EVALUATION OF THE NUTRITION COMPONENT ADAPTIVE CROP RESEARCH AND EXTENSION (ACRE) PROJECT, SIERRA LEONE

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by

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I. Background

The evaluation of the Nutrition Compouent (NC) of the Adaptive Crop Research and Extension (ACRE) Project was carried out in Sierra Leone between February 3–20, 1987. It involved meetings with the United States Agency for International Development (USAID) representative in Freetown, ACRE Project staff in Njala, and faculty of Njala University College (NUC). The evaluation also entailed travel to four of the five ACRE Project target areas, namely Njala, Rokupr, Makine and Kalala. The assessment of the Nutrition Component was part of a comprehensive, final evaluation of the ACRE Project conducted by an AID/Washington team.

As a matter of background, the ACRE Project was designed in 1978 by the Sierra Leonean Ministry of Agriculture and Natural Resources (MANR), in collaboration with NUC and USAID/Freetown. The project was funded jointly by MANR and USAID, and was implemented between 1979 and December 1986. ACRE project headquarters were located at NUC and project research staff were drawn from this institution. In addition, project extension staff were provided by MANR. Under a contract with USAID, Southern University/Louisiana State University (SULSU) provided in–country technical assistance to the project as well as training in Louisiana for ACRE Project staff.

The purpose of the ACRE Project was to adapt and extend improved agricultural technologies to small farmers in five zones in Sierra Leone for the production of the project's mandated crops, namely rice, cassava, sweet potatoes, cowpeas, maize, groundnuts and, to some extent, pigeon peas. Project objectives included: 1) the development of low–cost, appropriate agricultural technologies through on–station adaptive research trials and on–farm extension demonstrations; and 2) the development of an effective extension program for disseminating information relevant to the needs of small farmers. More specifically, attention was focused on small farmer agricultural production in upland areas of Sierra Leone. On–station research was directed at specific problems identified both through baseline studies and contact with small farmers. On–farm research involved the participation of small farmers who conducted adaptive research trials and extension demonstrations on their farms under the supervision of project extension staff. The ACRE Project aimed to indirectly improve food consumption and, concomitantly, the nutritional status of target farm households by increasing their income as a result of improved crop production. However, in the original design of the ACRE project, food consumption and nutritional considerations were not given explicit attention.

II. Nutrition Component

The idea of a nutrition component within the ACRE Project was conceived in November 1979, with a request from the project director to the USAID Regional Development Support Office for West and Central Africa (REDSO/WCA) in Abidjan, Ivory Coast, for technical assistance to design a nutrition component in collaboration with NUC staff. Some activities involving cooking tests and consumer acceptability of the project's mandated crops were carried out in 1982. Formal implementation of the NC, however, did not occur until mid–1983, with the training of ten nutrition instructors (NI) and the initiation of nutrition extension activities. A chronology for the design and implementation of the NC is summarized in Appendix I.

The main objectives of the NC were:

1. To improve the nutritional status of 20,000 ACRE farm families in the five ACRE Project zones. Special emphasis was to be given to small children, and

pregnant and lactating women.

2. To encourage the production, preservation, storage, and consumption of nutritious foods in rural households.

3. To identify and introduce appropriate labor-saving devices for use by rural women.

4. To train field staff in the use of appropriate, effective methods for the dissemination of information to rural women.

5. To strengthen the NUC Home Economics Department.

The conditions which indicate that the objectives have been achieved are: (a) Nutrition considerations will have been fully integrated into all project activities; (b) food consumption behavior in 20,000 ACRE farm families, especially among young children and mothers, will have improved in both quantity and quality; (c) NUC home economists will be actively involved in food technology research and extension at the college and in the five ACRE Project zones; and (d) nutrition education materials will be effectively utilized by ACRE nutrition extension agents and other field workers in the five project zones.

