, Council of the Nutrition Institute (Advisory) & Chairman, Department of Biochemistry, Cairo University  
Many ongoing discussions of the CRSP and local arrangements

B. OTHER SENIOR INDIVIDUALS WHO WILL BE INVOLVED OR ADVISORY TO THE CRSP

\*Dr. Mamdouh Gabr  
 Professor of Pediatrics, Cairo University  
 Abu el-Rish Hospital, Cairo  
 Head, Consultative Committee on Foreign Nutrition Research,  
 Nutrition Institute, Ministry of Health  
 Several discussions about CRSP arrangement, personnel,  
 field site selection, and subcontracting arrangements.  
 Will serve as senior consultant to the CRSP and head of the  
 advisory committee.

Dr. Osman Gallal  
 Head, Child Health Unit, National Research Council  
 Several discussions of CRSP and related issues. Dr. Gallal is on  
 the Council of the Nutrition Institute and will very likely  
 serve as a member of the CRSP advisory committee.

Dr. A. Safwat Shukry  
 Head, Department of Pediatrics, Cairo University  
 Abu el-Rish Hospital, Cairo  
 Dr. Safwat Shukry is on the Council of the NI and may serve on  
 the advisory committee for the CRSP

\*Dr. Dais Fleita  
 Department of Chemistry  
 American University of Cairo  
 Senior Egyptian Scientist, biochemistry

\*Dr. Esmat Ekkladios  
 Department of Chemistry  
 Cairo University  
 Senior Egyptian Scientist, immunology

\*Dr. Zeineb Bishry  
 Department of Psychiatry  
 Ein-Shams University College of Medicine, Cairo  
 Senior Egyptian scientist -Cognitive

\*Dr. Noustafa Nonsour  
 Head, Nutrition/Biochemistry  
 Navy Medical Research Unit (NAMRU-3), Cairo  
 Senior Egyptian scientist, biochemistry/nutrition

\*Dr. Saneya Saleh  
 Social Research Center  
 American University of Cairo  
 Senior Egyptian scientist, social performance

\*Dr. Samia Mohamed Fahmy  
 Vice-Dean, School of Social Work  
 Alexandria  
 Senior Egyptian scientist, social performance

\*Dr. Mohammed Hussein Khalil  
Chairman, Department of Biostatistics  
High Institute of Public Health  
Alexandria University, Alexandria  
Senior Egyptian scientist, statistics & data management

Dr. Laila Kamel  
Dept. of Public Health  
Cairo University  
member of Council of NI, probable member of CRSP advisory committee

Other individuals with whom discussions were held and who may be regarded as informed about the objectives of the CRSP:

USAID Office of Health and Population, Cairo:

Dr. William Oldham, Director  
Ms. Keys McMannis, Head of Human Resources Division  
Mr. John Wiles, Nutrition Officer  
Mr. Robert Cunningham (computers and data management)  
Mr. Fayek Todary Michael (procurement and supplies)

US Embassy:

Ms. Stephanie Sagabiel, Science Officer

Catholic Relief Services

Mr. Andrew Koval  
Mr. George Robs  
Dr. Diana d'Treville

NAMRU-3

Captain Craig Wallace (Commanding Officer)  
Dr. Aftab Ansari (Chief Science Officer)

Cairo University

Dr. Hakim Grace Shenouda (Dept. of Chemistry)  
Dr. Zeineb Hamed (Dept. of Pediatrics - Neonatology)  
High Institute of Public Health, University of Alexandria  
Dr. Sawsan Fahmy, Head, Dept. of Family Health  
Dr. Ahmad El-Sherbini, Dean  
Dr. Abdel Monem, Head, Department of Nutrition  
Dr. Olfat Darwish, Professor of Nutrition  
Dr. Aly Khamis Amin - Lecturer in Nutrition

University of Texas-Ministry of Health Diarrheal Disease/Field  
Epidemiology project in Bilbeis:

Dr. Charles Wright

Fayoum Governorate Health Department

Dr. Fakhry Hakim - Director General  
Ms. Samira Morsey - Nutrition Organizer

Village Health Center personnel in several villages in Bihera,  
most especially

Nediba  
Caracas  
Disounis Omdinar  
Darbuk  
Sharnouh

Social Research Center, American University of Cairo  
Ms. Kelly Effat  
Research Assistant

Ministry of Health  
Dr. Ahmed Akkad, Undersecretary for Preventive Medicine  
(retired 6/1/82)

