

*D-111-601 ISN-1112*

REGULAR EVALUATION  SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING		7. PERIOD COVERED BY EVALUATION	
A. First PRO-AG or Equivalent FY <u>78</u>	B. Final Obligation Expected FY <u>81</u>	C. Final Inout Delivery FY <u>82</u>	A. Total	\$ <u>1,002</u>	From (month/yr.)	<u>October 1979</u>
			B. U.S.	\$ <u>515</u>	To (month/yr.)	<u>October 1981</u>
					Date of Evaluation Review	

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., sirgram, SPAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETE
1. To conduct cost audit of the production of the CEREX product.	USAID & GPC	April 30,
2. Evaluation of the alternative formulation of the CEREX product using indigenous commodities.	USAID & GPC	April 30,
3. Initiation of program for free distribution of CEREX through MCH clinics.	MOH/GPC	March 31,
4. Deposit of proceeds from sale of CEREX for 1980/81 into Agricultural Commodity Development Account.	GPC	March 31,

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9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS			10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT	
<input type="checkbox"/> Project Paper	<input type="checkbox"/> Implementation Plan e.g., CPI Network	<input type="checkbox"/> Other (Specify) _____	A. <input checked="" type="checkbox"/> Continue Project Without Change	
<input type="checkbox"/> Financial Plan	<input type="checkbox"/> PIO/T	_____	B. <input type="checkbox"/> Change Project Design and/or	
<input type="checkbox"/> Logical Framework	<input type="checkbox"/> PIO/C	<input type="checkbox"/> Other (Specify) _____	<input type="checkbox"/> Change Implementation Plan	
<input type="checkbox"/> Project Agreement	<input type="checkbox"/> PIO/P	_____	C. <input type="checkbox"/> Discontinue Project	

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER BANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)		12. Mission/AID/W Office Director Approval	
Sandra Callier, Consultant	Lorna McPherson, MOH	Signature	<i>David A. Cohen</i>
A. A. Ackels, Consultant	Dr. Cudrit Naraine, MOH	Typed Name	David A. Cohen
Dr. Leslie Chin, GPC	Dr. Linda Lion, USAID/G	Acting Director, USAID/Guy	
Beverly Harper, GPC	Sam Dowding, USAID/G	Date	March 5, 1982
Jagat Persaud, GPC			

AID PROJECT NO. 504-0073 / 17  
"WEANING FOOD DEVELOPMENT"

AN ASSESSMENT OF PROGRESS  
TO DATE

September 28 - October 9, 1981  
Georgetown, Guyana

Sandra Callier  
New Trans Century  
Foundation

I. Introduction, Summary Conclusion  
and Recommendations

A. Introduction

The report is intended to be read in conjunction with a report submitted separately by Mr. Alden Ackles. The author and Mr. Ackles, under separate contracts with USDA, served as a consultant team to undertake an interim evaluation of AID Project No. 504-0073, "Weaning Food Development" in Guyana. Mr. Ackles includes a brief section on background and content of the Project Agreement so it will not be repeated here.

This report will primarily address the question of whether and to what extent the distribution of the weaning food is reaching the intended target consumers, namely, malnourished children under age two (and as a secondary objective, up to age 5) throughout Guyana.

In addressing that crucial question, an analysis will be made of current operations and plans for both commercial distribution and free distribution through MCH clinics, especially within the context of expectations related to the current AID project (representing Phase I) and a possible follow-on project (Phase II).

The scope of work for this assignment anticipated that results of a consumer survey carried out in June/July, 1981 would be available for analysis and interpretation. Upon the author's arrival in Georgetown, however, it became evident that programming complications and other delays would

(2) how Cerex is prepared and consumed (bottle vs. spoon-fed:

thickness or calorie density, frequency of feedings, etc.)?

- . What is the total cost of the program and the cost per malnourished child whose diet (and/or nutrition status) improves. (i.e. both the magnitude of costs and cost effectiveness need to be taken into account.)

Free distribution of Cerex through clinics is not yet underway.

Resolution of a payment dispute between GPC and MOH is cited as the major reason for delay. Brief consultations with those involved in the program and visits to a few selected clinics, however, also revealed both potential design and operational difficulties. While the decision to start at a pilot rather than national level is a good one, the pilot program needs to be well designed so as to answer questions about the effectiveness of the food distribution. Criteria for participation need to be well defined and reasonable. Clinic personnel need adequate orientation and supervision (in turn requiring personnel, transportation and other resources); an adequate logistical system for moving, storing and distributing food and for record-keeping must be in place. Many of these problems (discussed in the body of this report) are recognized by the MOH Cerex Director, but she is frustrated at having neither the power (especially resources) to act nor success in focussing the attention of MOH authorities on these issues.

The MOH needs information about recurrent future costs of the program (the current price of G\$ 0.38/per 1/2 lb package bears an unknown relation to actual cost) as well as effectiveness (which could be estimated based on a well-designed pilot program) in order to make a wise decision concerning the long term feasibility of the program.

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Cerex in the market place is currently viable and should remain so as long as its price advantage continues and available substitutes remain restricted. Changing either or both of these conditions may well result in a decline in Cerex demand. (A brief comparison of prices of available substitutes suggests that demand is elastic.

The economic viability of Cerex is unknown until the costs are adequately identified. Cerex may be low-priced but the more important question for the longrun is whether it is truly low-cost. Given the current pressures on the Guyanese economy, a Cerex program dependent on a hefty GOG subsidy forces a much more problematic future.

Alternatively, if Cerex were sold at a price to recover costs, that price may put it beyond the reach of the nutritionally needy; even though demand remained adequate, the composition of that demand may well change as the price increased, further eroding positive nutritional consequences of the program. On the other hand, if commercial demand were adequate at a price which permitted recovery of costs and a margin to cover a subsidized distribution to the nutritionally needy (e.g. through the MCH program) then the program offers promise. This assumes, of course, an effective MCH, large enough to cover the needy target population.

### C. Recommendations

#### Overall

1. Priority should be given by AID and GOG to accurate identification of the production costs of Cerex. This information is crucial for planning future strategy, including the important decision about a Phase II. General economic viability of Cerex production, commercial pricing policy and the feasibility of the MCH distribution program all depend on this crucial, currently missing, data.

In addition, the "special fund" based on Cerex profits for financing

nutrition education, promotion, storage improvements in clinics, etc. will be inoperable until the cost issue is resolved. (The evaluation plan defined in the PP requires assessing the price of Cerex relative to production costs as well as substitute foods).

2. The Cerex program should be judged not only according to the primarily nutrition objectives identified by the AID Project Paper but also other criteria of current objectives are somewhat changed from the original ones. For example, Cerex may not prove cost effective as a nutrition improvement mechanism but it may have importance to GOG for other reasons, for example, as a subsidy to a certain segment of the population and/or as an import substitution policy. The latter should not, however, be confused as nutrition objectives. Cerex contribution to alternative objectives should be judged separately. Similarly, alternative means to reach the nutrition objectives, if these remain valid, should be explored.
3. An "all or nothing" decision on Phase II may not be the most appropriate. Even if USAID cannot agree to continued support (based on nutrition or other objectives), the future utility of USAID/GOG investments already made should not be ignored. A lesser alternative to the Phase II plan may still enable GOG to make use of equipment and other inputs provided in Phase I whereas an abrupt shut-off might not. Consideration of a range of alternatives, rather than a simple yes or no on Phase II, is encouraged.
4. USAID/Guyana should look into further assistance to GOG, if and as requested for:
  - (A) An investigation to supplement the consumer survey results which would identify and test future educational/promotional

Cerex preparation and feeding.

- (B) Design and evaluation of the MCH distribution such that it fulfills the purpose of pilot testing the effectiveness in terms of impact as well as operational criteria.

To provide for such technical request assistance, the Mission might request it through centrally funded contracts with the Office of Nutrition in Washington.

#### Commercial Cerex Distribution

1. In addition to a thorough analysis of information from the Cerex consumer survey, supplementary information needs to be collected and analyzed to better quantify Cerex's role as an increment to the weaning child's diet; how is Cerex currently being prepared and fed? how can mothers be persuaded to prepare Cerex correctly, feed it frequently and in adequate quantities? This kind of analysis is needed to inform planning of future promotional/educational messages and requires in-depth exchanges with a small number of mothers to identify and actually test messages.
2. A increase in the selling price of Cerex should be allowed fairly soon so that its effects can be monitored prior to a decision on Phase II. It is almost certain that such an increase is needed if GPC is to recover production costs (even aside from raw materials costs). Given Cerex's low price relative to substitute products, demand is almost certainly distorted. It is important to identify demand for Cerex at a more competitive price level. However, the price increase may negatively affect composition if not volume, of demand to the disfavor of low income malnourished children. This is equally important to identify given the project's nutrition goals.

Only if MCH distribution actually offsets this negative effect,

would such a change in demand be acceptable.

3. The strategy for future commercial Cerex distribution should reflect (or combine) one of the following two possible scenarios if nutrition impact and long term economic viability are to result:
  - (A) The price of Cerex and the availability should result in accessibility to low income households with malnourished children such that an adequate amount can be purchased and fed to the malnourished child resulting in an improved diet and nutrition status OR
  - (B) The return from Cerex sales (based on adequate volume and price) is such as to subsidize free distribution through MCH clinics in quantities adequate to reach the malnourished target group of children under age 2.
4. Obviously, specific marketing/promotion decisions should be based on whether (A) or (B) or some combination is the chosen strategy. In either case, however, it is desirable to incorporate educational messages on adequate weaning feeding habits.
5. The Cerex program has intentionally been more than simply marketing a new product; it has also served as a vehicle to encourage positive changes in weaning habits by prolonged breastfeeding, spoonfeeding instead of bottlefeeding; appropriate age of supplementation, adequate caloric density of supplements, the need for frequent, smaller meals, etc.). Behavioral changes in line with these educational messages should be monitored and the Cerex program credited as appropriate for contributing to these changes, which apart from Cerex consumption, represent significant contribution to improve child nutrition.

6. To supplement currently inadequate data on geographic distribution of Cerex sales, some kind of survey of customers at GPC and other wholesalers should be undertaken and repeated periodically to estimate geographic coverage. Known problem areas, identified by the survey or other means should be especially monitored (Linden, E. Berbice and Essequibo). Alternative distribution means, such as the travelling Cerex salesperson idea of Marketing Dept. personnel should be explored and tested.
  
7. If Cerex commercial sales are (directly or indirectly through subsidizing an MCH program) to lead to improved child nutrition, some advertising of the product should be renewed, emphasizing its value for small children, the importance and "how to" of adequate preparation and feeding. Information from the survey will provide guidelines about which media are likely to be most effective and which population group should be targetted. However, further information as discussed in No. 1 and in the body of this report, is also needed to formulate effective messages. One particular point of concern is the extent to which Cerex is viewed and used as an infant formula.

#### MCH Program

1. While launching a pilot effort, long term, especially recurrent cost implications of the program should be realistically assessed. These include the actual costs (not selling price) of Cerex to GOG with and without USAID Phase II import and costs of additional personnel and material inputs based on a realistic plan.
  
2. The size of the current pilot program should be reconsidered; it is too large for the very limited personnel and material resources currently available to the program. To serve as a "pilot", the

effectiveness of the program needs to be carefully monitored and operational systems tested and modified as necessary.

3. If the cost of Cerex distribution in MCH clinics appears very high and/or its potential effectiveness limited, the MOH may well wish to consider additional or alternative means for improving the nutrition status of weaning aged children such as promoting home prepared weaning supplements geared to particular food habits and beliefs of ethnic or other groups. (Distributing food in clinics may well be undertaken for other than nutrition goals, such as income-transfer; here it is assumed, however, that improved health and nutrition is the primary goal.)
4. The objective of "improved clinic attendance" should be clarified. Available statistics indicates a high percentage of children under 2 are seen at least once per year in the clinics. (30,000 in 1979 of a total under age 2 population of under 50,000). More frequent visits may be an important objective. However, clinic staff and material resources must be adequate to handle an increased patient load. If the quality of services deteriorates, the program may be counter-productive.
5. Food distribution is more likely to be effective when it is integrated with other MCH services. Growth monitoring is particularly important preventive measures such as vaccinations and diarrhea prevention/treatment are among important complementary measures. (The relative importance of diarrhea and other infections compared to consumption inadequacies as causal factors of weaning age malnutrition in Guyana could not be explored in this brief visit but it is urged that these

factors be assessed and appropriately addressed by the MCH package of services accompanying Cerex distribution). Caution is urged to MOH officials that an integrated approach not be sacrificed to facilitate the logistics of food distribution or the effectiveness of the latter will be seriously affected.

6. Appropriate educational messages on weaning nutrition, food preparation, etc., is required along with provision of a food supplement if nutritional improvement is expected. No preparation, other than continuing individual advice from clinic staff is currently planned. Reenforcement of the education component of the Cerex clinic program is recommended, probably including mass media, clinic demonstrations and inter-personal communication.

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8. Program logistics, especially transportation and clinic-level storage should be adequately planned for before launching the program. Program continuity is essential if any impact is to be measured: irregular supplies, damaged products, overburdened clinic personnel, and/or disillusioned participants can all seriously affect the program's effectiveness.

9. Effective monitoring and evaluation requires more than simple inventories of commodity movements and growth monitoring. (Appreciable changes in nutrition status are probably an overly ambitious expectation although very important to monitor). For at least a small sample of participants, baseline data on current consumption (especially of Cerex) should be obtained and measured against changes once participation in the program begins. This is the only way to determine whether and how much (1) intra-family sharing takes place and (2)

donated Cerex replaces Cerex or other foods previously purchased.

Either of these two factors can significantly erode program effectiveness and should be accounted for in future revision of program criteria

-eg increased ration size and/or emphasis on educational component.

I. Commercial Distribution  
and Marketing of Cerex

A. Product and Market Tests:

Tests of Cerex in terms of product acceptability, its effectiveness as a nutritional supplement and its market-place acceptability were completed by June, 1979, which coincides with the schedule identified in the Project Agreement. These are reported on extensively in earlier reports, notably in trip reports by marketing consultant, John Nichols, TMRU in Jamaica and GPC's reports especially "Commercial Cerex Consumer Acceptance Test: Analysis of Principal Findings". Tests indicated a positive reception for the product and provided information for the design of a marketing plan.

B. The Cerex Launch:

In hindsight, it is easy to recognize that Cerex was launched prematurely; production problems emerged and persisted following market introduction in mid 1980 and supplies were very irregular until early 1981. Promotion efforts were concentrated to coincide with the launch. These included an emphasis on messages about Cerex' nutritional value and proper use, stressing who the product was intended for, etc. Distribution arrangements emphasized directing as much

as possible of the product outside Georgetown where mal-nutrition levels are much higher.

Promotion included direct advertising by radio and newspapers, posters and display boxes for retail stores and merchandisers who visited stores and clinics giving Cerex demonstrations.

Immediate sales were high; some 264,000 packets were sold in the first month. Obviously, a significant number of consumers were persuaded to try Cerex. However, supply problems obviated prospects for establishing sustained consumer use. Promotion and merchandising efforts were discontinued given supply problems. These unfortunately were never resumed even after the establishment of an adequate production pattern. There has been no advertising of the product since January.

#### 1. Current Sales

Production has been increasing fairly steadily since 1981, with sales generally keeping pace. There has been some worry of a demand "slump"; monthly sales have not yet reached the level of the first month. Current demand, however, appears adequate to move a production level of 820 MT per year (based on the past three months performance). This nearly meets the expectations put forth by the AID project for full production during Phase I.