The strategy of the NC was to complement and reinforce the ACRE Project's agricultural research and extension activities. ACRE nutrition staff were to advise project agricultural researchers and extension specialists on the nutritional aspects of their work and to assist them in achieving a favorable impact on the food consumption and nutritional status of the project's target groups. In addition, ACRE nutrition education materials and improved food technologies were to be shared with community workers in cooperating governmental ministries and private voluntary organizations in Sierra Leone.

III. Nutrition Component Inputs

A. USAID Contribution

Total USAID funding for implementation of NC activities was $200,000 which was allocated as follows: Technical assistance, $104,000; Commodities, $58,000; and Training, $38,000. Each funding allocation is reviewed below.

1. Technical Assistance

a)	Long-term:		
	Nutrition coordinator – 12 pm		$ 80,000
b)	Short-term:		
	(1) League for International Food Education (LIFE) consultant	$ 3,000	
	(2) Senior consultant – 12 days	6,000	
	(3) Other consultants – 12 days	12,000	
	(4) Agriculture course development specialist – 20 days	7,000	
			24,000
	TOTAL		$104,000

Few of the technical assistance positions were filled as planned. The long-term nutrition coordinator, Ms. Susan Lloyd, a Maternal Child Health Advisor at REDSO/WCA, was contracted to oversee implementation of NC activities during two weeks each month over a two-year period. Ms. Lloyd completed four two-week assignments before resigning in March 1984. Reasons cited for her resignation included conflicts with ACRE Project staff as well as Ms. Lloyd's perception that there was insufficient support of the NC by USAID/ Freetown and ACRE Project staff.

Between April 1983 and August 1984, the NC had five short-term technical assistance consultancies. These included the following:

(1) In April 1983, J. Agustin, a food technologist sponsored by the League for International Food Education (LIFE), assessed the existing capabilities within NUC and the ACRE Project to carry out a nutrient analysis of ACRE crops. Dr. Agustin's recommendations included the hiring of a full-time NC coordinator and the integration of a nutrient analysis component in the NC. The latter was never achieved.

(2) In December 1983, G. P. Sevenhuysen reviewed the NC nutrition extension component. Dr. Sevenhuysen recommended that communication be improved between the ACRE Project agricultural extension instructors and nutrition instructors, and that a nutrition consultant be appointed for a six months full-time position.

(3) In August 1984, a three member SULSU evaluation team (M. Hegsted, B. M. McGee and M. Younathan) made the following recommendations: Better cooperation between ACRE Project research and extension staff, improved laboratory facilities at NUC, greater project support for the NC, an upgraded professional training program for the NIs, and a better system for feedback from the NIs in the field to ACRE Project staff in Njala.

2. Training

The proposed allocation of training funds was as follows:

a)	Master's level training in Home Economics (1 person/12 months)	$15,000
b)	Study trips to nutrition programs in other countries (4 trips @ $2,000 each)	8,000
c)	Seminars and short courses (5 persons @ $3,000 each)	$15,000
		$38,000

In actuality, two persons were trained in nutrition during the life of the ACRE Project:

Name	Major	Starting Date	Duration	Degree	Location
Bertha Jackson	Nutrition	Aug. 1981	2 years	Diploma	UK
Elizabeth Kpolie	Home Econ. Education/ Nutrition and Extension	Jan. 1983	2 years	M.S.	LSU/ USA

Upon completion of their studies, Ms. Jackson accepted a position with the Ministry of Health in Freetown, and Mrs. Kpolie returned to her job with the ACRE Project. There is no indication in the NC records that the other training activities were in fact undertaken.

3. Commodities

Approximately $38,000 of the $58,000 budgeted for commodities was spent as planned, namely: 10 motorcycles for the NIs, nutrition reference materials, baby weighing scales, audiovisual equipment, cassette players and tapes, food preparation supplies and a typewriter.

Twenty–thousand dollars allocated for food processing and nutrient analysis equipment and supplies, a Xerox machine, a refrigerator, and a camera/slide projector system were not expended.

While cassette players were purchased under the NC budget, they do not appear to have been used for village nutrition education purposes. The six NIs interviewed during the NC evaluation made no reference to the cassette players nor is there mention of them in the End–of–Project Report.