Staff of Nutrition Institute field facility at Damanhour,  
especially  
Mr. Gabr (social worker)  
Mr. Gamal (administrator)  
Ms. Kamilia (dietitian)  
Ms. Salma (dietitian)

Appendix BITINERARY

May 24-25, 1982:	Travel Tucson to Cairo
May 26, Wednesday:	Nutrition Institute
May 27, Thursday:	Alexandria & Damanhour
May 28, Friday:	Alexandria
May 29, Saturday:	El Fayoum (Fayoum City and several villages)
May 30, Sunday:	Nutrition Institute
May 31, Monday:	Nutrition Institute
June 1, Tuesday:	USAID; Nutrition Institute; and Am. Univ. Cairo Social Research Center
June 2, Wednesday:	USAID; Nutrition Institute
June 3, Thursday:	Alexandria
June 5, Saturday:	Social Research Center, Am. Univ. Cairo
June 6, Sunday:	Nutrition Institute; US Embassy
June 7, Monday:	Catholic Relief Services; Nutrition Institute
June 8, Tuesday:	Cairo University; Nutrition Institute
June 9, Wednesday:	National Research Center, Child Health Unit; NAMRU-3
June 10, Thursday:	Nutrition Institute; Abu-el-Rish Hospital (Cairo University)
June 12, Saturday:	USAID; Abu-el-Rish Hospital; Nutrition Institute
June 13, Sunday:	Am. Univ. Cairo laboratories; Nutrition Institute; and villages near Cairo
June 14, Monday:	Cairo University neonatology section; Nutrition Institute
June 15, Tuesday:	USAID; Nutrition Institute; Ministry of Health; US Embassy Science Office
June 16, Wednesday:	NAMRU-3; Nutrition Institute
June 17, Thursday:	Damanhour and several villages in Biheya
June 19, Saturday:	Nutrition Institute
June 20, Sunday:	Travel from Cairo to Chicago
June 21, Monday &	
June 22, Tuesday:	West Lafayette, Indiana (Purdue University)
June 23, Wednesday:	Travel from West Lafayette to Tucson

Appendix C

BRIEF DESCRIPTION  
EGYPT PROJECT  
NUTRITION CRSP

5/82

The situation of mild or moderate deficits of food intake is prevalent in most of the world's populations, but its functional effects have not been systematically studied. The proposed project is a collaborative research effort funded by USAID among the University of Arizona, the University of Kansas, Purdue University, and the Ministry of Health of Egypt, to investigate the functional effects of mild-to-moderate undernutrition. The project is one of three in a Collaborative Research Support Program (CRSP) on nutrient intake and function. The other two projects are in Mexico (the University of Connecticut and the National Institute of Nutrition in Mexico) and in Kenya (the University of California and the University of Nairobi). The central question to be addressed by the investigators is "Under conditions of mild-to-moderate undernutrition, what relationships exist between food intake and various functional outcomes?" To begin to answer this question, the investigators will explore, in a population in which chronic mild-to-moderate undernutrition is prevalent, the relationships between dietary intake of food energy and certain nutrients and aspects of physiological, psychological, and social functioning in individuals in the context of the household unit. The overall three-project CRSP is administered by the University of California

at Berkeley (Dr. Doris Calloway, Program Director) and the scientific management is handled by a Scientific Coordinating Board (SCB) which will meet several times yearly and which includes the principal investigator from each US institution and each overseas institution. Major objectives of the Egyptian project include: 1) the prospective investigation of the effects of variation in energy intake on functional performance in terms of: disease frequency, course and pattern; reproductive outcomes, cognitive and sensory function; physical activity and work performance; and social performance, (defined in locally relevant terms.) 2) Development and validation of techniques and instruments for further field research. 3) Assistance to Egypt in developing the infrastructure to improve nutrition services.

The project will consist of three phases: 1) preliminary survey and pilot work; 2) longitudinal study; and 3) data analysis.

#### Phase 1

The first phase of the project will last approximately six months and will consist of pilot studies necessary to decide, in collaboration with the Mexican and Kenyan projects, on critical details of design for the second phase of study. Phase I will include the following:

1. preliminary ethnographic study of the village community selected for study
2. establishing the magnitude of inter- and intra-individual variation in usual intake of food energy

3. characterizing usual cyclical patterns of food intake
4. describing the distribution of nutritional status in the community, primarily using anthropometric data
5. describing the mortality, fertility and morbidity characteristics of the village community selected for study
6. pilot testing of methodology projected for use in Phase II, including testing of feasibility and practicability of all methods.