#### 2. Geographic Distribution

monthly sales reports by wholesale/retail and regional classifications. Since June, GPC has operated its own wholesale outlet in Georgetown which handles up to 60% <sup>1/</sup> of current sales to retailer. Most other large wholesalers are also based in Georgetown, therefore, the geographic sales data does not adequately reflect actual retail distribution across the country. (The monthly figures also gloss over the not infrequent days out of stock which may negatively affect total wholesale and retail purchases). During the author's visit, an attempt was made to assess the geographic distribution by the 7 large wholesalers (including GPC) whose purchases represent 86% of total Cerex sales. This proved impossible since wholesalers do not keep such records. However visits to retailers on the East Bank and wholesalers' guesstimated indicate that a significant part of the sales to Georgetown are to retailers who come in from other regions (40 - 60% of Georgetown sales by the 7 largest wholesalers are estimated to go to out of town retailers).

The attached chart on geographic sales should be viewed with these limitations in mind. Since such data is not proving very practical for market analysis, an alternative suggestion is to monitor or spot-survey retailers at the seven large wholesalers as well as GPC's wholesale outlet to assess the geographic distribution of buyers. Baseline data can be collected during the coming 2 - 3 months with later spot surveys to assess changes over time. More effective use might also be made of GPC's sales staff. However, these number only 12 to cover all GPC products nationwide.

In addition to distribution by wholesalers, through

Table 2 II.1

RESIDENTIAL SALES OF GRENADA - JUNE 1980 - MARCH 1981

	1. North West Dist.	2. St. George West Dem.	3. East Coast Dem. P.C. Berbice, East Bank Dem.	4. Corntyne East Berbice	5. Bartica Mazaruni Potaro	6. Rupununi	7. George town	8. Linden	9. New Amst.
'80	1,600	38,240	37,760	4,000	-	-	157,465	<del>12,000</del> 12,800	13,200
	500	240	8,574	16,000	-	-	24,339	-	-
	-	3,600	12,400	-	1,200	-	23,475	-	9
	-	22,480	22,880	880	2,000	-	75,745	4,000	17,920
	2,000	30,480	10,160	4,560	5,000	-	22,809	6,200	2,800
	-	14,240	8,800	400	-	400	34,496	10,880	5,200
	800	14,720	18,160	-	-	-	62,907	-	-
'81	80	23,040	7,520	-	-	-	58,386 <sup>86</sup>	2,400	13,280
	2,160	14,160	11,040	-	1,520	-	54,886	4,640	13,600
	-	12,320	6,320	4,000	-	-	87,790	4,240	8,000
JUN	6,000	20,000	12,480	-	-	-	104,420	-	-
JUL	-	26,560	4,800	8,000	-	-	113,704	12,000	800
AUG	-	12,400	20,400	-	-	-	233,360	-	8800
SEP	-	34,300	25,100	-	-	-	80,908	-	2,000
OCT	7,500	15,000	10,000	-	-	-	186,100	-	-
TOTAL	20,940	291,280	215,594	37,840	9,720	400	1,220,850	56,320	8560
TOTAL	10	13.9	10.6	1.2	0.5	0.02	10.1	2.8	4.2

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Table I.1

REGIONAL SALES OF GOREX - JUNE 1980 - MARCH 1981

1.	2.	3.	4.	5.	6.	7.	8.	9.	
North West Dist.	Essequibo West Dem.	East Coast Dem. W.C. Berbice, East Bank Dem.	Corentyne East Berbice	Bartica Mazaruni Potaro	Rupunni	Georgetown	Linden	New Amst.	
1,600	38,240	37,760	4,000	-	-	157465	<del>12,000</del> 12,800	13,200	
800	240	8,574	16,000	-	-	24339	-	-	
-	3,600	12,400	-	1,200	-	23475	-	9	
-	22,480	22,850	880	2,000	-	75745	4,000	17,920	
2,000	30,480	10,160	4,560	5,000	-	22809	6,200	2,800	
-	14,240	8,800	400	-	400	34496	10,880	5,200	
800	14,720	18,160	-	-	-	62907	-	-	
80	23,040	7,520	-	-	-	<sup>86</sup> 58386	2,400	13,280	
2,160	14,160	11,040	-	1,520	-	54886	4,640	13,600	
-	12,320	6,320	4,800	-	-	87790	4,240	8,000	
6,000	20,000	12,480	-	-	-	104,480	-	-	10
-	26,560	4,000	8,000	-	-	113,704	12,000	900	15
-	12,400	20,400	-	-	-	233,360	-	9800	27
-	34,300	25,100	-	-	-	80,908	-	2,000	14
7,500	15,000	10,000	-	-	-	186,100	-	-	21
20,940	271,280	215,594	37,240	9720	400	1,320,850	51,360	85609	20
10	13.9	10.6	1.9	0.5	0.02	65.1	2.8	4.2	10

their own outlets outside Georgetown, many out of town retailers come into Georgetown for stock including Cerex. They generally purchase Cerex from a wholesaler who also supplies several other goods. Delivery by wholesalers is not the rule and GPC's wholesale division delivers only a very small percentage of its goods, little of that outside Georgetown.

There is evidence from travelling sales personnel of GPC, as well as anecdotal sources, that Cerex is reaching a high percentage of the estimated 700 retailers throughout Guyana. However, the quantity and regularity of supply are difficult to ascertain. Preliminary survey confirm the need to enhance marketing efforts in the interior, particularly East Berbice, Essequibo and Linden; Rupununi and remote areas are not being served at all. The Marketing Department feels it could make effective use of a sale person and vehicle specifically for Cerex sales and promotion outside the capital. An issue raised earlier concerning adequate profit margins for distributors and retailers appears a non-issue given that retail prices up to 75¢ a packet are reported; since the price of Cerex is a recommended, not controlled (i.e. no penalty for non-compliance), some "over" compensation is evident. Current margins are already in the 15% range identified as desirable in informal interviews with retailers.

### 3. Sales by Ethnic and Income Groups

Information on Cerex sales and use by these classifications will be available once data from the recent Consumer Survey is analyzed. There is some evidence from earlier, less formal soundings that Africans are more likely than East Indians to use the product. Because of price and lack of alternatives, all income groups probably use Cerex to some extent.

### C. The Consumer Survey

As contemplated by the Project, preparations were made to conduct a consumer survey once Cerex's availability was stable enough over a seven month period to reasonably assess market penetration and consumer reactions.

The primary objective of the survey was to estimate the progress to date in reaching the target population; specifically these questions were addressed:

- (1) What proportion of children under 5 years of age uses Cerex frequently?
- (2) Of those who use Cerex frequently, what proportion uses it properly?
- (3) What socio-economic, ethnic, cultural, age or other factors influence Cerex purchase or use?

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The survey also addressed what was perceived as a demand slump, assessing Cerex availability, product image, and other marketing issues (e.g. package type and size, shelf life, etc.). US\$15,000 was added to the AID Grant to cover survey costs.

The survey was carried out during June 1981, among a stratified, representative sample of Guyanese household having at least one child under age 5. A description of the survey ~~plan~~ and questionnaire are amended to this report. Once complete, the survey questionnaires were coded and edited; GPC's computer department was charged with data processing. The latter has proved more time-consuming than originally planned. Consequently only very partial and preliminary results

## 2. The Survey's Limitations

As a result, the author's own contribution has been to assist in refining plans for analysis, assessing what information will and won't be available from the survey itself <sup>1/</sup> and identifying measures to collect and analyze other information needed for future marketing plans.

Of particular importance, is information on the price elasticity of demand: how much will demand be decreased and among which groups as the price is raised (which it almost surely must be if the subsidy burden for GOG is not to be intolerable)? Will a more costly product affect how the product is used, how often, what quantity, how dilute? The survey itself will provide only minimal information on this point. Additional analysis (begun here, in the next section of this report) is needed to investigate the current and proposed price in the context of available income, food expenditures and the market for substitute products.

A second important area which survey results will only partially inform concerns how to improve proper use of Cerex; that is, as a special food for young children, prepared and fed in an appropriate quantity (as a porridge) and frequency, so that it represents a substantial contribution to the weaning diet.

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Survey results will quantify who is using the product, in what form and with what frequency. Such information is obviously essential, however since it is already

believed that a significant amount is consumed by other than small children and that the manner of use for the latter is inadequate, what is really required is a more in-depth in-probe into "why" and whether/how current practices can be altered. (A price increase may add positive or negative effects on both--e.g. at a higher price, the food may be used selectively for the intended age group, but diluted more than recommended). Such information collection can build on the results of a sample survey through applying techniques borrowed from anthropologists and social marketers. For example, a "formative evaluation" process might be applied among a very small sample of households to test new messages with mothers, exploring any usage problems in depth, and obtaining a precise picture of child feeding practices. (The formative evaluation process is one in which not only is information gathered but proposed behavior changes are suggested and tested for their appropriateness through a series of interviews.

### 3. The Results to Date

Preliminary survey data show that 66.1% of children under 5 consume Cerex. Children under 5 represent 47.8% of total Cerex consumers and children under age 2, 18.7%.

Among children under age 2 who consume Cerex everyday, 70% have three servings per day, 18% two and 12% one. Correlating correct use of the children consuming Cerex daily appear to be eating enough for it to represent a significant part of their diet. Among households who are regular users, over half purchase two or less packets per person per fortnight (2 weeks).

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The survey did not quantify amounts consumed by adults and older children, but it does indicate that these groups eat Cerex once a day or less. Among the survey population, adults and older children are less likely to be Cerex consumers: 14.7% of adults and 37.3% of children under age 5.

74.3% of the households surveyed have tried Cerex. (6.6% did not know the product); 84.8% of these purchased it a second time; 45.9% of the Cerex survey population are current users.

The major reason for not trying Cerex is preference for another product (43%); another was the view that the child was too old (14%). Why another product is preferred was not probed during the survey but information will be available on which products are used instead.

Major reasons for disliking the product or discontinuing its use include "child did not like", "child too old" and "did not know". Such answers are only minimally useful in determining what product or promotional changes are appropriate. A more in-depth probing is needed to come up with useful, "actionable" information.

Information was also obtained on current, feeding habits for weaning age children and will be analyzed by ethnic regional and other categories as well as Cerex users/non-users

This information will be supplemented in the near

out in 1980 in collaboration with the Caribbean Food and Nutrition Institute.

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### C. The Price Issues

The current selling price of Cerex, G\$0.50 per 1/2 lb. packet, is not based on production costs. The latter have not yet been accurately calculated and raw material costs, given USG and GOG donations, have been given only cursory analysis in calculations to date.

In looking beyond Phase I, it is essential to have an accurate accounting of costs to identify a meaningful price policy (that is, at what selling price, will costs be covered? To what extent is GOG able/willing to subsidize production in order to reduce selling price and/or alternatively, at what price (and what volume) would commercial sales produce sufficient revenue to subsidize MCH distribution?

If we accept the 2 ounce/day/child ration as a significant supplement, this presently requires a daily expenditure of G\$0.125 (\$0.87 per week and \$45.50 per year). The significance of this cost obviously depends on family income and current food expenditures. (The Cerex purchase should be considered an additional expenditure if it is, in fact, a supplement, not simply a replacement for other foods).

As in many countries, reliable income and expenditure data is difficult to come by. The Cerex consumer survey (which only includes households with children under age five) will identify <sup>the</sup> percentage of families with incomes less than

G\$500 per month, G\$500 - 1,000 and over G\$1,000. For the lowest income group, the yearly cost of a Cerex supplement for the average 1.6 children under 5 per household, represents 1.2% of their maximum income (i.e. those with \$500/month incomes). Among households reporting the lowest food expenditures, (estimated as G\$45 per week)<sup>1/</sup> the weekly expenditure for 1.6 Cerex portions represents 3% of their food expenditures.

Cerex is undoubtedly a bargain and recognized as such; nevertheless, the required expenditure for Cerex as a supplement is not inconsequential for low income households. High inflation rates (currently 30% per year) exacerbate the problem, even though the price of Cerex has not been increased.

Cerex is intended not only to be inexpensive, but a bargain in nutritional terms. Its cost per energy and protein supplies compares very favorably with alternatives products. The following table illustrates this comparison.

<sup>1/</sup> G\$45 is reported by the survey director as the lowest value reported for weekly food expenditures. The data has not yet been analyzed to establish ranges or to factors in household size.

COST/NUTRIENT COMPARISON OF CEREX AND SUBSTITUTE PRODUCTS

	Price/lb	Price/100g	Cal/100g	Protein/100g	Price/100 Cal	Price/g Protein
Cerex	1.00	0.22	387	17.0	0.06	0.01
Plantain Flour	2.40 <sup>a)</sup>	0.53	305	2.8	0.17	0.19
Plantain/Wheat Flour <sup>b)</sup>	2.15	0.47	335	7.8	0.14	0.06
Wheat Flour	0.65	0.14	364	10.9	0.04	0.01
Cornmeal	2.00	0.44	364	7.9	0.12	0.06
Rice	0.80	0.18	363	6.7	0.05	0.03
Nestun/Cerelac	22.00	4.85	387/584	12.5/13.3	1.25/1.26	0.39/0.36
Dry Skim Milk <u>c)</u>	1.66	0.35	360	36.0	0.10	0.01

a) Cheapest brands available; ranged up to G\$4.15/lb

b) Assumes 50 - 50 mix; not verified

c) Subsidized sales based on EEC donation

Information available from the Cerex survey and elsewhere indicates that plantain flour (plain or mixed with wheat) wheat flour and cornmeal are the most commonly used bases for porridge. Generally, milk, water and sugar are added to the base ingredient. Ideally the cost/nutrient computation would be based on the product as consumed. However, in the absence of such data and given the lack of evidence to suggest differences in preparation, the comparison here is limited to the base ingredients.

While Cerex at its current price compares very favorably with this range of substitutes, doubling the price (a not unreasonable projection in the view of GPC executives), would significantly alter the relationships from strictly economic vantage (although cost/protein and other quality indicators would still make Cerex a better buy nutritionally). Just as consumers are currently economically rational in response to Cerex current price, they can be expected to maintain a rational stance. Thus the degree of preference for Cerex at a higher price is the crucial issue.

The possible scenarios following a price increase cover a broad range:

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- (1) Minimal effect on demand (as believed by GPC Executives) since the product is so seriously under-priced now,
- (2) A positive effect based on better targeting to the intended consumers (that is, consumers are more discriminate about use of the product

at a higher price); and/or product image (as a good food for babies) may improve with price since high-priced imported baby foods (available only on the black market due to import controls) enjoy a very high prestige.

- (3) A negative effect even if overall demand does not drop, demand by low income consumers and/or use for young children may fall disproportionately. (One "substitute" may simply be reduced consumption due to income constraints).

A negative effect on the composition of demand is not unlikely given low incomes and available substitutes (in terms of use, rather than nutritional value). The higher priced commercial Cerex could be seen as a vehicle for subsidizing free distribution through MCH clinics; thus consumers displaced from the commercial market would still be served provided MCH clinics prove an effective system for reaching these consumers and the required subsidy is not excessive.

Once the production cost of Cerex is verified, the viability of first covering costs and secondly providing a margin to support free distribution in the clinics needs to be ascertained through estimations of demand at the required price levels.

## II The MCH Distribution Program:

### A. Background and History

Free distribution of Cerex through MCH clinics is not yet underway. Cerex production problems prevented initiation of the program prior to 1981. As an interim alternative, distribution of cornmeal and dried skim, milk was carried out on a highly sporadic and ineffective basis; that experience demonstrated the considerable planning required to ensure that the Health Ministry and GPC would be adequately prepared to handle the program. As of March 1981, serious planning for initiating the MCH distribution began when a well-qualified public health nutritionist was given responsibility for the program within the Ministry of Health. The program itself was scaled down from the intended national level coverage to a reduced sized, geographically concentrated pilot effort.

Existing MCH clinic infrastructure (especially Storage Facilities) and logistical systems proved inadequate, during an initial attempt to launch the program in May-June, 1981. The primary reason for this false start was financial. GPC insists that the Ministry pay its past bills for the cornmeal and milk powder as well as pre-pay Cerex orders before it will re-establish distribution to the MCH clinics.