B. Government of Sierra Leone Contribution

The proposed Government of Sierra Leone (GOSL) contribution to the NC was Le 62,215. The actual contribution was Le 69,055 which was allocated as follows: Personnel, Le 45,605; Field Work/Operating Expenses, Le 14,000, and Training, Le 9,450. Each funding allocation is reviewed below.

1. Personnel

1 Nutritionist (24 pm)	Le 3,600
1 Research Assistant (24 pm)	5,480
10 Nutrition Instructors (8 pm each)	30,000
1 NI Supervisor (18 pm)	5,400
Short–term NUC Home Economics staff (7 pm)	1,125
	Le 45,605

Two nutritionists from the NUC Department of Home Economics were employed on a part–time basis from 1981–1986. There was also occasional input from other NUC home economists.

In 1983, ten NIs were trained to carry out the NC's nutrition extension activities. Nine of them remained with the NC throughout its duration. Two NIs were assigned to each of the five ACRE project regions and each one received a motorcycle for transportation. The NIs were involved in food and nutrition extension activities, either individually or in collaboration with the ACRE Project's agricultural extension instructors (EIs). The number of families with whom they were involved ranged from less than twenty to more than two hundred. The NI's activities included cooking demonstrations, breastfeeding promotion, weaning food preparation, growth monitoring, and oral rehydration therapy for severely malnourished dehydrated children. Other NI functions involved gleaning information from the project's target families on cooking and storage problems with the new crop varieties, and reporting these concerns to project staff in Njala. The NIs often received requests for health services (i.e., immunizations, medicines, etc.) which they could not deliver. They were, however, able to make referrals to health care providers.

One of the main constraints impeding the NIs in their work was the lack of contact with ACRE Project and NC staff at headquarters in Njala. Initially, contact was satisfactory and involved meetings both in Njala and at project sites. However, during at least the last two years of the project, there had not been any monthly retraining and discussion sessions. Furthermore, the NC coordinator had paid few visits to the NIs working in the project's more remote zones. Despite their lack of contact with project staff, some NIs displayed considerable initiative as evidenced in their achievements with the project's target families. On the other hand, other NIs felt that they were unable to make progress in their work due to the lack of guidance from and coordination with project staff at headquarters.

The main reasons cited for this lack of contact between headquarters and the field were frequent petrol shortages, the absence of a full–time NC coordinator, and the NC's relatively low status within the ACRE Project which made it difficult for NC staff to arrange transportation. The NI Supervisor claimed that transport was never available to visit the regions while project administrators indicated that the NI Supervisor was never able to travel when transport was available. Whatever the real facts may have been, the net results were inadequate communication between NC staff in Njala and the NIs in the field, as well as meager accomplishments in some of the NC's field sites.

The NI Supervisor, in effect, served as the NC leader. This position was filled by Mrs. Corneh from mid–1983 until late 1985, during which time the NC program and activities were initiated. During Mrs. Corneh's administration of the NC, Mrs. Elizabeth Kpolie was working on a Master's degree in Home Economics/Nutrition at LSU. Upon her return to Sierra Leone in 1985, Mrs. Kpolie was employed as the NC's Research Assistant and, as such, conducted cooking trials with the project's mandated crops. Subsequently, she was appointed to the NI Supervisor position which she held from late 1985 until late 1986.

2. Field Work/Operating Expenses

NC monitoring costs	Le 2,000
Survey analysis	10,000
Materials retesting and revision	2,000
	Le 14,000

Funds allocated for field work and operating expenses were not always utilized efficiently due to inadequate communication between project headquarters and the field sites. The money allocated for survey analysis was for the purpose of evaluating the impact of the NC on project beneficiaries during its three years of operation. Criticisms arose regarding the way the evaluation was conducted, particularly given the almost complete absence of reliable anthropometric data on the project's intended beneficiaries. These data were to have been compared with the 1978 Sierra Leone Nutrition Survey in order to evaluate the nutritional impact of the ACRE Project.