#### Phase II

Phase II will consist of a longitudinal study of at least 200 households in a single village community for 2-3 years. The exact protocols are still under discussion in the various technical advisory groups of the overall GESP. The description below reflects the overall design which may be modified based on the result of the Phase I pilot work in all three countries.

Approximately three-hundred households will be selected from the selected community, in order to follow at least 200 household for the duration of the study. Eligibility criteria will include the presence of a woman of childbearing age, and 1 or more children under age 5. Initial screening of weights of preschool children will be used to classify children as adequately nourished, mildly or moderately malnourished.

Exclusion criteria for a household will be: anyone in the household suffering from severe malnutrition, severe physical handicap, severe psychiatric illness, or illness requiring severe

dietary restriction or plans to migrate from the community.

Staff from the Egyptian Institute of Nutrition will be employed as research assistants in the village and will live near the village for several weeks of each month. They will undergo extensive training in a program designed for this project.

The various areas of scientific investigation in Phase II include food intake, nutritional status, and several types of functional variables (reproductive outcomes, cognitive and social status, disease experience and immunocompetence, work performance). Each of the three country-specific projects includes scientists who are experienced in these areas, and they form (with consultants) Technical Advisory Groups for each area. These groups will recommend to the SCE, based on results of Phase I as well as on scientific considerations, what measurements will be required of all projects ("core" measurements) in each area. In addition, the Egyptian project is free to add other variables based on the interests of US and Egyptian investigators and the needs of the Egyptian Ministry of Health, so long as such can be accompanied within the confines of the budget and without jeopardizing the collection of the "core" data. The current estimate of "core" data to be collected is detailed below, with the qualification that it will be subject to modification.

#### A. Food Intake

1. Since the project is designed to assess relationships between food intake and function, the quantity and nutrient composition of the subjects' dietary intake must be measured with the greatest accuracy possible.

The dilemma is that greater accuracy means greater intrusion and changes in usual behavior. This project aims at the best mix of strategies aimed at maximizing accuracy while minimizing disruption of daily living. Therefore, great care will be taken to operate within local traditions, conventions, and cultural norms.

Risk of intrusion to families will be minimized by the ability of participants to withdraw at any time and to refuse participation in any aspect of the project, and by the continuous involvement of local personnel in design and execution of the project.

2. The methodology chosen will include the designation of a "visitor" who will conduct interviews, observations, and measures (a-d). Each "visitor" will have a panel of target households; each household will be visited daily for eight consecutive days each month.

a) Two 24-hour food intake recalls will be taken via interview on the lead female, the lead male, a pre-school child, and a school child. One 24-hour intake will be done on a breast-fed child, if there is one, and a third 24-hour intake will be done on the lead female if she is pregnant(See 5 below) .

b) Food preparations for the next meal will be observed while the visitor is there, with the attendant recipes being collected from the lead female.

c) Starting and ending food inventories, with daily food-in and food-out changes, will be taken by interview with the lead female.

d) One 24-hour food intake diary will be kept by each household member who is eight years old or older, except the lead male and lead female.

## B. Nutritional Status

1. The central focus of the research design is on energy intake; therefore, energy is also the focus of nutritional status measures. These will include anthropometric, clinical, and biochemical measures, with anthropometric measures forming the most extensive longitudinal data base on each subject. However, since deficiencies of other nutrients may affect the relationships of interest, provision must be made to control for these when they exist. These deficiencies may take either of two forms:

a) isolated cases of clearcut nutrient deficiency of a type not prevalent in the community. These will, for the purposes of this study, be identified clinically. These individuals should be treated or immediately referred for treatment, and their households should be excluded from the study. Criteria for treatment include any of the following:

- i. edema or severe wasting, or
- ii. failure to increase weight plus anorexia and asthenia, or
- iii. 35% less weight than reference tables for age, or

iv. 20% less weight for height than reference tables

b) Micronutrient deficiencies which are common in the community. The most likely deficiency is iron, although there may be others. Severe deficiencies will be treated (e.g. Hb less than 8 gm/dl); milder deficiencies will be measured and followed, so that potential inter-relationships with other variables may be elucidated.