The distribution attempted during May-June proved problematic given that delivery times were not coordinated with clinic operating times. (Many MCH clinics operate only one day per week <sup>or less</sup> / staffed by Health Visitors who each cover several clinics). In some cases no one was there to take delivery; in others, delivery was made but

subsequent accountability has been difficult to trace. The distribution was further hampered by the fact that the delivery vans provided with AID Grant funds didn't arrive until the end of July.

B. Proposed Operation of MCH Cerex distribution program

GPC is to be responsible for delivering Cerex from the factory to the clinics. A delivery schedule has been worked out in accord with clinic schedules and administrative arrangements made to take delivery at the clinics. The system is as yet untested, but was designed in response to problems encountered during the May-June trial.

The Ministry will make advance payment to GPC to cover the wholesale price of Cerex (G\$0.38 per ½ lb packet) with transportation provided by GPC using AID-purchased delivery vans.

Cerex deliveries will be inventoried by responsible clinic personnel upon arrival and stored. The time between delivery and distribution to program beneficiaries is designed to be minimal, however, there will almost certainly be <sup>stock from month to month.</sup> holdover / Some steps have already been taken to improve inadequate storage at the clinic (however based on visits to 4 clinics, considerable preparation in terms of security, protection from rodents and insects is still required. If and when funds from the Cerex "profits" account are available, one prescribed use is for these storage improvements.

Inventory control forms as well as individual beneficiary records have been developed with USAID assistance. Beneficiary records consist of a separate sheet attached to clinic patient records.

Inventory controls will be tallied and reported monthly. Also each month, data will be compiled on the number and nutrition status of new as well as continuing beneficiaries. The program director in the Ministry will receive and analyze these reports.

Beneficiaries will attend the clinic monthly to receive their take-home ration of Cerex; this will be distributed as part of a monthly check-up which will include growth monitoring, other appropriate preventive or curative services and individual advice on health and nutrition. Existing health center personnel will be responsible for Cerex distribution and record keeping. Six university students

detailed from the National Service program will serve as field supervisors for the program. Eventually, these positions would need to be incorporated within the MOH personnel structure. If and as the program expands beyond the pilot stage, the Program director has also identified the need for an assistant director.

Transportation logistics and allowances for these supervisors has been programmed; again the system is as yet untested and other supervisory personnel report transportation as a persistent problem.

The following summarises currently projected additional costs to the GOG for the MCH Cerex pilot distribution program:

- |   |                  |
|---|------------------|
| . 23,552 packets of Cerex<br>per month                  | G\$8,949.7/month |
| . Transport to clinics                                  | G\$ * /month/    |
| . Transportation/Allowances for<br>6 supervisors        | *                |
| . Storage Facility Improvements                         | *                |
| . Other Material Costs (Scales, Charts,<br>Forms, etc.) | *                |

\* No Estimate Available

C. Program Objectives and Norms

The MCH Cerex distribution program aims to improve the health and nutrition status of malnourished children; two principal measures of improvement have been identified:

- o Increased clinic attendance both in numbers of children and frequency of visits (based on Cerex's incentive value).
- o Maintenance/improvement of nutrition status as measured by growth charts (i.e. reduction in number of children with poor or deteriorating growth curves)

1. Beneficiary group

Age and nutrition status are the criteria for beneficiary selection. The current definition (which has evolved over several months of planning) is children under 2 years of age identified as Grade I, II and III malnourished according to Gomez weight for age scale.

Beneficiaries will be selected by clinic personnel based on the assessment of weight for age. "Exit" criteria are not yet clearly defined: for example:

- (1) whether age (i.e., reaching 2 years) disqualifies a participating child regardless of nutrition status
- (2) if improved nutrition status (to normal) will disqualify a participant prior to his/her second birthday and if so, how many months of adequate growth would determine the timetable for continued participation.
- (3) whether failure to attend or irregular attendance would result in disqualification, how would such criteria be defined and what are the implications for program objectives of

excluding malnourished children in these circumstances? Is an outreach effort desirable, feasible?

## 2. Program Size

As noted elsewhere population estimates for Guyana vary widely and age specific estimates are even more tentative. Based on the range of estimates the population under age 2 approximates forty to fifty thousand.

The most recent clinic data (1979), - the accuracy of which may be questioned, suggest a coverage, that is, at least one visit per year, of some 38,000 children under age 2. Of that number 11,400 (30%) have been identified as I, II, or III degree malnourished.

Current estimates of the target population for nationwide Cerex distribution at MCH clinic are therefore 11 - 12,000. The pilot project as it is currently planned would cover about 25% of that total (or 33% of the original 9,000 projected for MCH distribution by the AID Project Paper).

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Coverage, of course, would depend on the extent to which the target population is attracted to the program and the absorptive capacity of the clinics to handle the program (as well as adherence to program selection criteria and other norms).

The pilot phase will cover 30 of the 150 MCH clinics; the pilot area covers only regions near Georgetown. While this will facilitate delivery, supervision and other aspects of program operations during the pilot phase, it will obviously not adequately answer questions about how well the program could function in more remote areas.

### 3. Ration Size and Value

Each child in the program will receive 8 packets of Cerex per month, enough for a daily ration of 2 oz. (dry weight). This daily ration represents about 234 Kcal and 10.3 g protein per day, approximately 20% and 45% respectively of recommended energy and protein intakes<sup>1/</sup> for a 1 - 2 year old child.

The economic value of the <sup>monthly</sup>ration is G\$4.00 given the current market price of Cerex, or about 1/5 the current minimum daily wage rate.

The ration size was based on calculations of the quantity of Cerex per day a year old child can comfortably eat given bulk limitations. The two ounce daily ration represented a quantity equal to for three average feedings. There is insufficient quantitative information on the amount and types of foods which are or could be added to the child's diet (breastmilk, family pot, or other sources) to provide the additional energy and protein needs not met by Cerex alone. (Milk, sugar or other foods added to the Cerex porridge may be one source). Also there is insufficient information about the current diets of malnourished young children to quantify how well Cerex could fill <sup>their</sup> "nutrient gap".

The total quantity of Cerex required for the pilot phase is 23,552 packets per month, representing 7.9% of current monthly production of 300,000 packets, and costing the Ministry about G\$9,000/month including delivery costs. At full production for Phase I according to the AID Project schedule, MCH distribution was to represent some 15-20% of production (850 MT). The proposed level for national distribution (12,000

children) would require, 1,152,800 packets of 252 MT per year, substantially more than the 150 MT estimated for Phase I MCH distribution.

#### 4. Complementary Services

No additional or special nutrition education component is currently envisioned as part of the MCH Cerex distribution, a potentially serious omission given the experiences of food distribution programs in other countries. Individual advice and growth monitoring are programmed as part of the package; how well these currently operate undoubtedly varies with personnel qualifications and motivation.

The distribution of food as a nutrition intervention assumes inadequate consumption (evidence from the 1971 Nutrition Survey do indicate inadequate consumption levels - less than 80% of recommended intake - for one-half of the population). The relative importance of food inadequacy given incidence of diarrhea, infectious disease and parasites is unknown and does not appear to have been considered in the decision making for the MCH Cerex distribution program. However, the services made available to program participants should take into account the importance of factors, other than food inadequacy, as causes of poor growth or malnutrition.

#### D. Considerations for Program Planning & Evaluation

##### 1. Long-term Costs/Viability

The above estimated requirements of Cerex to serve a national scale MCH distribution program represent a yearly cost of over G\$438,000 for the commodity alone, based on the current wholesale price of \$0.38 per 1/2 lb. packet. Actual costs of current production are not known; however, current GOG and USG provision of the raw materials represent a

substantial subsidy of the product. Without, or after, a Phase II, the subsidy would be borne alone by GOG or passed along to commercial consumers of Cerex. Whether commercial demand would be sufficient at a price adequate to reduce or maintain the current subsidy by GOG is not clear. The required additional subsidy (for soybean milk and corn and oil or alternatives) may moreover, represent a foreign exchange cost rather than just local purchases.

The next questions are whether this burden can be assumed, what benefits (increased clinics attendance and improved nutrition status) are obtained and whether alternative means to attain these benefits would be more or less cost-effective? (Just to illustrate, could rice distribution serve as an incentive to attend clinics and as the basis for preparing an adequate home-prepared weaning food)

Certainly, whatever the difficulties encountered in mounting the MCH distribution program, dismantling it, once in operation, would be <sup>and a</sup> far more problematic/potentially serious political cost.

## 2. Evaluating Program Impact

Clinic records on attendance and nutrition status will form the basis for baseline data and subsequent monitoring and evaluation of program impact. The accuracy of this data is unverified and factors such as confusion of "first" or "subsequent" visits, mistakes in conversion from pounds to kilograms, weight chart recording, etc. may be significant. (The monitoring of this program may have the bonus effect of improving data collection in the clinics).

Increased clinic attendance, obviously, as a meaningful objective to the extent that not only do more malnourished children come more frequently but that the quality of services is maintained or improved, that the absorptive capacity of clinics in terms of infrastructure, supplies and personnel is adequate. In other words, a qualitative as well as quantitative baseline measure would be useful.

It was suggested for example, that more frequent visits would represent an important opportunity to insure that vaccination appointments are made and remembered. (Would immunization coverage then be expected to improve along with increased numbers coming for food?) Are there other services in health behavior changes (e.g. longer breastfeeding) which can be monitored as well?

In terms of nutrition status, expectations concerning measurable impact due to Cerex distribution are realistically limited. More importantly, growth monitoring (which predates the Cerex project) has been recognized as important in itself for individual child follow-up. (New plans include provision of take-home growth charts). If Cerex proves an incentive for monthly attendance, the monitoring plus encouragement and

and practical advice/education may well have positive results where simple handouts of Cerex would not.

While it is agreed that the effectiveness of Cerex distribution will not be adequately measured by nutrition status indicators, alternative ways to assess the use of Cerex by MCH beneficiaries have not yet been identified.

As a baseline, it is necessary to identify current dietary inadequacies among beneficiary children, these are the standards by which the potential (234 Kcal and 10.4 g protein per day). And actual nutrients contributed by the Cerex ration need to be assessed.

While the ration is intended to be a supplement and only for the beneficiary child, the experience of similar programs (and common sense) suggest that:

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(a) Some or all of the Cerex may replace other food being given the child (In that case the actual supplement is the food value of Cerex minus the food value of the replaced foods. Given the commercial availability of Cerex, the free Cerex may simply replace, in part or whole, an amount previously purchased. One essential baseline question is whether and how much Cerex is currently purchased and how it is used.

and/or

(b) Some or all of the Cerex may be eaten by other family members, or put to some other use (sold, fed to animals, given away etc).

In other words the crucial calculation is how much more the child is eating (including quality as well as quantity) as a result of the Cerex distribution. The effect may be quite indirect, for example, Cerex may be used as an addition to the family food and reduce the amount

of Cerex previously purchased. However the target child may continue to eat Cerex daily and, because the family is saving money, receive other complementary foods which result in an over all increment in the child's food consumption.

To the extent that Cerex distribution represents a family food subsidy, the question becomes the marginal propensity to spend additional income on food - and more specifically food for the weaning age child.

An investigation of baseline and subsequent consumption behavior is really essential to assessing program effectiveness. It will also provide import planning information as to the changes which are likely to improve program effectiveness - e.g. (1) change the ration size to a more realistic amount, allowing for some substitution or intra-family dilution, or (2) give greater emphasis to an education component, etc.

### 3. Evaluating Program Operations:

Food distribution programs such as that contemplated for the MCH centers cannot even expect to demonstrate an impact on child health and nutrition unless the prescribed amount of food is actually delivered to the intended beneficiaries in a timely and regular manner.

Thus an adequate system for monitoring operations (i.e. process variables) needs to be in place. The May-June experience provided a glimpse of some operational problems which need particular attention.

a) Effective relationship between GPC and Ministry of Health:

The program is currently stalled due to unresolved financial transactions between the two institutions. It is essential to resolve not only the current crisis but avoid future ones. Consensus needs to be attained for systematic means to transfer funds and resolve any new disputes so as not to disrupt commodity deliveries once the program begins.

b) Transportation and storage:

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Given clinic schedules, the timings of deliveries leave little room for delays and other mishaps. Flexibility must be built in somehow, e.g. contingency plans for alternative delivery means, locations, times, etc., (Redeployment of the AID provided vehicles for other purposes should be allowed only on the basis of a realistic delivery schedule).

Storage requirements need to be addressed to prevent losses at the clinic level. Handling of food commodities, including inventory, will be new to clinic personnel and needs to be monitored so that, for example, food is distributed in order of its arrival, damaged goods are identified properly, precautions and treatment for insect/rodent problems are adequately undertaken and inventories controlled to avoid either overstocking or shortfalls.

Forms and procedures have been identified to deal with these logistical concerns. However the system has not been tested. Turn-around time for feedback concerning problems and the time required to take corrective action are also unknown. The system will depend on existing clinic staff plus 6 National Service workers (who are new to the task

and have not received specialized training). The program director at the national level has several other responsibilities in addition to this program.

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### C. Additional time/workload for clinic personnel:

The program requires both an increase in attention given each individual - e.g. assessing eligibility, giving out food, recording its receipt and other data, providing instruction on use of Cerex and related nutrition/health advice - and an increased patient load. Monthly attendance is a requirement of the program. The build-up of program participants may well be slow. But if and as the program is effective in stimulating considerable additional monthly clinic visits, the question is whether and how effectively the clinic staff (and other resources) can provide expanded services. Another concern voiced by clinic personnel is whether they can give Cerex to only some mothers during a clinic session or whether a special clinic for the malnourished is needed.

There is apparently some analysis underway of how much time per patient is currently the norm. If this is judged adequate and efficient, a maximum program size per clinic (or provision of additional staff) can be identified.

### 4. Implications for the Pilot Phase:

The preceding analysis has obviously raised more questions than it has answered, inevitable, perhaps, given that what is being assessed is a still developing plan rather than an operational program. Moreover, conversations with Ministry and USAID staff revealed that the planning had not yet taken into account certain questions raised here. It was specifically requested that questions be raised beyond those which the

author herself could respond to in a two week visit. All interviewees in the program appear to agree that additional information and decisions are needed before the pilot program is launched. (All of the questions raised here do not necessarily imply evidence of problems but are based on the experiences of similar programs).

Clearly the Ministry's intent in undertaking a pilot program is sound: to test the operation as well as impact of the program before moving ahead with a national program.

That intent however may be unfulfilled if the pilot is itself a larger undertaking than can be carefully monitored. Given limited personnel resources and the totally untested nature of the proposed system, the size of the pilot program may well be too large to be effectively managed. The uncertainties about Phase II support by AID and GOG's alternatives without or after Phase II further urge the need for a continuous, well designed pilot undertaking.

#### 5. Coordination with other food distribution programs

In determining selection criteria for beneficiaries and other program planning decisions, MOH decision makers should explicitly define the relationship of this program to existing or planned distribution programs.

a) Milk distribution in Georgetown Municipal Clinics. Dry skim milk powder (DSM) is currently being distributed to children under age five in Georgetown clinics; this is expected to continue even after Cerex distribution begins. Municipal clinic staff voiced the desire to distribute Cerex to the same age groups, some special effort to explain why Cerex will have a different target group seems necessary. The milk distribution has not been systematically operated or evaluated. Program criteria seem flexible. These clinics have an advantage in having prior experience with food distribution; but there is also the possibility of some resistance to following different procedures for Cerex.

b) WFP Nursery School Feeding. The target age group for this program (45 - 69 months) would complement rather than duplicate the intended beneficiary group for Cerex. WFP will provide WSB and DSM for a maximum of 27,000 children (phased in over a 3-year period, then phased out). The phase-out implies another source of recurrent cost to COG for food distribution and therefore is relevant to overall, long-term planning in conjunction with Cerex.

c) UNICEF Applied Nutrition Program. UNICEF is supporting integrated nutrition activities in three villages (sites still to be determined); a food distribution will be incorporated initially (probably using Cere and then phased out in favor of home and community food production. Given the size and design of the program, it is unlikely to represent a duplication of efforts.