3. Training

Although training is cited as one of the budget line items, the original draft of the NC evaluation report does not discuss the training component.

IV. Nutrition Component Outputs

The proposed outputs for the NC were the following:

1. Continued crop variety testing and recipe development;
2. Implementation of a nutrition baseline survey and analysis and utilization of survey data to plan future interventions;
3. Implementation of a food consumption monitoring system;
4. Development and utilization of nutrition audiovisual materials;
5. Introduction on a trial basis of select, appropriate food processing technologies;
6. Presentation of two nutrition seminars to ACRE Project staff;
7. Development of short, nutrition-in-service training courses for the project's EIs and agricultural officers;
8. Assessment of the project's nutrient analysis capability and needs;
9. Recruitment, training and placement of NIs in the project's five zones.

Each output is discussed below.

Output 1

Data presented in the NC End-of-Project Report (Kpolie and Green, 1986) are inadequate for drawing conclusions regarding achievement of this output.

Output 2

The nutrition baseline survey did not include the collection of anthropometric data in order to assess nutritional status. Rather, the survey focused on collecting data on household food consumption patterns, food storage, preservation and processing techniques, and existing food beliefs with respect to the project's mandated crops. It appears that the survey data have never been completely analyzed. All in all, the survey did not provide enough data to serve as a baseline for evaluation purposes (DeWalt,

1986). However, it did generate information which has been utilized to address the nutrition concerns of ACRE Project beneficiaries. For example, the project's sweet potato program originated in recognition of a nutrition concern: The presence of a hungry season following rice harvest.

Some anthropometric (i.e., weight) data were collected by NIs. With careful interpretation, these data might be used to assess the NC's impact on the nutritional status of the target population (DeWalt, 1986). This possibility, however, might be unlikely given the general lack of data analysis skills among NC staff.

Output 3

As originally planned, the baseline survey was to have provided information for project monitoring purposes and for the assessment of project impact on food consumption behavior. In addition, appropriate nutritional status measures (i.e., arm circumference or weight for age) were to have been identified and utilized. Data were to have been analyzed and disseminated biannually to ACRE Project staff for their information and action.

The baseline survey data were never fully analyzed. As a result, the proposed monitoring system was not implemented. Nevertheless, information on the qualitative aspects of food consumption patterns among project beneficiaries was periodically communicated to project staff.

Output 4

Cassette recorders were purchased for the development of multilingual nutrition education materials. Some materials were prepared, but they were not field-tested. All in all, a significant amount of nutrition education occurred, but the beneficiaries were limited to those individuals and small groups who were contacted directly by the NIs.

Output 5

The NC, in collaboration with NUC's Department of Agricultural Engineering, carried out some activities to select and promote appropriate technologies in solar cooking, corn shelling and rice parboiling. It appears that these activities were not completed nor were any final reports prepared.

Output 6

Funds had been allocated for two nutrition seminars for ACRE Project staff. These, however, did not take place. Nevertheless, many of the same desired results may well have occurred anyway as evidenced by the present integration of nutritional considerations in the agricultural development planning process.

Output 7

Short nutrition in-service training courses were also to have been developed and offered to the project's EIs and agricultural officers. The purpose of these courses was to incorporate nutritional information and considerations into the field of agricultural extension. While this was probably achieved to some degree, the proposed courses themselves did not materialize.

Output 8

This output was achieved. A food technologist sponsored by the League for International Food Education (LIFE) spent two weeks in Njala assessing the project's nutrient analysis capability and needs. The consultant made several recommendations for developing a food analysis capability. The estimated capital and recurring costs for a nutrient analysis lab were as follows (in $U.S., 1983):

A. Fixed Costs

-- Building space	$ 34,220
-- Lab furniture	10,000
-- Equipment	141,700
-- Training in U.S.	5,000
Total	$190,920

B. Recurring Costs (exclusive of power and maintenance)

-- Supplies	$ 10,000
-- Four technicians	7,000
-- Travel	3,000
-- Books and journals	1,000
-- Miscellaneous	5,000
Total	$ 26,000

Total cost (first year of operation)	$216,920

A nutrient analysis facility at NUC, as recommended by the LIFE consultant, was never developed. Facilities to undertake nutrient analysis are nonexistent in the NUC Department of Home Economics. However, the ACRE Project's soil-testing laboratory is equipped to do protein and mineral analysis.