2. Anthropometric measurements will be taken by the field team (weight, mid-arm circumference, and skinfolds (triceps, biceps, subscapular, supra-iliac) will be taken on all subjects, with added measurements on certain age groups. Newborns will be evaluated for gestational age using the Dubowitz score, and will have anthropometric measurements done before 1 week of age. From 0 to 24 months of age, core measurements plus length will be done every two months ( $\pm$  1 week). On individuals 24 months to 18 years of age, core measurements plus height will be done every three months. Adults will also have core measurements taken every three months, with an initial height measurement also taken. In addition, pregnant women will be measured monthly, starting with identification of pregnancy. Postpartum women will be measured every 2 months with their baby until 24 months postpartum or the onset of the next pregnancy. A sub-routine on sick children

has been established to remeasure them at one-week intervals until they are well.

3. Clinical examinations, done initially and one time per year thereafter, will utilize a computerized scoring system of 18 clinical signs of malnutrition. One physician should be responsible for this facet of data collection.

4. At present, we recommend measures of iron status, including hemoglobin, hematocrit, and ferritin as a minimum, to be taken by finger prick or heel prick.

Local laboratories can do these measures, with a quality control laboratory at one of the US institutions assaying duplicate samples.

#### C. Changes in Disease Experience and Immune Functions

1. Historically, a close association between severe malnutrition and disease has been long recognized.

However, mild malnutrition produces children who appear clinically similar to normal children. The main objective of this work will be to identify the interactions of mild-to-moderate malnutrition with disease history and/or immune function changes. Methods have been chosen to gain the most information on a longitudinal basis with the minimum intrusion and risk to children. Thus most attention is being given to behavioral measures and to secretions, minimizing blood sampling and other intrusive procedures. This work will include collection and analysis of disease histories, and biochemical analyses of biological samples. The biochemical analyses will be

done jointly in Egypt and Dr. Watson's laboratory in the USA.

2. The same home "visitor" who conducts the eight-day monthly food intake measures will administer a one-week retrospective health query on day one of the eight-day periods, and will record health status on household members for each day of the eight-day periods. Symptoms of household members and medicine taken by them will be recorded. Field work done prior to Phase 2 will develop locally appropriate standard symptom definitions for data recording.

3. Initially, serum samples will be taken. Specific antibodies will be measured to determine immunization status and prior exposure to diseases of interest. Lymphocyte function, humoral immunity, and hormones which may modulate the response will also be measured..

a) Fecal samples will be taken to identify and quantify when possible a parasite burden which may affect nutrition status. Additional fecal samples will be taken during diarrhea to determine causative agents.

b) Secretions of tears, saliva, and breast milk will be studied for secretory immunity.

c) Cellular immunity will be studied via skin (tine) tests.

#### D. Work Capacity

1. The question of what relationships exist between mild-to-moderate malnutrition and physical status in the area of work functioning and capacity will be examined here. A major concern is the possible detrimental effect of strenuous exercise on a given subject. Tests have been chosen to be minimally stressful and inconvenient while capable of elucidating the maximal information possible within the given constraints, (e.g. long-term acceptability of the project).
2. The tests will be field tested for local acceptability and feasibility. All subjects to be tested will be given physical examinations by an Egyptian physician to ensure their safety when taking the work capacity tests. The tests themselves are expected to be given every 6 months to adults. The following tests may be conducted:
  - a) resting metabolic rate will be determined
  - b) energy expenditure on graded tasks, associated with heart rate, will be taken
  - c) one full day of heart monitoring will be done
  - d) detailed time and motion studies will be done with stop-watch techniques.

#### E. Reproductive Performance

1. The overall objective of this portion of the project is to examine the functional consequences in pregnancy and lactation of limitations in energy and protein intake.

The project is particularly concerned with increasing maternal depletion over several pregnancies and lactations, and therefore requires adequate measures of pregnancy outcome (fetal outcome) and lactation performance.\* Our concern here is that the pregnant/lactating woman, who as the lead female, is already donating several hours each month to the project, will need to give additional time for the added tests on reproductive capacity. Therefore, measures already part of other sections will be used whenever possible.

2. Fetal outcome assessment is discussed in the nutritional status section. In addition to the anthropometric measurements mentioned there, notation of neonatal abnormalities will be done, including recording of stillbirths and miscarriages. Gestational age will be estimated using the Dubowitz scale, dates of last menstrual period and quickening will also be recorded.

3. Maternal food intake has already been discussed in the Food Intake section, and maternal energy expenditure will be measured in conjunction with the Work Performance Project in the 6th and 9th months of pregnancy, at 2 and 12 months postpartum, and at the cessation of breastfeeding. Serum prolactin may be monitored as a measure of malnutrition; it can be analyzed on serum in the capillary tube.