### III. Nutritional Implications

#### A. The Problem Being Addressed

The nutrition problem intended to be addressed by the Cerex project is inadequate feeding of the 4 month - 2 year old child. Cerex is intended as a supplement to breast-feeding serving as an initial semisolid food for young children as they begin the transition <sup>to</sup> 'family pot' fare.

The intent is that Cerex consumption be an addition rather than replacement of breastmilk or other foods.

Cerex has also been viewed as a vehicle for promoting improved weaning practises, such as:

- o Proper timing of introduction of supplements (not too early or too late)
- o Frequency of feeding; a child can only consume small portions so should have more meals/day.
- o Use of a cup and spoon rather than bottle which is more sanitary and provides greater nutrient density per feeding.

Such improvements, if achieved, represent important contributions to sound child health and nutrition, apart from use of Cerex.

Availability of good weaning foods and improvement in weaning practises are critical since in Guyana, as elsewhere, it is weaning - age child who is most vulnerable to malnutrition. Data from the most recent national nutrition survey is not available, but the 1971 survey found 17.7% of

children under five with serious malnutrition (Grades II and III) and an additional 43% with Grade I. Rates were higher in rural areas and among East Indian groups. More recent clinic data, while not verifiably representative of the general population, indicates a significant continuing problem. (Overall rates in 1979 were 30.4% and 9% respectively for mild and serious malnutrition. Using clinic population figures alone, malnourished children under five number some 22,700 with half of those in the primary target group under age 2.

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### B. Nutritional Value of Cerex

The recommended 2 ounce/day per child of Cerex would provide 23% and 48% of the recommended Kcal and protein intake for children 6 - 11 months and 16% and 42% of recommended intakes for 1 - 3 year old.

The current cost (to consumers) for this amount is G\$0.125 per day (G\$0.19 where Cerex is selling for 75¢ a packet). A. Table 2 in Section II of this report illustrates, this cost compares favorably with alternative sources of weaning supplements in Guyana. What percent of these allowances were covered before Cerex was used and what percent Cerex plus breast milk/other complementary foods covers is an unanswered, but not unimportant, question.

### C. Nutritional Benefit to Target Children

Data from the Cerex consumer survey suggests that 47% of regular users are children under five. Presuming this also reflects quantities of Cerex use, at current production levels (300,000 packets/month), use by children under five is enough to provide 18,800 children

Whether Cerex consuming children are in fact eating what quantity and how many of these children are among the primary target population, i.e under age 2 and/or Grade I, II or III mainourished can only be speculated given current data. The 18,300 is really an "at best" figure. (Among the East Indian population, for example while child malnutrition is higher, there appears to be less Cerex consumption. East Indians, unlike Africans, do not traditionally incorporate a porridge or cereal in the weaning diet).

Even "at best" however, the question remains as to whether Cerex is used as a substitute or supplement. Survey data may provide some insight by analyzing the weaning practises of Cerex users versus non-users, but a quantification of the increment represented by Cerex will not be possible. Supplementary information collection to estimate this quantification as well as obtain more detailed information about Cerex use and the use of substitute products has been recommended by the author to GPC and Ministry personnel. Such information would add importantly to an evaluation but even more, it would inform promotional/educational efforts related to Cerex.

The MCH clinic distribution would augment the number of children reached by the Cerex program. How much depends on program size but also whether the food actually is given to the intended child and whether MCH recipients add to or replace Cerex retail consumers.

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### **D. Cost Effectiveness**

Cerex scored well on the admittedly rough comparison of cost/nutrient presented in Section II. However the "cost" in this case is to the consumer rather than the true economic cost. The latter is presumably of some interest to GOC as

It was not possible to accurately project the cost given available data (while Ackels report provides some data on raw materials costs; lack of production cost data prevented calculation of the total cost of the final product and consequently the subsidy cost given current or projected selling prices). The possibility of using commercial sales to cover the subsidy for the free clinic distribution has been suggested. Whether this is feasible depends on the total production cost, the potential size of the commercial market and the size of the MCH distribution (For Phase I, the latter was estimated at 15 - 20% of production, intended to provide for 9,000 recipients. Current projections for the size of the MCH target group are 11 - 12,000).

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To the extent that commercial sales could cover costs of the subsidized distribution, long term viability of the latter is more likely. On the other hand, GOG may be faced with the option of not only completely subsidizing MCH distribution, but continuing to subsidize commercial production as well.

The nutritional value of a food subsidy generally varies with the extent to which a commodity is only consumed by the nutritionally needy population. Whether low income (or malnourished) households are more likely to consume Cerex is still not verified; certainly the price is cheap. (The MCH program, to the extent that it functions as intended is specifically targetted). In terms of age group targetting, children under 5 represented 48% of Cerex users, but only 25% of household members (The Cerex survey population only includes households with at least one child under 5 and an average of 1.6).

In terms of food subsidies, therefore, Cerex may well be a relatively more efficient choice (especially if it is also nutritionally superior).

than other products for reaching the under 5 age group.

E. Nutrition Impact

Improvement of child nutrition status due to use of Cerex cannot yet be demonstrated. A systematic appraisal of whether and how much improvement can be demonstrated is certainly recommended given the magnitude of pending decisions. This may be best accomplished within the clinic program. Intermediate indicators, in addition to changes in weight for age data can and should be monitored in at least a small sample of cases. Intermediate measures might include:

- o Increased total quantity/quality of food consumed by child (with the proportion contributed by Cerex quantified).
- o Positive changes in weaning habits:
  1. Frequency/feedings
  2. Age at introduction of solids
  3. Thickness/nutritient density of foods given
  4. Longer duration of breastfeeding
  5. Non-use of bottles

Obviously there will be difficulties in attributing the changes directly to Cerex consumption; nonetheless, such benefits may well be associated both with the commercial and MCH distribution which has intended to serve an educational purpose. Preliminary data from the survey, for example, suggest that spoon feeding may be a more common practised than previously. A fair assessment of the nutritional benefits of the project should, therefore, include positive (or negative) weaning behavior changes related to the educational/promotional component of

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Nurse Webster, South Road Clinic

Personnel and Mothers at South Road, Herstelling and Soesdyke  
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Oudit Narain, MCH Director

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Cerex Consumer Survey Plan and Questionnaire 1/

1/ A description of the sample design will be sent separately to USDA by GPC.

Our Ref: REJYeb

Date: 23rd April, 1961.

Dr. Linda Linn,  
U.S.A.I.D.

Dear Dr. Linn:

CEREX EVALUATION SURVEY PROPOSAL

OBJECTIVES:

The present market will have a major influence on the objectives of the survey. Originally the objectives were to discover:

- (a) What proportion of children under five (5) years of age use Cerex frequently.
- (b) Of those children who use Cerex frequently, what proportion use it correctly.
- (c) What, if any, socio-economic, racial, cultural, religious or age factors influence the purchase or non purchase of Cerex - and if any of these factors influence the way in which Cerex is used.

The ten (10) months that Cerex has been on the market, has shown the following consumption pattern. (see Appendix 1, 2, 3 & 4)

The consumer demand for Cerex was initially very high and then due to production instability there was a shortage of Cerex on the market for two (2) months. When the production stabilised itself, Cerex demand did not return to the sales high, achieved in June of 1960.

Several possible reasons could have caused the drop in demand, but the following factors are those that have been singled out as the chief contributory factors. Inevitably, the survey will quantify and qualify the causes far more accurately and in detail.

The sample will spread over the country except the more remote interior areas.

A multi-stage stratified sample design will be employed, the major distinction being made between urban and rural strata. Within each major stratum, sub-strata will be founded, based on location.

SAMPLE SIZE:

Expected Numbers of Households	-	976
Expected Numbers Of Children Under 5-	-	444
Significance Level	-	5%
Power Of Test	-	90%
Estimated Non Response	-	10%

Comparisons Catered For In Determining Sample Size

In addition to providing an estimate of the proportion of children under five (5) years old who use Carax regularly, estimates of the differences in proportions between:

INDIANS AND NEGROES

LOW INCOME AND HIGH INCOME.

RURAL AND URBAN

will be estimated.

IMPLEMENTATION:

Once the survey is fully approved intensive work will begin on the actual drawing of the sample, preparation of maps and allocation of households to interviewers. This process will take at least two (2) weeks.

The Hiring and training of staff should last for about two (2) weeks at the most.

Actual interviewing should not last for more than one (1) week but three (3) weeks will be used as an estimate of maximum fieldwork time. This will be dependant on the availability of vehicles for transportation. If the Carax vehicles arrive on time, the time element will at a minimum. Editing and Coding Operations should be completed in one (1) or two (2) weeks.

The data should be processed and a report published within six (6) weeks of the completion of Editing and Coding Operations.

### Estimated Causal Factors:

- i) Sporadic Production - the mother has tended to distrust giving her child, a product that is not always available.
- ii) Uneven Distribution - (as above)
- iii) Insufficient Advertising - apart from the initial campaign - advertising has been minimal. It is now necessary, since the production is steady, to create a new interest in Cerax and revive the old interest, with a second advertising campaign.
- iv) Cultural Prejudice - it would appear that the East Indian race within the country areas have not accepted the product as well as we had hoped for.
- v) Product Perception - certain segments of the population have perceived Cerax as a 'cheap', local product, that has probably been produced from the remnants of Breakfast Cereal, Skim Milk Powder and Cornmeal production
- vi) The Company's image (GPC/Quality Foods) - within the population, the image is not as high as it used to be, hence, this affects the market for any product that is produced by the company.

Consequently, one of the primary objectives of the survey will be to establish why demand has dropped. Obviously, this is critical, because measures have to be taken to arrest the downward momentum and ensure that demand takes an upward trend again.

In conclusion, the objectives for the survey are as follows:

To establish.

- i) What proportion of children under five (5) years of age, use Cerax frequently.
- ii) Of those children who use Cerax frequently, what proportion use it correctly.
- iii) What if any, socio-economic, racial, cultural, religious or age factors influence the purchase or non purchase of Cerax - and if any of these factors influence the way in which Cerax is used.
- iv) Why has the consumer demand for Cerax dropped.

### SAMPLE DESIGN:

#### Population:

The target group for the survey comprises of all children under five (5) years old. Questions have been included that will directly concern children under two (2) years old who use Cerax regularly.

TIME SCHEDULE:

ESTIMATED TIME SCHEDULE

<u>ACTIVITY</u>	<u>MOORETOWN</u>	<u>MAIDEN</u>
Redesign and pre test of the Questionnaire	1 week	1 week
Sample Selection, Preparation of Maps, etc	2 weeks	3 weeks
Hiring and Training of Staff	1 week	2 weeks
Field Work	2 weeks	3 weeks
Editing and Coding	1 week	2 weeks
Processing	4 weeks	4 weeks
<b>TOTAL</b>	<b>11 weeks</b>	<b>15 weeks</b>

PRE TEST OF THE QUESTIONNAIRE

The questionnaire has been tested twice already, in rural and urban areas. Due to the fact that three (3) additional questions will be asked, relating to the drop in demand, another pilot test will be carried out.

This is not expected to take a long period of time and very few problems are anticipated.

CODING AND ANALYSIS

The Computer Section of Guyana Pharmaceutical Corporation have given their assurance that they will be able to process and analyze the survey, within four (4) weeks of the completion of the coding and editing process. The cost is fixed at three thousand, Guyana (G\$3,000.00) including labour costs. The comparison of costs between the Guyana Pharmaceutical Corporation quotation (\$3,000.00) and the cost of analyzing and processing in the United States of America (US\$10,000.00) is vast. Additionally, completion in the United States of America would take double the time of the Guyana Pharmaceutical Corporation. Hence, it would appear that Guyana Pharmaceutical Corporation are the better option for completing the analysis process.

ESTIMATED BUDGET:

Salaries:

8	Area Supervisors	x	5	weeks	x	G\$120	=	\$ 4800
18	Interviewers	x	5	weeks	x	G\$ 66	=	5940
4	Coders	x	2	weeks	x	G\$120	=	960

\$ 11,700

STATIONERY & OFFICE SUPPLIES

2,000

TRANSPORTATION

3,000

ACCOMMODATION (BOARDING & LODGING)

2,500

DATA PROCESSING

3,000

**T O T A L**

**G \$ 22,200**

Budget Notes:

SALARIES

- Interviewers will be paid at the minimum wage rate stipulated by Government.
- Supervisors will be paid at a slightly higher rate.
- Coders will be chosen from among supervisory level staff.

STATIONERY & OFFICE SUPPLIES

- The Printing of the Questionnaire will constitute the major item of cost in this group

TRANSPORTATION

- This estimate is based on an allocation of one hundred and twenty, Guyana, (G\$120.00) per person for the entire survey.

ACCOMMODATION

- This estimate is based on present rates in various districts.

DATA PROCESSING

- Computer services cost three thousand dollars (\$3,000.00) per month (IRM).

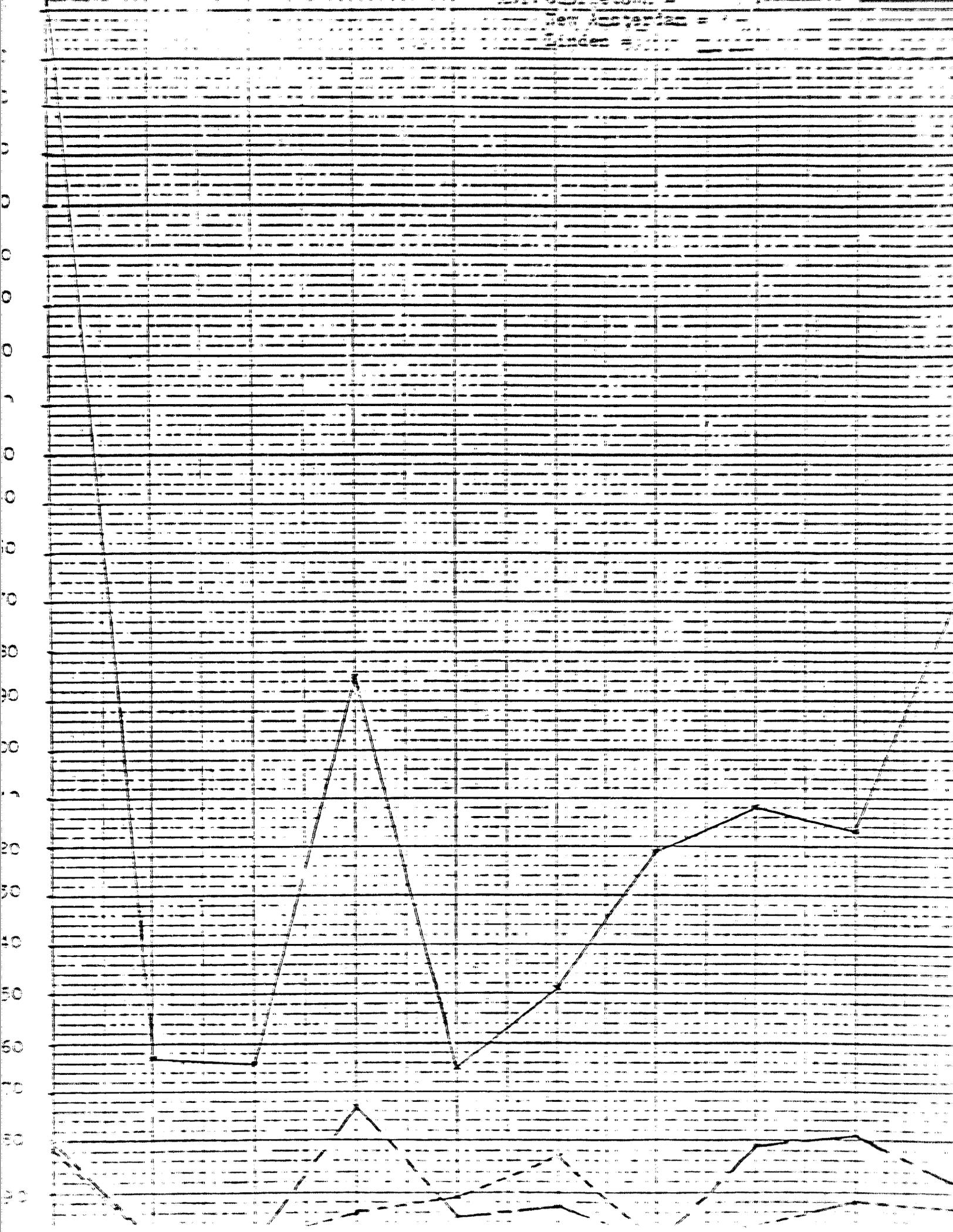
**Yours co-operatively,**  
**GUYANA PHARMACEUTICAL CORPORATION LIMITED**  
**Food, Household, Toiletries & Cosmetics/Marketing Division**