Some would argue that a nutrient analysis capability is required for some aspects of adaptive research. Such a capability is desirable not only in its own right, but also to give a scientific basis to nutritional research.

Output 9

This output was by and large achieved. Two female nutrition instructors were trained and deployed to each of the five project zones. At the time of the evaluation, nine of the ten NIs were still working with the project. Six of them were interviewed during the evaluation.

DeWalt (1986) gives an illustrative example of the work of one NI in the Kenema zone. While the evaluation team was unable to visit this zone, the situation as described by DeWalt appears quite similar to that of the NIs in the four other project zones. All of them were faced with similar problems and difficulties, namely lack of contact with project staff at headquarters in Njala, transportation problems, difficulty of ensuring continuous compliance, and certain expectations regarding food and/or medicines. Their main outreach activities involved carrying out food demonstrations and collecting information on farmers' problems with the newly introduced high-yielding varieties of sweet potatoes and cassava, among other crops.

The NI's efforts at anthropometric data collection and growth monitoring were less satisfactory. The NIs were not adequately trained to measure children accurately and growth monitoring records were not always completed properly.

V. End of Project Status

As stated earlier, one of the main purposes of the NC was to improve the nutritional status of farm families in the ACRE Project's target zones. Overall this has probably been achieved as evidenced, for example, in the widespread use of new sweet potato varieties and the subsequent reduction in the hungry season. Additional examples of improved nutritional status are available from the end-of-project survey (Kpolie and Green, 1986). This survey was carried out in the five ACRE Project target zones where the NC was implemented. Pregnant and lactating women from 423 households were interviewed about their children under five years of age. Half the households were project target families. The other half were families from villages that had no contact with project NIs. These families formed a control group. A survey questionnaire was designed to obtain information on demographic variables, food consumption patterns, child health, methods of food preparation, processing, preservation and storage, and the farm families' perception of the ACRE Project. Very little information was collected on nutritional status. Although the survey collected large amounts of data, there was little statistical analysis of the findings.

According to the Kpolie and Green report, the survey data clearly suggest that NC activities were effective in changing the dietary practices of the project's target mothers and their children. Due to the increased production of the project's mandated crops, more food was available for home consumption and, as well, for preparation and processing in the variety of ways suggested by the NIs. As a result of the NC's activities, more women fed their children cereals, vegetables, protein and oil. They also had better knowledge of the functions of food in the body. More of the project's target women gave their children supplementary food than did women in the control group. The target women also used fish and beans in the preparation of weaning foods in addition to rice and sweet potato as the carbohydrate base. Target women also benefitted from the NC by developing new skills for the preparation of weaning foods and oral rehydration solutions. The data also revealed that target women followed the NC's recommended health and sanitation procedures and used the labor-saving devices introduced by the project. Due to limited data analysis, little can be said regarding the health and nutritional status of the project's target children. However, the data suggest that more target children were immunized and received better treatment for diarrheal diseases than did control children. Also, there was a lower mortality rate among target children.

Considerable interaction occurred between the NUC Home Economics Department and the ACRE Project's NC. Two members of the department, Mrs. Dahniya and Mrs. Smith, were involved throughout the life of the project as part-time NC staff members. Mrs. Gbani was also involved during some phases of the NC's activities. Two members of the Home Economics Department were full members of the ACRE Nutrition Advisory Committee. Mrs. Kpolie, also from the same department, was sponsored by the ACRE Project to receive Master's level training in nutrition at LSU. Upon her return to Njala she served as the project's nutrition specialist and was co-author of the NC report. Members of the Home Economics Department developed recipes using the project's mandated crops. They also collaborated in NC activities involving appropriate technologies and labor-saving devices for food preservation and storage. All of these interactions with the ACRE Project's NC helped to strengthen the NUC Home Economics Department. Nevertheless, on the whole, the department's nutrition program remains

weak.