4. Assessment of the adequacy of lactation in terms of milk quantity and nutrient composition can be determined by measurement of infant growth before supplementary foods are introduced and by direct measurement of breast milk.

The quantity of milk produced during a 24-hour period will be estimated by use of a test-weighing procedure for a subsample of infants. The infant will be weighed before and after a feeding for the estimation of milk intake. If it is locally acceptable, a worker will remain in the household for 12 hours or 24 hours, if possible, to supervise and record weights of the infant before and after a feeding (without a change in clothing). During the 24-hour period, all foods and liquids given the infant will be weighed prior to and following feeding in order to determine the amounts consumed. Measurements will be made at 4-weeks and at 3-month intervals until weaning.

Total energy and proximate composition of milk will be assayed as well as the content of other nutrients which could reflect maternal dietary inadequacies. Representative samples of milk will be obtained for analysis at 4-week postpartum and at 3-month intervals throughout lactation, coinciding with the infant measurement intervals. At mid-day, all milk will be expressed from one breast with a manual breast pump while the infant suckles the other breast. Milk will be analyzed for total energy, total protein, non-protein nitrogen, and total lipid content. Other

nutrients in milk will be analyzed when country-specific nutrient inadequacies are evident.

5. Anthropometric measurements of infants and mothers will be done as discussed in the Nutritional Status section.

#### F. Social Performance

1. This project will focus on those aspects of social performance which are more likely to be affected by caloric deficits, and which in turn may have an impact on the calories available to the household. Therefore, the main topics of interest are the activity patterns and productivity of households, the ability of households to cope with stress, and the school performance of children. The latter area has been chosen since it represents an investment for the family, and it is relatively unobtrusive to measure.

An adequate methodology for studying social performance cannot be designed without relevant ethnographic data regarding behavioral options and norms within the community to be studied. For this reason, the ethnographic portion of Phase I must be completed before a complete design can be presented.

2. General topics to be addressed, examples, and potentially important variables within them are as follows:

a) School performance will be measured as attendance, grade received, and extra-curricular participation (if locally appropriate).

b) The household budget for allocating time and energy of household members to productive tasks will provide information on how the household copes over time with its requirements and constraints. Full-day activity records kept in conjunction with the Food Intake and the Work Performance protocols can be used for this purpose; other instruments will be developed as necessary.

c) Family interviews will be used to measure stress. Important factors will be the range of available options, the decision-making process, and the effectiveness of coping strategy evaluated in terms of the percent recovery and the resources drained. The project is particularly concerned with stresses which have consequences for production or expenses. The stresses may be specific to individual households, such as a son being recruited into the army or a husband breaking a leg, or the stresses may be village wide, such as sudden increase in food costs.

### **C. Cognitive Performance**

This section of the project is aimed at exploring the relationship between mild-to-moderate malnutrition and cognitive functioning. This relationship is not a simple linear one. A variety of factors covary with chronic mild malnutrition, which may serve to either magnify or diminish its impact upon cognitive development. These factors include chronic morbidity, disturbances in caretaker-child interaction patterns, and the child's

own individual and behavioral characteristics, such as growth pattern and pattern of activity level.

Specific tests will be adjusted to account for cultural differences between the CRSP projects, with the emphasis being on the measurement of cognitive processes rather than on the utilization of specific tests.

Basically, the types of measures used will fall into the following categories; cognitive assessment procedures, behavioral measures, interactional-environmental measures, infant temperament assessment, and language probes.

Exact frequency of different measures is still to be worked out; the following are "ideal" estimates.

Cognitive assessment procedures, using the Motor Scales from the Bayley Scales of Infant Development, will be given quarterly from 3 to 12 months of age. At 24 months, the Mental and Motor Scales from the Bayley Scales will be given, followed at 3 years by the Porteus Maze Test, and at 4 years by the appropriate Weschler Intelligence Scales. Infants in the first week of life will be assessed using the Brazelton Neonatal Assessments. Starting at one month through 24 months, monthly samples of infant activity will be taken with a standard actometer. This device can be fastened onto an infant or toddler's wrist and can be used to measure the degree of activity for a 24-hour period once a month. Starting at 6 months, infant's

play schemes will be used to assess infant exploratory behavior with culturally appropriate toys. The Continuous Performance Task will be used starting at 36 months as a direct measure of attention.

Interactional-environmental observations will be made on infants in their homes between 1 and 36 months of age by field personnel during regular monthly visits. Thereafter, the Whiting Children's Interactional Codes will be used to assess the nature of the child's interactional environment.