.....  
**EVEREDY HARPER**  
**Marketing Analyst**

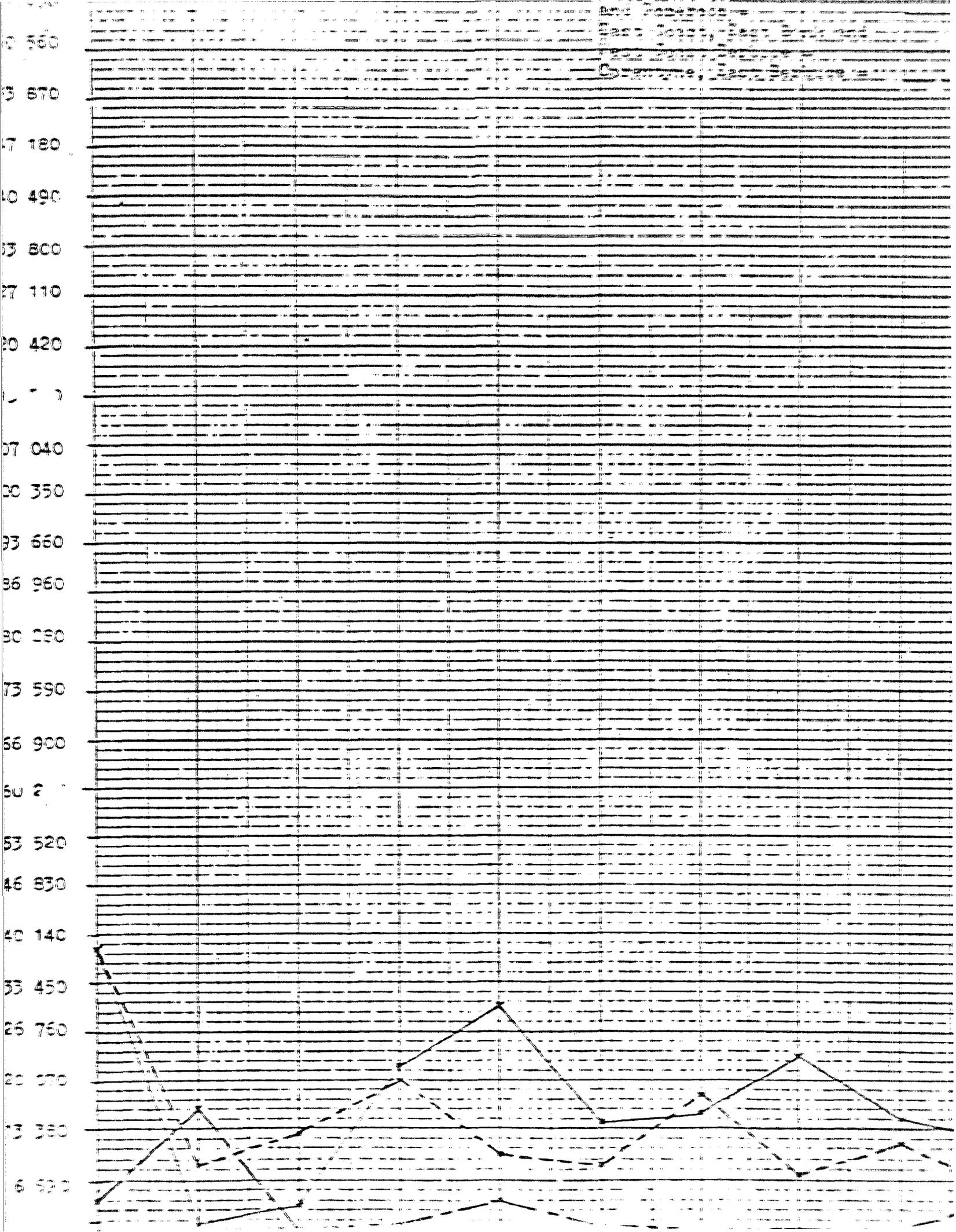
- c.c. Cdes: W.A. Lee - Guyana Pharmaceutical Corporation**
- P. Wishart - Guyana Pharmaceutical Corporation**
- Dr. L. Chin - Guyana Pharmaceutical Corporation**
- Mr. S. Dowling - U.S.A.I.D.**

MONTH 1980	1. NORTH WEST DISTRICT	2. BUSEMBO POLEROOR WEST H.A.	3. H.C.D. E.C. BERBICE S.P.D.	4. CORENTYNE EAST (BERBICE	5. BARTICA HAZARUNI PORTAD	6. JUPUNUNI	7. DORGLITOMI	8. LITANI
June	1,600	58,240	37,760	4,000	-	-	173,385	12,000
July	800	240	6,574	16,000	-	-	24,339	-
August	-	3,600	12,400	-	1,200	-	23,475	-
September	-	22,400	20,900	800	2,000	-	75,745	4,000
October	2,000	30,400	10,160	4,560	5,000	-	22,809	6,200
November	-	14,240	8,800	400	-	400	34,496	10,000
December	800	14,720	10,160	-	-	-	52,907	-
<u>1981</u>								
January	80	23,040	7,520	-	-	-	56,386	2,400
February	2,160	14,160	11,040	-	1,520	-	54,856	4,600
March	-	12,320	6,320	4,000	-	-	87,790	4,240
<b>TOTAL</b>	<b>7,440</b>	<b>173,520</b>	<b>141,614</b>	<b>29,040</b>	<b>9,720</b>	<b>400</b>	<b>608,218</b>	<b>45,160</b>

REGIONAL SALES OF CEREAL JUNE 1980 - MARCH 1981







CHILD FEEDING PRACTICES SURVEY QUESTIONNAIRE

(To be administered only to households with at least one (1) child between four months and five years of age)

INTERVIEWER : \_\_\_\_\_ SCHEDULE NO. : \_\_\_\_\_  
 DATE : \_\_\_\_\_ ADDRESS : \_\_\_\_\_  
 TIME : \_\_\_\_\_

For the children under five years of age in the household, who decides what they eat, who buys their food, and who prepares/serves their food?

CALL-BACK TIMES: \_\_\_\_\_

QUESTION	DECIDER	BUYER	PREPARER
Which household member: 1 - Mother 2 - Grandmother 3 - Father Other (specify) _____ (CODE LATER)	1	8	15
Age (in years):	2 - 5	9 - 10	16 - 17
Ethnic Group: 1 - Indian      4 - Portuguese 2 - Negro      5 - Chinese 3 - Mixed      6 - Amerindian Other (specify) _____ (CODE LATER)	4	11	13
What is the name of the last school/institute/university you went to? (CODE LATER) 1 - Don't know/none 2 - Primary 3 - Secondary 4 - Higher than Secondary	5	12	19
Occupation (CODE LATER)	6 - 7	13 - 14	20 - 21

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- PART I - Product Awareness and Knowledge - to be answered by DECIDER
- PART II - Purchasing Pattern and Source - to be answered by PURCHASER
- PART III - Product Use - to be answered by PREPARER
- PART IV - Product Acceptability - to be answered by DECIDER
- PART V - Child Feeding/Feeding Practices - to be answered by DECIDER
- PART VI - Demographic and Socio-Economic Information - to be answered by DECIDER

THIS SECTION MUST BE ANSWERED BY THE DECIDER

# Best Available Copy

Do you recognize any of these names? (NAME THE FOLLOWING PRODUCTS)

- a. Nestum                      1 - Yes                      2 - No
- b. Plantain Flour            1 - Yes                      2 - No
- c. Cerex                        1 - Yes                      2 - No

22

23

24

Do you recognize this packet? (SHOW A PACKET OF CEREX)

- 1 - Yes                      2 - No

25

(IF NO TO BOTH QUESTIONS 2.c. AND 3., GO DIRECTLY TO PART V, QUESTION 35)

What is Cerex?

(CODE LATER)

- 1 - Correct Response                      2 - Incorrect Response

26

Whom do you think Cerex is for?

(CODE LATER)

- 1 - Correct Response                      2 - Incorrect Response

27

What is Cerex made from?

(CODE LATER)

- 1 - Correct Perception                      2 - Incorrect Perception

28

How did you first learn about Cerex?

- 1 - Radio                                      5 - Merchandiser in store/shop
- 2 - Newspaper                                6 - Friends/neighbors/relatives
- 3 - Poster in store/shop                    7 - Clinic
- 4 - Saw in store/shop                      Other (specify) \_\_\_\_\_

(CODE LATER)

29

What is the first thing that comes to your mind when you hear the word "Cerex"?

- 1 - Baby cereal                              4 - Cerex and the breast are best
- 2 - For babies 1 month and over                      5 - Packet
- 3 - To be eaten with bowl and spoon                      Other (specify) \_\_\_\_\_

(CODE LATER)

30

How often do you visit the cinema?

- 1 - Never/hardly ever                      3 - Once a month
- 2 - Less than once a month                      4 - More than once a month

31

10. How often do you use a newspaper?  
 1 - Hardly ever  
 2 - Sundays only  
 3 - 2-3 times a week  
 4 - Daily

Which newspaper? (specify) \_\_\_\_\_

11. What time of day do you like to listen to the radio the most?  
 1 - Morning  
 2 - Morning  
 3 - Afternoon  
 4 - Evening  
 5 - Night  
 6 - All day  
 7 - Never/hardly ever

12. Has anyone in the household ever used Corax?  
 1 - Yes  
 2 - No

(IF YES TO QUESTION 12., GO DIRECTLY TO PART II, QUESTION 14.)

13.a. What is the major reason why you have never used nor bought Corax?  
 1 - Did not like  
 2 - Locally produced product  
 3 - Poor packaging  
 4 - Not hygienic  
 5 - Could not afford  
 6 - Too cheap  
 7 - Preferred other products  
 8 - Poor appearance  
 9 - Not available  
 10 - Made of waste products

Other (specify) \_\_\_\_\_  
 (CODE LATER)

13.b. IF FREE RESPONSE GIVEN IN QUESTION 13.a. IS "1 - Did not like", THEN READ LIST OF ALTERNATIVES ABOVE (CHOICES 2 THROUGH 9) TO THE RESPONDENT AND CODE THE ONE WHICH HE/SHE CHOOSES AS THE MAJOR REASON.

(GO DIRECTLY TO PART IV, QUESTION 35.)

PART II - PURCHASING PATTERN AND SOURCE

(THIS SECTION MUST BE ANSWERED BY THE PURCHASER)

14. Where do you usually get Corax?  
 1 - Department store  
 2 - Neighborhood store  
 3 - Wholesale store  
 4 - Clinic  
 Other (specify) \_\_\_\_\_  
 (CODE LATER)

15. How do you prefer to purchase Corax from that area store?  
 1 - Cash  
 2 - Credit

(IF YES TO QUESTION 16., GO DIRECTLY TO QUESTION 17.)

17. If Carex was not always available, did you ask the seller/clinic to get it for you?

- 1 - Yes
- 2 - No

 40

18. Are you still buying/using Carex?

- 1 - Yes
- 2 - No

 41

(IF YES TO QUESTION 18., GO DIRECTLY TO QUESTION 19.)

19. What is the major reason why you are no longer using Carex?

- 1 - Not available
- 2 - Bad taste
- 3 - Bad smell
- 4 - Worm infested
- 5 - Baby disliked
- 6 - Caused diarrhea
- 7 - Didn't mix well
- Other (specify) \_\_\_\_\_

 42

(CODE LATER)

(FOR THOSE NO LONGER USING CEREX, GO DIRECTLY TO PART III, QUESTION 24.)

20. How many packets of Carex do you use in your household per fortnight, i.e. every two weeks? (INDICATE NUMBER OF PACKETS)

 43

21. Did you have any trouble getting Carex within the last month?

- 1 - Yes
- 2 - No

 44

22. Are you now buying/using less Carex than you did when you first started to buy/use Carex?

- 1 - Yes
- 2 - No

 45

(IF NO TO QUESTION 22., GO DIRECTLY TO PART III, QUESTION 24.)

23. Why are you buying/using less Carex now than you were when you first started to buy/use Carex?

- 1 - Unavailable
- 2 - Child has grown and is using other food
- 3 - Do not like the product anymore
- Other (specify) \_\_\_\_\_

 46

(CODE LATER)

PART III - PRODUCT USE

(THIS SECTION MUST BE ANSWERED BY THE PREPARED)

(To be administered to all respondents who have used or are using Carex. Questions, however, should be asked accordingly, i.e. in past or present tense.)

24. \_\_\_\_\_  
\_\_\_\_\_

1 yr. = 12 months  
 2 yrs. = 24 months  
 3 yrs. = 36 months  
 4 yrs. = 48 months  
 5 yrs. = 60 months

**QUESTION 24: CEREX CONSUMPTION - CONSUMERS AND THE FREQUENCY AND FORM IN WHICH THEY CONSUME CEREX**

QUESTIONS	CHILDREN UNDER 5 YEARS OLD (NOT YET 60 MONTHS)					CHILDREN OVER 5 YEARS OLD (60 MONTHS AND OVER)					ADULTS			
	48-49	54-55	60-61	66-67	72-73	78	81	84	87	90	Mother	Father	Grand-P	Other
a. Who in this household eats or has eaten Cerex? For children under five years of age, indicate age in months, for all others who eat Cerex, place the number 1 in the appropriate column.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. How often does each person eat Cerex? 1 - Three or more times a day 2 - Twice a day 3 - Once a day 4 - More than once a week 5 - Once a week or less	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. In what form is Cerex eaten? 1 - Porridge 2 - Tea/drink Other (specify) (CODE LATER)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. For children under two years of age, how is Cerex fed to the child? 1 - Bowl and spoon 2 - Feeding cup 3 - Bottle with nipple Other (specify) (CODE LATER)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	/								
e. How much Cerex do you use at each feeding for the child? 1 - Less than 1/4 cup 2 - 1/4 cup 3 - More than 1/4 cup	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>									

15. Please briefly describe the steps you use to make Cerex for the DECIDER:

FREE RESPONSE: \_\_\_\_\_  
(CODE LATER)

PROMPTED RESPONSE: \_\_\_\_\_  
(CODE LATER)

16. FREE RESPONSE: (CODE LATER)

- i. Uses boiled water 116
  - 1 - Yes    2 - Did not mention
- ii. Uses correct amount of Cerex for amount of water used 107
  - 1 - Yes    2 - Did not mention
- iii. Adds other ingredients 108
  - 1 - Yes    2 - Did not mention

17. PROMPTED RESPONSE: (CODE LATER)

- i. Uses boiled water 109
  - 1 - Yes    2 - No
- ii. Uses correct amount of Cerex for amount of water used 110
  - 1 - Yes    2 - No
- iii. Adds other ingredients 111
  - 1 - Yes    2 - No

26. Where do you usually store open packets of Cerex between use?

- 1 - Safe/cupboard                      3 - Tin 112
  - 2 - Refrigerator                      Other (specify) \_\_\_\_\_
- (CODE LATER)

27. Have you found the instructions on the packet easy to follow?

- 1 - Yes                                      2 - No                                      3 - Don't read them 113

PART IV - PRODUCT ACCEPTABILITY

(THIS SECTION MUST BE ANSWERED BY THE DECIDER)

- 28. Are you satisfied with Cerex as a food for your child? 114
  - 1 - Yes                                      2 - No

- 29. Do you think Cerex is: 115
  - 1 - Better than
  - 2 - As good as
  - 3 - Poorer than

other baby cereals/porridges you have previously used?