Educational materials were to have been developed collaboratively by the NC and NUC Home Economics Department. This activity, however, never reached the field-testing stage.

VI. Conclusions

The main conclusions drawn from the evaluation of the ACRE Project's NC include the following:

1) Full-time, qualified leadership and adequate staff training are necessary in order to fully achieve project objectives.

2) Food consumption and nutrition objectives and interventions should be integrated into a project from the very beginning.

3) Project objectives must be measurable in order to assess a project's impact on the nutritional status of its target beneficiaries.

4) The relatively poor performance of the NC was due to the lack of full-time leadership and, consequently, the NC's inability to receive a status equivalent to the ACRE Project's agricultural extension component.

5) As a result of the NC's activities, women's extension activities and women working with men were accepted, access to women farmers improved, women's opinions were sought out and incorporated into the decision-making process, and a health and nutrition information service was established.

6) Since a properly designed anthropometric survey of children was not carried out, it is not possible to prove that there was an improvement in the nutritional status of target families' children. Nevertheless, such an improvement is assumed in light of the widespread adoption of new crop varieties and the generally greater availability of food.

7) The NUC Home Economics Nutrition program is very weak. Significant improvement is needed in staff development, training, equipment, and facilities before the program will be able to seriously address Sierra Leone's nutrition problems.

8) The ACRE Project's NC staff have benefitted directly from participation in the project. Their professional skills have been enhanced through short- and long-term training, collaboration with nutrition and food science specialists, and from financial and resource support for their research and extension activities.

9) The actual number of NC beneficiaries is probably less than 5,000 families since there were only 9 NIs to carry out the NC activities compared to 45 agricultural extension instructors (EIs). The number of women reached by each NI ranged from 10 to about 200. In all probability less than 500 families were actively involved with the NC although many more may have attended the cooking demonstrations. On the other hand, given the widespread adoption of new sweet potato varieties throughout the country, which helped to reduce the negative impact of the hungry season, many non-target families must also be

regarded as beneficiaries of the project's nutrition component.

VII. Recommendations

The following recommendations are offered to help improve the impact of agricultural projects on the consumption and nutritional status of project beneficiaries:

1) Measureable consumption/nutrition objectives should be identified and integrated into an agricultural project from its inception in order to assess a project's nutritional impact on target beneficiaries. Anthropometric measurements and food consumption frequency data should be included in data collection efforts.

2) There should be a greater degree of overlap in the training of NIs and EIs in order to strengthen the linkage between agriculture, health and the role of women.

3) PhD level training in the U.S. should be provided for a Sierra Leonean national in order to assure qualified leadership of the project's nutrition component.

4) Consideration should be given to the involvement of Peace Corps volunteers, who are trained in nutrition, in the project's nutrition activities.

5) The establishment of a nutrient analysis facility is essential in order for sound nutrition/food science research activities to be carried out in Sierra Leone. NUC should seek donors to support a nutrient analysis laboratory for the various NUC activities concerned with food science, agriculture and nutrition. Some collaboration with the existing soils analysis laboratory might help to avoid duplication of equipment.

6) Morley growth charts, wherein a child's actual weight is plotted against desired weight gain, may be more satisfactory for growth monitoring purposes than the one presently used. The latter entails calculation of the percentage of standard weight gain. In addition, for accurate anthropometric data collection, a child's weight, length/height, and age should be determined by the nutrition supervisor with the assistance of an NI. This will better ensure the accuracy of the data for subsequent analysis and comparison.

7) The NC end-of-project survey should be reevaluated with the help of a statistician in order to better ensure that the conclusions drawn are indeed valid.

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