Infant temperament may be assessed monthly by use of the Bayley Infant Behavior Record from 3 to 24 months, and a revision of this record for children past 24 months.

Language assessment will be done yearly starting at 24 months of age via a 5-minute audiotape of the child's language level while the mother is teaching the child a task. Hearing (and vision) screening should begin at 2 years and continue yearly.

#### H. Project planning and administration

The project planning will be accomplished jointly by the principal investigators in each of the three US Universities (Dr. Avanelle Kirksey at Purdue University, Dr. Gail Harrison at the University of Arizona, and Dr. George Jerome at the University of Kansas) and the principal investigator designated by the Egyptian Ministry of Health. Dr. Helmat El-Sayed Aly has functioned ably in this role during the lengthy planning phase of the CESP thus far; the US investigators recognize her contribution

and the value of continuity of scientific involvement in Egypt and hope that she will be able to continue with the project after her retirement as Director of the Nutrition Institute.

A full-time scientific staff member of the US component of the Project ("Field Coordinator") will be employed, who will reside in Egypt for the duration of the study and function as field coordinator and liaison for day-to-day scientific operations as well as for administration and financial liaison between the US institutions and Egyptian institutions. It is anticipated that Egyptian field staff, employees of the Nutrition Institute and collaborating institutions, will be the primary field workers in the project and that Egyptian scientists will be involved fully in this collaborative work. US investigators will communicate regularly and frequently with their Egyptian counterparts, provide consultation and needed training of field staff and others when appropriate, and be in Egypt sufficiently often and for long enough periods of time to function in a fully collaborative role.

#### **I. Data Management**

One copy of all raw data will remain in Egypt with the Nutrition Institute; one copy will be sent or taken to the cooperating US institution(s). A core data handling system will be developed for the CESP, and data shared

with other projects according to guidelines now being developed. The SCB is presently also developing guidelines to insure timely publication of results, publication rights of all investigators, and sharing of data with the larger scientific community.

## APPENDIX D

**Job Description**  
**PROJECT FIELD COORDINATOR**  
**EGYPT PROJECT**  
**NUTRITION CRSP**

The Field Coordinator (FC) will be responsible for overall coordination of project activities in Egypt, including financial/administrative and research/administrative areas.

1. Regarding financial/administrative activities, the FC will be responsible for administering Egyptian project funds according to budget guidelines and CRSP objectives. In this responsibility, she/he will work closely with the NI/ROH and with the International Education and Research Office at Purdue University.
2. Regarding research/administrative activities, the FC will be responsible for day-to-day administration of research activities of the project and ongoing coordination with the staff of NI/ROH, local AID mission, and the US and Egyptian scientists involved in the project. In these activities, she/he will be responsible to the PI's (one each at Purdue, Arizona, Kansas, and in Egypt). His/her principal line of communication and responsibility will be to the PI who is designated to represent the project on the SCB in a given year, and to the Egyptian PI. Specific activities will include:
  - a) maintenance of appropriate records of field activities
  - b) timely handling of raw data, communication of data to all appropriate parties (NI, Purdue, Arizona, Kansas, other collaborating institutions when appropriate), and keeping of records of data transfer
  - c) coordination and logistical arrangements for the work of US and Egyptian scientists

- d) collaboration in the training of field personnel
  - e) maintaining appropriate quality-control procedures for all types of data collection
  - f) regular planning and evaluation meetings or other appropriate mechanisms for assuring coordination with Egyptian personnel
  - g) developing a procedures manual for field operations in Egypt in collaboration with the Egyptian and U.S. PI's no later than the end of Phase I.
3. The FC will communicate regularly and frequently with the Egyptian PI and with the Project Representative (the PI who is an SCB member at the time), keeping both fully informed of both activities and changes in plans or activities. The PR will assume responsibility for keeping the FC fully informed of CRSP and project decisions which affect the field operation.
4. The FC is encouraged to attend meetings of the various CRSP groups when appropriate, considering the agendas of the meetings, locations, costs, and need for his/her presence in the field at the given time.
5. The FC is encouraged to develop a scientific area of interest within the project but external to the core research design, and to pursue his/her own scientific career in this way. If this involves additional studies, it will be proposed to the SCB by the PR in the same way that any other additional research would be, according to the policy of the SCB. If it involves only analysis of data collected during the project, the FC will communicate his/her interests as early as possible to the PI's, who will take appropriate steps to protect the opportunity of the FC to make an identifiable scientific contribution which is primarily his/hers.