(IF RESPONDENT NEVER USED ANY OTHER PORRIDGES OTHER THAN CEREX, PUT "0" IN THE BOX)

DATE OF BIRTH OF CHILD

(CODE LATER)

Why these foods in particular?

(CODE LATER)

15. What baby foods not now available on the market would you like to see sold in Guyana?

(THIS SECTION MUST BE ANSWERED BY THE DECIDER)

(IF HOUSEHOLD HAS NO CHILD TWO YEARS OLD OR YOUNGER, GO DIRECTLY TO PART VI, QUESTION 37.)

PART V - CHILD FEEDING/WEANING PRACTICES

- 1 - One-half-pound (same as) 4 - Three pounds
- 2 - One pound 5 - Four pounds
- 3 - Two pounds 6 - Five pounds

14. If you had a choice, what size packet would you prefer, bearing in mind that the price will go up in relation to the size of the packet?

(CODE LATER)

- 1 - Plastic bag (same as) 4 - Foil
- 2 - Tin 5 - Glass jar
- 3 - Box Other (specify)

13. If you had a choice, what type of packaging would you prefer, bearing in mind that any other packaging will cost more?

- 1 - Too low 2 - Too high 3 - Just right

12. Do you think the price of Corax is:

11. How much do you usually pay for one packet of Corax?

(CODE LATER)

- 1 - Taste/Flavor 2 - Odor/Smell 3 - Texture 4 - Color
- 5 - Price 6 - Nothing 7 - Other (specify)

QUESTIONS

CHILDREN

QUESTIONS	CHILDREN			
	1-18	19-24	25-29	30-39
1. Age of child (months)				
2. Is child being breastfed now? 1 - Yes 2 - No (IF YES, GO DIRECTLY TO 3.)	3	10	8	30
3. Was child ever breastfed? 1 - Yes 2 - No (IF NO, GO DIRECTLY TO 4.)	6	21	38	31
4. At what age was the child taken off the breast? (Indicate age in months)	7	13	16	15
5. At what age was the child given semi-solid/solid foods? (Indicate age in months)	10	10	10	10
6. What was the first semi-solid/solid given to the child? 1 - Plantain Flour 2 - Nestum 3 - Cornmeal 4 - Cerex Other (specify) (CODE LATER)	11	26	41	36
7. How often does the child attend Clinic? 1 - Never 2 - More than once a month 3 - Once a month 4 - Less than once a month	1	27	42	37

*Scraped hard egg shell, milk  
6 M 1/2  
3 M 2 1/2  
2 M 1/2  
3 M 1/2  
1 M 1/2*

Best Available Copy

FOR THOSE RESPONDENTS WHO NEVER USED CEREX, GO DIRECTLY TO 8.

8. At what age was the child given Cerex?				
9. How often does the child receive Cerex?				

QUESTIONS	CHILDREN			
1. In addition to Corex, what cereals/corridges is the child being given? (specify) _____ (CODE LATER)	<input type="checkbox"/> 16	<input type="checkbox"/> 31	<input type="checkbox"/> 46	<input type="checkbox"/> 61

GO DIRECTLY TO PART VI, QUESTION 17.

2. What cereals/corridges is the child now being given? (specify) _____ (CODE LATER)	<input type="checkbox"/> 17	<input type="checkbox"/> 32	<input type="checkbox"/> 47	<input type="checkbox"/> 62
--	-----------------------------	-----------------------------	-----------------------------	-----------------------------

**PART VI - DEMOGRAPHIC AND SOCIO-ECONOMIC INFORMATION**

(THIS SECTION SHOULD BE ANSWERED BY THE DECIDER)

1. Household location:    1 - Urban            2 - Rural             53
2. Household composition:
- a. Total Number of persons living in household:  64 - 65
  - b. Number of children under five (5) years:  66 - 67
  - c. Number of persons between five and sixteen (5 - 16) years:  68 - 69
  - d. Number of persons over sixteen (16) years:  70 - 71
3. If you added up the monthly take-home pay for all household members, which of the following would best describe the total monthly take-home pay for the entire household?  72
- 1 - Over \$1,000 per month            3 - Less than \$500 per month
  - 2 - Between \$500 and \$1,000 per month

(IF RESPONSE GIVEN IS MONTHLY OR BIWEEKLY, INDICATE AMOUNT PER WEEK PER BIWEEKLY (CROSS OUT ONE) AND CODE LATER.)

4. How much money is usually spent for the entire household on food each week? (INDICATE AMOUNT IN DOLLARS)  73 - 75
5. Do you own accounts of the household members? (CODE LATER) - Check appropriate response  76
- a. A telephone            Yes     No
  - b. A stereo                Yes     No
  - c. A car                    Yes     No
  - d. Refrigerator            Yes     No
  - e. Television              Yes     No

Priorities for Analyses of Cerex Consumer Survey Results

Attached are three memos indicating priorities for data analyses related to the consumer survey carried out by GPC in June-July, 1981. They resulted from a series of meetings between the author and GPC personnel including Dr. Leslie Chin and Ms. Beverly Harper. In addition to the suggestions included in these memos, the author reviewed and commented on the original data analyses plan and made the following additional recommendations:

1. The survey allows for analysis according to several types of population stratification. The importance of each of these will emerge only initial results are available:
  - a) Regional
  - b) Urban/rural
  - c) Ethnic
  - d) Income levels/socioeconomic status
  - e) Household size
  - f) Age of household decision maker/mother
  - g) Education level of decision maker/mother
  - h) Occupation of decision maker/mother
  
2. The above groupings may be conducted with:
  - a) Use of Cerex (Q 12, 18, 22)
  - b) Reasons for non-use/less use (Q 13a, 19, 23; if (a) proves significant)
  - c) Quantity/Regularity of Cerex consumption (Q 24b)
  - d) "Adequate" use (combined Q 24b, d, e)
  - f) Price Opinion (Q 32)

g) Weaning Health Habits (Q 36a-K)

h) Availability of Cerex - regional only (Q 16)

3. Correlate "child too old" response in Q 13a, 19, 23 with age of child.
4. An analysis of Cerex users vs non-users (defined by 24b or by 18) through correlations with:
  - a) Weaning habits (36b-K)
  - b) Product adequacy (Q 29) and image (92a)
5. Some possible confusion may result from the fact that those no longer using Ceres nevertheless answered Q 25-34. In analysis of this data, it may be useful to separate these from current users' responses.

GUYANA PHARMACEUTICAL CORPORATION LIMITED

LABORATORY DIVISION

CHEEK EVALUATION SURVEY

TABLE 1

PRODUCT USE FREQUENCY WITH WHICH CHEEK IS WASHED - FREQUENCY CODE, 24D.

<u>ORUSHOLD / FREQUENCY</u>	<u>3 OR MORE TIMES</u>	<u>TWICE DAILY</u>	<u>ONCE DAILY</u>	<u>LESS THAN ONCE WEEKLY</u>	<u>ONCE A WEEK OR LESS</u>
	<u>Code 1</u>	<u>Code 2</u>	<u>Code 3</u>	<u>Code 4</u>	<u>Code 5</u>
<u>Under 1 year</u>					
<u>1 - under 2 years</u>					
<u>2 - under 3 years</u>					
<u>3 - under 4 years</u>					
<u>4 - 5 years</u>					
<u>&gt; 5 years</u>					
<u>Adults</u>					
<u>Police</u>					
<u>Police</u>					
<u>Grand-Parents</u>					
<u>Other</u>					
<u>Adults</u>					

DR. LESLIE CHIN  
 TECHNICAL DIRECTOR  
 LC:kb

CURT CHOO-KANG  
 COMPUTER

INFORMATION REQUIRED AS A FIRST PRIORITY FROM  
 CEREX SURVEY

81-09-20

This information is required to answer two crucial questions:

1. What is the percentage of children under 5 years of age who are currently using Carax daily?
2. What is the daily amount of dry Carax being consumed by children under 2 years of age?

It is proposed that question one could be answered by the following tabulations:

- (a) the total number of children in the survey under 5 years obtained by summarising the answers to question 18b.
- (b) see attached Table 8.

Question two will be answered by the following tabulations:

- (a) Information from Question 24b, d and e.

Frequency of Feeding (Q 24b)	Cup & Spoon or feeding cup		Bottle	
	% cup	% cup or greater	% cup	% cup or greater
3 x or >				
2 x daily				
1 x daily				
more than 1x weekly				
once per week or less				

- (b) Tabulate the ratio

No pkts/fortnight (Q 20)  
No persons consuming (Q 24b)

This ratio should be tabulated as follows:

Ratio	Frequency
1	
2	
3	
4	
5	
6	
7 or more	

.....  
 DR. L CHIN

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DR. LESLIE CHIN  
TECHNICAL DIRECTOR  
LC:kb

CURT CHOO-KANG  
COMPUTER

THIRD PRIORITIES - CEREX SURVEY

81-10-05

1. Question 38  
Tabulation of a, b, c, and d  
giving frequency
2. Question 24b  
How many household use Cerex only for children under  
5 years i.e. older children and adults in those  
households do not use.
3. Correlation of responses to question 12 with responses  
to question 1a, b, c, d, 39 and 41.
4. Correlations of responses to question 18 with responses to  
question 1a, b, c, d, 39 and 41.
5. Correlation of responses to question 24b with responses  
to question 36b, c, d and e.
6. Correlation of responses for questions 39, 40 and 41  
(please advise how).



DR L. CHIN

ASSESSMENT OF THE CURRENT STATUS  
OF  
USAID PROJECT NO. 504-0073  
WEANING FOOD DEVELOPMENT - GUYANA

BY

A. A. ACKELS

This report has been prepared in keeping with the scope of work required by a personal services contract between the U.S. Department of Agriculture, OICD and the author. It is based upon personal investigations made in country during the period September 26 - October 10, 1981. A two member assessment team, Mrs. Sandra Callier, and the author of this report have collaborated in the ~~project~~ review. Each team member has written a separate, but integrated report; therefore, both sections should be read for an overview of the status of the project. In general the two sections of the report cover the entire project review.

1. The Callier section covers:

Assessment of the effectiveness of the delivery system, to both commercial and clinic outlets, in reaching the target groups; analysis and recommendation related to marketing strategy, especially the recent consumer evaluation survey; identification of the nutritional implications of the marketing strategy, and current consumer uses.

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2. The Ackels section (this section) covers assessment of attainment of the project goals in production and distribution, evaluation of the present manufacturing process, an assessment of the availability of indigenous raw materials for continuing production, and an assessment of the physical delivery system employed in the distribution of the product.

3. Both sections contain suggestions, or recommendations, with respect to continuing operations.

The Project History - Summary

The project paper was signed September 21, 1978. It represents an A.I.D. grant of US\$500,000 with a first tranche approval of US\$275,000. It requires the GOG to commit itself to counterpart funding equal to US\$502,000 over the life of the project with a first tranche commitment of US\$280,000 equivalent. The commitment history follows:

	<u>USAID</u>	<u>GOG</u>
Grant Agreement dated 9/31/78	\$ 275,000	\$280,000
Amendment No. 1 (2nd Tranche) dated 8/27/79	115,000	104,000
Amendment No. 2 (3rd Tranche) dated 2/14/80	110,000	118,000
Amendment No. 3 (Project evaluation) dated 6/3/81	15,000	----
	<hr/>	<hr/>
TOTAL as of October 1, 1981 in US\$ equivalent	\$ 515,000	\$502,000
	<hr/>	<hr/>

In ~~summary~~, the original financial plan provided that fund usage would be:

1. USAID funds would provide the equipment delivered, ~~market~~ research, technical assistance, and certain commodities (primarily vitamin pre-mix, mineral premix, and packaging materials).
3. GOG funds would provide land, buildings, operating expense, and indigenous commodities.

In ~~addition~~ to the grants under the project listed above, Transfer Authorization No. 504-XXX-000-9606 authorizes the transfer of food ~~commodities~~ in an amount of 1,102 MT with an estimated market ~~value~~ of \$349,454 plus \$131,000 freight for a total value of US\$480,454 delivered Georgetown, in support of the project.

The ~~grants~~ and agreements were made with the GOG, represented by its ~~Minister~~ of Economic Development. Implementation of the project ~~is~~ the responsibility of the Guyana Pharmaceutical Corporation Limited (GPC) represented by its Technical Director, Dr. ~~Leslie~~ Chin.

The ~~original~~ date for completion of the project commitments is and ~~remains~~ December 31, 1982.

In ~~summary~~, the stated purposes of the project are:

1. Test the feasibility of producing and distributing a ~~new~~ food made from indigenous commodities.
2. Improve the nutritional status of children aged 4 months to 2 years of age.

3. By projection estimates, 15 to 20 percent of the production will be distributed free through Ministry of Health (MOH) sponsored Maternal and Child Health (MCH) Clinics. 80 to 85 percent of the production will be sold to the public through normal commercial retail channels. Although not a forecast, it is expected that 36,000 to 45,000 of an estimated 150,000 pre-school children will be served within the three year life of the project.

The nominal plant capacity shall be 1,000 MT per year on a one shift basis. The plant shall provide a Brady Cooker system to precook a cereal grain mixture, a grinding system to grind the cooked product, and a blending system to mix that cooked product with milk powder, soy flour, vitamins, and minerals. A labor intensive packaging system shall be installed to package the finished product in 1/2 lb net weight polyethylene bags.

The estimated full market development by the 5th year:

Retail	-	700 MT/year
MCH Clinics	-	150 MT/year
		<hr/>
TOTAL		850 MT/year

The estimated market development during the three year life (Phase I) of the project:

Year 1	-	430 MT
Year 2	-	570 MT
Year 3	-	710 MT

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The Project Paper states that distribution will be by GPC trucks to wholesale and retail outlets presently serviced by GPC representing about 90 percent of some 4,000 retail outlets. (The number 4,000 appears to have been in error, with the proper number in the magnitude of 1,500). MCH clinic distribution would be scheduled by the MOH with delivery made by GPC vehicles. It was estimated that 150 clinics, more or less, would be serviced.

An extensive sales and proper usage promotion campaign was to be implemented using radio, newspapers, cinema, and presentations to influential people in the health sector.

---

~~Four consumer surveys will be conducted and reported by GPC.~~

The Grant Agreement follows the Project Paper. In addition to the usual legal "condition precedent" this agreement requires:

1. A time phased implementation plan.
2. An evaluation plan covering:
  - a. Progress toward goal attainment.
  - b. Identification and evaluation of attainment constraints:
  - c. To the degree feasible, evaluate the projects development impact, including nutrition.
  - d. The progress and effect of the nutrition education program to be funded with monies generated by the sale of product, over and above the GPC costs of manufacture and distribution.
  - e. A third year in depth evaluation of the project, its programs, and its impact.

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- f. An evaluation of expansion of the coverage to include maternal nutrition in the post project Phase II of the program.

The proposed pricing policy for the commercial sales program provided:

1. The product shall be priced so that it shall be available within the means of families of all income levels.
2. In order to do so the USAID and GOG food commodities shall be used to subsidize the pricing structure.
3. The GPC pricing structure shall result in recovery of the GPC production and distribution expense.
4. To the extent that the pricing structure adopted, meeting the conditions of 1. and 3. above, results in margins above those necessary to meet condition 3., such funds generated shall be sequestered in a separate bank account for use in a nutrition education program to be formulated later.

The project represented by the "Project Paper" is a "pilot" project. It is designated as Phase I of a three phase program and it was designed to guide decision making for future planning for the program. The activities contemplated within the three phase program are:

- Phase I - The Project No. 504-0073, as hereinbefore discussed. Duration - Years one through three. Final evaluation shall result in recommendations to extend, modify, or terminate the program.

Phase II - Expanded distribution to the full market potential. Duration - years four through six.

Phase out PL 480 Title II Commodities as follows:

	<u>Fiscal Year</u>		
	<u>1981</u>	<u>1982</u>	<u>1983</u>
PL 480 Title II	80%	46%	15%
GOG	20%	54%	85%

Evaluate results and modify the program, as needed.

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This phase is not funded.

Phase III - The GOG will provide all inputs, otherwise continue as in Phase II. the stated duration of this phase is years seven through year nine. For practical purposes satisfactory completion of this phase would represent acceptance of the program as a viable development program worthy of continuance into the future.

The Grant Agreement required an implementation plan from GPC. That plan submitted with the GOG response to the "Conditions Precedent" and attached thereto, dated February 13, 1979 and signed by the Minister of Economic Development is summarized and paraphrased to include only those items currently meaningful and pertinent to this evaluation effort.

1. Factory - Beneficial Occupancy - May 15, 1979
2. Factory - Full production - June 15, 1979

TABLE 1

CEREX PRODUCTION

	<u>1/2 lb. Pouches</u>	<u>Metric Tons</u>
Sept <del>ember</del> 1980	146,800	33.3
Octob <del>er</del> 1980	109,845	24.9
Novemb <del>er</del> 1980	55,304	12.5
Decemb <del>er</del> 1980	146,856	33.3
Janu <del>ary</del> 1981	207,250	47.0
Febru <del>ary</del> 1981	6,640	1.5
March 1981	231,920	52.5
April 1981	142,840	32.4
May 1981	161,235	36.6
June 1981	110,141	25.0
July 1981	171,736	38.9
August 1981	198,140	44.9
		<u>382.9</u>
	12 months TOTAL	
6 months 3/1 - 8/31/81 Annualized		<u>460.8</u>

3. Product - In House Testing - September 15, 1978 to January 15, 1979
  4. Product - Mini-Market Testing - January 3, 1979 to June 30, 1979
  5. Product - Retail Marketing - July 2, 1979 to September 30, 1981
  6. Product - MCH Distribution - September 3, 1979 to September 30, 1981
  7. Evaluation - Preliminary - September 1, 1979
  8. Evaluation - Annual - September 1, 1980
  9. Evaluation - Final - September 1, 1981
-

PLANT INVESTIGATION

The processing plant was inspected. Essentially it was installed as intended, as described in the Project Paper. It conforms to the concept of a low cost extruder system.

The plant is presently being operated on a one shift basis. The Brady Cooking system is being operated on a five hours basis during the shift.

The blend of material to the cooker at the time of inspection was a grain mixture of 70 percent whole corn; 30 percent whole grain white rice, to which 7.5 percent soy bean oil is added. The cooked material formula and rate of feed was:

	<u>Rate of Feed</u>	<u>Formula</u>
	Kg/hour	%
Whole Corn	294	65.1
Whole grain white rice	26	27.9
Soy Bean Oil	<u>31.5</u>	<u>7.0</u>
	451.5	100

Three percent of water was being added at the cooker, as an aid to cooking.

The stated cooking temperature is 340° F. At the time of inspection the thermometer indicated temperature was 335° F. Inspection of daily operators reports indicated that the operating temperature is sometimes allowed to drop as low as 320° F. With the formula in use a 20° deviation probably is not critical to the organoleptic properties of the product; however, experience elsewhere has shown that raw starch flavors start to become apparant at about 320° F. At 340° F, gelatinization

of the cereal starches is sufficient to eliminate such flavors. It is recommended that the target temperature remain 340° F but that the acceptable range be no greater than plus or minus 10° - 330 to 350 F. A minor machine adjustment is indicated when the temperature exceeds that range.

Whole corn and rice are being fed directly to the MIX-MILL without benefit of prior cleaning. Assuming that the corn received is always well cleaned, as received, and therefore free of foreign matter, then minimum requirements at the feed in hoppers would be static screens mounted in frames on top of the hoppers with mesh sizes selected to freely pass each of the raw-materials in use, and retain all larger foreign matter; including bag tags, string, bag lint balls, and other miscellaneous foreign matter including wood and metal that not too infrequently are found in or on the outside of bagged ingredients. Such screens would be quite low in cost, and could easily be fabricated and installed by GPC. It is recommended that for the present operation all raw material feed in points be so protected.

For Phase II, and thereafter, it has been anticipated that PL480 Title II commodities will be phased out. The original thinking, and hope, has been that indigenous commodities will supplant the Title II commodities. Present GPC thinking is that in any event, domestic or imported, the economic consequences are <sup>to</sup> ~~small~~. The matter of commodity supply is discussed elsewhere in this report in greater detail. Irrespective of the source, the thinking has been and remains that the most likely commodities for the replacement of the original corn meal and soy flour will be commercial whole corn and

raw, whole, commercial soybeans. These typical commercial grains will contain between two to five percent of foreign matter. Indigenous grain might contain much more, depending upon the domestic facilities used to rough clean the grain before delivery to the Cerex plant. Typical foreign materials that are found in commercial grain are:

1. Weed seeds, some of them noxious
2. Pieces of cob stems, leaves, pods
3. Plant and soil dust
4. Animal and bird excreta
5. Sand
6. Rocks
7. Mud balls
8. Wood
9. Metal
10. Glass
11. String

Commercial grain should not be used in a food product without adequate cleaning equipment to remove such materials. The minimum cleaning equipment needed in the Cerex plant to use commercial grains would appear to be:

1. A good two sieve "milling" separator with adequate aspiration components.
2. Gravity separator - stoner or table. Specifically designed to separate materials of similar size and shape, varying in density.
3. A good magnetic separator

Fibre limitations for the product require dehulling of whole

A very preliminary estimate of the cost of the above cleaning and dehulling equipment, installed in the Cerex plant is US\$90,000 to US\$100,000 at 1981 prices. Presently there are no funds allocated for such installations by either USAID or the GOG. Phase II, and thereafter, planning must include such installations if commercial grains are to be used.

The grains of world commerce have had some cleaning, usually at least over a coarsely clothed two sieve machine commonly known as a "receiving" separator. Indigenous grains in LDC's frequently are very dirty as they come from the field. Lots containing as much as 30 percent foreign matter have been observed. Soybeans containing high levels of mud balls (a difficult material to clean out) plus high levels of other foreign matter are relatively common. The cleanliness and condition of indigenous grain for CEREX must approximate the standards used in the higher commercial grades for world trade in order for the equipment discussed above to be adequate. Satisfactory beneficiation of very dirty grain usually requires a much more extensive cleaning plant than is suggested herein.

Soak yields of cooked product have been quite variable, running from 86 percent to about 92 percent, with no discernable reason apparent to plant management. All of the usual checks of scales, reconciliation of official production, etc. have been made without a finding of fault. Certainly there was no operational problem apparent to the writer that would account for such a range. Operating as it was during inspection, and as it is reported to have performed for the past nine months, this writer would expect the true yield to be

in the range of 91 to 92 percent with the grain near the bottom of that range, or about 92 percent over a full months production. The most likely cause of the wide range, shown by the books, is short weighted bags of ~~raw~~ ingredients being recorded at their billing weights.

Rice is likely to be a major offender. Rice is billed at 130 pounds per bag. The actual net weight is 177 3/4 pounds of rice with the bag weighing 2 1/4 pounds of the billed weight. By observation in the Cerex warehouse, the physical condition of many of the re-used bags used to deliver rice to the Cerex plant is poor. There is evidence of much leakage. The quality of the bags used is excellent for the purpose when new or in very good used condition. Open, leaking rice bags are an invitation to petty theft - an activity that has been endemic in the rice industry.

Plant management has agreed to check actual cooking yields by weighing the materials fed in and used as the denominator base, and using the actual weights of the product made therefrom, as totally weighed into the batch mixer, as the numerator of the ratio.

If the speculative reason postulated above proves to be the cause of the wide range of cooking yields recorded, then the obvious action should be to take corrective actions, such as the following:

1. Weigh in-bound receipts
  - a. 100 percent, or
  - b. A statistically valid sample, and
  - c. - All obviously defective bags.
2. Tighten security, if necessary, to reduce the likelihood of petty theft.

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themselves fed in, and charging the process account only for the actual weight.

Plant management should be held accountable only for material quantities it actually receives. It should be prepared to demonstrate either by actual weight records or valid statistical sample analysis that it did in fact receive less than the billed weight, if it claims to have done so.

If the above hypothesis for the wide range of yields does not prove out, the cause certainly can be found either in the process, or in the accounting, therefore; by a process of elimination. The opportunities for such regression are few. The primary obvious potential causes:

1. Excess offal production, including off grade. (Should show in the records).
2. High moisture raw materials or excessive moisture loss (quite unlikely).
3. Dust losses to the atmosphere via the cyclones (would be quite obvious).
4. Accounting error in recording feed in and/or the mixer scale weights of the cooked product.
5. Defective scale weights.
6. A comparison of corn, rice, and oil disappearance from inventory to formula requirements may isolate the problem to one ingredient.

The finished product formula in present use is:

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	Batch Mixer In Kg	Percentage
Cooked Ground Cereal Mix	253.0	56.6
Defatted Soy Flour	90.0	19.6
Skin Milk Powder	45.5	9.8
Ground Sugar	39.2	8.4
Mineral Premix	14.88	3.2
Soybean Oil	10.7	2.3
Vitamins Premix	0.455	0.1
TOTAL	<u>464.635</u>	<u>100.0</u>

The only formula change of consequence has been the substitution of whole yellow corn in the cooked portion for degerminated yellow corn meal.

Plant management appears to understand the facilities provided for Cerex manufacture and is doing well with it. The plant equipment reliability is now exceptionally good.

In the period July 1 through September 29, 1981 there were only three hours and fifty minutes of machine downtime due to equipment trouble out of 270 packing hours scheduled—1.4 percent, and performance comparable to continuous duty industrial equipment, well managed. A flood shut down processing for twelve hours, packaging for nine. A power supply failure shut down packaging for four hours. Minor logistical problems exist primarily involved in labor productivity, such as prompt startups, scheduled packing production, etc. Plant management has addressed these problems of productivity and is making excellent progress.

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The present daily, one shift finished product schedule is 15,600 72.75 packets or 3,765 kg., requiring eight to nine mixer batches, and

	<u>In Kg</u>	<u>Percentage</u>
aked Ground Cereal Mix	253.0	56.6
atted Soy Flour	90.0	19.6
m Milk Powder	45.5	9.8
ound Sugar	39.2	8.4
eneral Premix	14.88	3.2
ybean Oil	10.7	2.3
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The present daily, one shift finished product schedule is 16,600 packets or 3,765 Kg., requiring eight to nine mixer batches, and

is quite capable of sustaining these rates. With concentration on packing labor productivity with possibly minor equipment additions, the packing machines with the present four operators should easily do forty per minute, 10 per operator per minute or 19,200 per eight working hours. More than that is quite possible. When really high hand packing productivity is sought, the packing personnel must be rotated hourly to relieve fatigue and boredom. This means having more than four trained to operate the machines.

Beneficial occupancy of the plant slipped about nine months from the original projected time. Simply said the original projected time was not realistic. Beneficial occupancy commenced late February - March 1980. The usual start up and training problems occurred. It can be said that real production began in the summer of 1980. Looking at the record this writer suggests that production year one be considered to be the 12 months, September 1, 1980 - August 31, 1981. Problems continued into the fall of 1980. Technical assistance was provided in December. From January on the plant and its people have performed well. Table Number I describes that twelve month production by months. With distribution closely following production over time (not necessarily by month) the more detailed comments made in the distribution section of this report with respect to volume attainment apply here too.

Production volume appears to be ahead of the project paper time projections at this time. Unofficial September production of 300,000 packets, annualized, produces 816 MT per annum, close to the market saturation level of 850 MT projected in the project paper for the 5th year. At the presently scheduled 16,600 packets per day production the 850 MT saturation level demand requires only 226 one shift days per year or 19 days per month. Plant capacity is quite adequate and

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The 2 mil laminated polyethylene/Nylon packet bag used is an entirely satisfactory container as far as can be seen from the record. It is an imported bag. Straight polyethylene bags are manufactured in Guyana from imported resins. Properly made 3 mil polyethylene bags should serve the product well with a possible saving in total cost and an almost certain savings in foreign exchange. Time does not permit detailed investigation of this possibility by the writer. It is recommended that first the economy of the two alternatives be investigated. If a change is economically sound then test the quality<sup>of</sup>/domestically produced 3 mil polyethylene bags by making fairly extensive test shipments of the product in such bags. Evaluate the result before commitments are made to make such a change.

Up until recently the shipping container employed for Cerex was a 2 ply multiwall paper bag with a 120 pounds basis weight. With that bag the packets were uniformly placed within. In the recent past a change was made to a synthetic plastic bag of the type resembling natural fabric bags in its qualities. The number of packets enclosed was increased to 100. The packets are randomly filled into the bag. This writer has no Cerex evidence with which to support the following statements; however his experience suggests:

1. Cerex shelf appearance may deteriorate due to random packed bags. Dust and rain may reach the packets more readily in transit and in storage.
2. Physical damage to the packets - holes - may increase due to random pressures on randomly packed packets.

It is recommended that field marketing personnel be alerted to observe these potentials if they should result from the change. The

is common. It is random packing of the packets and the porosity of the bag that arouse some concern.

Several items of lesser importance, but worthy of mention, concerning plant matters have come to the writer's attention. They are:

1. Storage of materials for other GPC activities in the Cerex plant warehouse space periodically causes some difficulty in proper maintenance of Cerex inventories. Certainly GPC management must make the best use possible of the physical resources at its command. However, to the extent possible it should minimize such encroachment in keeping with its commitment to provide suitable space. In particular, such use of the space should never encroach to the extent that it interferes with the program to reduce Cerex "out of stock" conditions discussed in the distribution section of this report.

2. A well worked out program of spare parts inventory maintenance has been prepared with technical assistance. Plant management appears to have done its part in proper, timely ordering. Deliveries have been significantly delayed by reason of timely issuance of import licenses. It is recognized that foreign exchange constraints are a burden on all Guyanese economic activity. However, USAID has now provided a significant second tranche of parts replenishment in addition to the original estimated one years supply. With that lead time already provided it would seem that the GOG could find it possible to support the continuing needs on a timely basis, in keeping with its general commitment to do so. Up to this time there have been no production losses resulting from these delays; however, sooner or later, under such procedures serious production losses will

occur, perhaps measured in months. Based upon its generous contributions to alleviate the problem, USAID Guyana can, and probably should petition the appropriate Ministry of Finance agency for relief from its delaying procedures for Cerex plant repair parts.

3. Sanitation is a continuous serious problem in a food factory. Labor employing brooms, brushes, wiping rags, soap, and water can maintain acceptable conditions with respect to dust and dirt. A significant part of that work can be done better, more quickly, and thus more timely with a vacuum cleaner. While not a critical item the purchase of a minimum 5 H.P. and preferably a 7 1/2 H.P. portable vacuum cleaner should prove to be a good investment. Smaller machines usually prove to be less efficient than manual means.

4. The plant floor, at grade level, is subject to surface water flooding during heavy rains. As noted before, herein, time has been lost due to such flooding. It is understood that a simple plan to prevent the flooding by building a concrete curb above the floor line around the building perimeter has been proposed. If properly designed and built such a curb should solve the problem, unless there are also interior leaks from the sub-surface. Certainly the problem should be corrected. Production and sanitation both suffer from such occurrences.

5. In his trip report covering his December 1980 visit Mr. Tribelhorn called attention to the ear damaging noise emanating from the Mikropul hammer mill and suggested building a housing for it. The condition he described persists. Certainly ear damage to those working in the area will occur if

protection. Mr. Tribelhorn suggested a housing structure. If that suggestion poses a cost problem or an operating problem for access to the machine, a removable (hinged) wood frame structure heavily lined with sound absorbing (acoustical) material could prove to be adequate. Such a structure would cost very little and could be built by the carpenter employed by GPC. This employment health hazard should not be ignored.

TABLE 2

GPC CEPEX DISTRIBUTION  
(Sales To Wholesale and Retail Outlets)

	<u>1/2 lb. Pouches</u>			<u>Total In M.T.</u>
	<u>Retail</u>	<u>Wholesale</u>	<u>Total</u>	
September 1980	50,305	93,600	143,905	32.6
October 1980	46,809	37,200	84,009	19.1
November 1980	44,456	29,960	74,416	16.9
December 1980	20,587	76,000	96,587	21.9
January 1981	30,706	74,000	104,706	23.7
February 1981	22,114	79,892	102,006	23.1
March 1981	48,670	74,000	122,670	27.8
April 1981	50,960	92,000	142,960	32.4
May 1981	44,160	120,904	165,064	37.4
June 1981	42,880	232,080	274,960	62.4
July 1981	42,308	100,000	142,308	32.3
August 1981	<u>12,300</u>	<u>206,300</u>	<u>218,600</u>	<u>49.6</u>
12 Mon. Totals	456,255	1,215,936	1,672,191	379.3
Percent	27.3%	72.7%	100%	100%
	6 mon. 3/1 - 8/31/81	Annualized		483.8
	3 mon. 6/1 - 8/31/81	Annualized		577.2

## DISTRIBUTION - SALES

In general, distribution of Cerex has proceeded as originally planned, with the exception of the MCH portion.

Deliveries are made to two classes of buyers - wholesalers and retailers. Within the GPC marketing organization there are two divisions - one handling sales to wholesalers, and a "Wholesale" division handling sales to retailers.

For practical purposes it can be said that all deliveries are made FOB GPC warehouses, Georgetown. Typically deliveries to wholesalers are made at the Cerex plant. GPC "wholesale" marketing operates a warehouse located near the marketing headquarters. An inventory of Cerex is maintained in this bond from which the "retailer" customers are served.

Tables 1 and 2 show that marketing has distributed the product manufactured. Comparison of the month by month totals of product manufactured and product distributed shows considerable deviation - a quite normal occurrence for such an operation. Delivery demand will not directly coincide with fixed plant capacity even though that plant's capacity is quite adequate to meet the total market needs.

The marketing records show recurring "out of stock" experience, some of considerable duration. Without question, the plant has the production capacity to prevent such occurrences, but it cannot logically be geared to meet highly variable demand as the peaks occur. The usual solution to this problem is to determine the finished product inventory level that is required to meet the usually recurring peaks of demand, and schedule production to

maintain such inventories. The marketing people presently have no certain knowledge as to the lost consumption by reason of "out of stock" conditions on retailer shelves. They are quite certain lost sales do occur by reason of the re-supply habits of their customers - the frequency of their trips to the Georgetown bonds. The constraints to such an inventory maintenance program are usually:

1. The greater storage space requirements and their attendant costs.
2. The increased working capital tied up in finished product inventories, and
3. The risk of quality deterioration, including infestation, from failure to properly rotate the inventory - the oldest always out first. (FIFO)

There is no indication that such constraints pose any significant problem to the Cerex operation. It appears to be only necessary for the responsible marketing and production people to collaborate in determining:

1. The required inventory levels to be maintained.
2. The bonds in which they will be maintained.
3. The re-order levels for inventory, and the procedure incidental thereto, so as to provide as much lead time as possible, in order to avoid overtime operation.

The responsible people in marketing and production are quite capable of solving this internal problem. It is recommended that they do so, promptly.

Marketing management states that there are some twelve wholesalers handling packaged foods and these are being served as outlined above. Some of these wholesalers maintain inventories in outlying bonds, other operate in Georgetown only.

## QUALITY CONTROL

The cooked material, as it was observed, is of excellent quality. The flavor is very good. Gelatinization of the starch is sufficiently complete so that there are no raw flavors. The puff attained makes for a tender eating quality.

The in plant quality control testing for process control appears to be adequate and effective. Four samples of the raw material to the Brady Cooker, the cooked ground material, and the blended Cerex are taken at one hour intervals. The grain mix is tested for moisture. The cooked material and the blended Cerex are tested for moisture, density, consistency [viscosity], and organoleptic properties. Examination of a significant volume of daily results of those tests indicates that the product is held within the prescribed tolerances.

Two packet samples per day are sent to the GPC Central Lab. for further testing. Analytical testing for protein, fat fibre, etc., is only accomplished on a random basis, perhaps bi-monthly. The production from each days operation is tested for micro-organisms. This testing is reported to require 72 hours to complete. The manufactured packed product is held out of the inventory available for delivery until approval is recieved from the Central Lab. The writer examined a volume of these daily microbiological reports. No report of significant total plate counts was observed. On none was there a finding of any pathogenic species. The Plant Manager and the Quality Control representative could recall of no instance where total counts or pathogenic species counts could possibly be a cause for concern. GPC management should logically reconsider the need for the daily microbiological testing. Alternatives might be:

1. Weekly testing of a composite sample of the prior week's manufacture.
2. Testing of all raw material receipts from which all infections would most likely originate. Raw grains to be cooked would show higher counts than are

presently reported. Cracking practically eliminates such infections.

In any event, there is no apparent reason to continue to hold daily production out of distribution channels for over three days awaiting the results of the plate counts. Continuance of the policy appears to be quite redundant. Identifying code information is on each package. Most of the time the product would still be in the plant inventory on completion of the tests. If it were not it would have been shipped so recently that most would still be in the consignee's inventory. In other words, most or all of it would be easily recalled if it were found to be out of tolerance - an unlikely occurrence. Such surveillance of dry cereal packaged products as is practiced at present is most unusual. The writer knows of no precedent for it.

The writer and the Plant Manager opened a bag of the whole corn being used and hand picked out the foreign matter in perhaps forty to fifty pounds of it. A large handfull was segregated. Most of the matter was corn plant related - cob, leaf, stem, etc. There was one stone, several soybeans, and one dried piece of unidentifiable matter which may have been a dried piece of plant material laden moldy material or it might have been a dry piece of animal excreta. Without the equipment necessary to conduct an actual grade test, the writer estimated the lot to be fairly typical sample of U.S. grade No. 2 that had only been subjected to the usual coarse silo cleaning. As discussed before, there is risk in using commercial grain without the benefit of grain cleaning equipment suitable for pre-process cleaning. This writer is not at all comfortable with the decision to use whole commercial corn without cleaning. The practice was initiated as a substitution for part of the corn meal in order to help solve a processing problem. It is worth investigating to see if the C.M.C. could deliver, either, in order of preference:

1. Food quality cracked corn, or
2. A large particle size corn grits.

**Best Available Copy**

These would be clean products. The matter of the use of whole commercial corn without the benefit of cleaning deserves reconsideration. If neither of the above materials are available under P.L. 480, or if the grits granulation is still too fine for good cooker operation one might also try just cracking the rice, in the Mix-Mill or even eliminating the grinding screen altogether in order to see if the problem with corn meal could be so solved.

**Best Available Copy**

The original project paper stated that there were some 4000 retail food outlets in Guyana. Later documents reduce that number to 1400 to 1500. GPC marketing management presently estimates that there are no more than 700 retail packaged food outlets. In addition there are clandestine importers who actively retail smuggled foreign products on the streets. Their activities are deemed to be damaging to legitimate retailers. Selling margin limitations are placed upon retailers both by law and by directive. The resultant profit potential for legitimate retailers of food-stuffs has become so low that their ranks have become decimated in a very short time. GPC marketing management states that it is time to again survey the remaining retail outlets and their location. They are urged to do so.

This rapid decline in retail outlets for food distribution should be of great and immediate concern to the GOG. If the findings of such a survey are that such decimation has occurred and is continuing to occur; and that regional availability of foodstuffs is suffering thereby; then it would seem that one of two actions would be required of the GOG. Either:

1. By price relief, return packaged foods retailing to a profitable level, and materially reduce illegitimate competition by police action, or allow the legitimate merchant to sell the goods through legitimate importation.
2. Expand GOG owned and operated retail outlets to insure continuing adequate produce availability for the people.

A small distribution of Cerex is accomplished with a small GPC van that carries an assortment of GPC items to outlying areas. This operation has the attributes of a "fill in" delivery service only.

GPC marketing management believes that Cerex is being sold to practically 100% of the remaining 700, more or less, retail food stores, either directly or through the wholesalers.

The GPC pricing policy directives, operating as coercive policy, without the effect of law, provides the following schedule for a 1/2 lb. packet of Cerex:

In Guyana Dollars

	F.O.B. GPC Bonds Georgetown	Delivery outside of Georgetown
Price to Wholesalers	0.38	N.A.
Price to Retailers	0.43	0.45
Retail price to Consumers	0.50	0.52

- Notes:
1. N.A. = Not available. GPC does not deliver to wholesalers outside of Georgetown.
  2. The G\$ 0.02 differential shown for sales to retailers outside Georgetown, and to consumers outside Georgetown, is allowed in recognition of higher freight costs for such deliveries.
  3. The prices to retailers apply to both the GPC "Wholesalers" marketing division and to independent wholesalers.

The planned M.O.H. program has not been implemented. Three one ton delivery vehicles intended for the distribution to the M.O.H. centers are in the country. Mrs. Callier's section of this report discusses the M.O.H. program in more detail.

Without question this important segment of the project has slipped badly. The principal problem appears to have been funding by the M.O.H. and GPC. If the problems are not solved promptly and the program vigorously implemented there will be little or no information of value available to guide the final, in depth, evaluation team from this component of the project. Since the in depth evaluation is intended to be a prime guide to decisions with respect to implementation of the continuing phases of the project, including the P.L. 480 contributions for Phase II, high level action appears necessary to clarify the problem and initiate prompt action. It is recommended that the following responsible people convene promptly, solve the problem, and initiate vigorous implementation;

1. The Minister of Economic Development,
2. The Director of USAID/Guyana,
3. The Minister of Health,
4. The Chairman of GPC,
5. And such of their aides as can contribute to the solution.

It is recommended that if the principals named, who have contract responsibility for the project, cannot participate, their nominees be vested with authority to act in their stead. Time is of the essence if this failed component of the project is to contribute a positive element to the decisions to be made prior to the stated project expiration date of December 31st., 1982.

The present pricing levels for Serex are not returning the GPC operating and distribution expense, contemplated in the project paper, according to fragmentary GPC reports to A.I.D. Acceptance of these reports as valid, or invalid, should be considered only after reading the statements made earlier herein with respect to project accounting. The project paper and an implementation letter

anticipated a favorable margin above those stated expenses to be placed in a special imprest account for use only for specific purposes. As of this time there have been no credits to that account. Whether there should have been, or not, is a matter of accounting methodology, discussed elsewhere. Certainly the rapidly growing volume distributed is placing an increasing burden on the GCG for subsidization of the product.

Table 2 illustrates that growth. From it one can see that in a 12 months period from September 1st. 1980 to August 31st., 1981, 379 tons were distributed not significantly below the project paper estimate of 430 tons. The last three months of that period annualized shows 577 tons equal to the year 2 projection. The September 1981 unofficial figure of 68 tons production if annualized equals 816 tons, approaching the market saturation estimate of 850 tons expected in the fifth year.

At its highly subsidized price, Cerex appears to be the lowest cost cereal based food available to the people and far below any available offering its additional unique properties. The people appear to recognize that value. At a price of G\$ 1.20 per packet it would appear to retain its pre-<sup>e</sup>minent value position. GPC management, including Marketing Management, have expressed a belief that a retail price up to that level, would have no deteriorious effect on volume of sales. Mrs. Callier's section of this report discusses consumption of the product by other than the target group, resulting in an unintended subsidy.

There appears to be no constraints under P.L. 480, Title II, Sec. 206, or in the project documents, to price escalation. There are constraints in Implementation letter No. 9, dated 21 July, 1980, with respect to usage of the margins earned over the costs incurred for production and distribution expense. That letter is in effect through December 31st., 1981 and provides:

Such funds shall be used to reimburse costs of GPC and the M.O.H. for the following in the priority shown:

1. GPC marketing and advertising costs exclusive of personnel salaries.
2. GPC and M.O.H. costs to provide adequate storage in participating M.O.H. Clinics.
3. GPC costs up to US.\$ 13,600 maximum for procurement, fabrication, and installation of Cerex factory equipment.
4. GPC Cerex factory operating expense for the period March 1st. - May 31st., 1980.
5. A nutrition education program, nutrition improvement, and research and development projects designed to promote indigenous raw materials for Cerex.

Immediate escalation of the pricing structure could have beneficial effects.

It could:

1. Provide funds for the purposes stated in the implementation letter.
2. Place the GOG in the position after December 31st., 1982 to recover more, or all of its costs thus reducing, or eliminating subsidy to the commercial sector sales. Such a result would be dependent upon the terms of agreement negotiated with USAID for Title II commodity support and any other support provided for Phase II.
3. It would provide the final, in depth, evaluation team with much better data with which to assess the costs and financial benefits likely to accrue, with a continuing program, under the phased concept, and thereafter. This benefit would lead to better informed decision making with respect to continuance of the program.
4. Perhaps reduce diversion of the highly subsidized product to non-target

consumption- which today tends to change the intended result from an infant food subsidy to a general food subsidy- in some presently unknown proportion,

It is recommended that prices be escalated over the next year starting as early as a well thoughtout plan can be formulated, in order to accrue the maximum benefits contemplated above. GPC management may logically formulate and implement the plan with notification of the action taken and the results ther from to USAID. Such escalation should certainly be accomplished in increments over time. For example only, let us say that the initial goal is to reach G\$ 1.20 per 1/2 lb. packet retail in Georgetown in time to evaluate sales results for the final evaluation team. Perhaps then the program might be:

1. Increase the price schedule to reflect a G\$ 0.75 per packet Georgetown retail price effective December 1st., 1981. Hold in effect for three months to March 1st., 1982 with the marketing organization carefully monitoring sales demand at least monthly. If there is no serious deterioration in demand then:
2. Increase the price schedule to G\$ 1.00 effective March 1st., 1982 and proceed as in 1.
3. Increase the price schedule to G\$ 1.20 effective June 1st., 1982 and proceed as in 1.
4. At any time during the program, if sales demand falls off significantly, for a month, let us say 10% or more, carefully consider either holding at that level, or retreating to a level that will sustain demand for the balance of the project life.

There has been no advertising or promotion since January 1981. From the standpoint of distribution volume, only, it does not appear to have been missed.

In summary, the sales and physical distribution of the commercial product

appears to have been effectively handled. There is no apparent serious need for additional marketing facilities or any significant organizational change required to attain the project goals in the sales and physical distribution areas of the operation. Better collaboration between the marketing and production management to materially reduce, or eliminate, the recurring "out of stock" condition is needed and should be easy to accomplish.

The M.C.H. distribution planned is out of control. There is no distribution to the M.C.H. centers. If this component of the project is to make any contributions to project goal attainment it appears to require high level vigorous attention, as herein before proposed.

Project Financial Status

The project paper, grant agreement, and the amendments provided for the following commitments during the life of the project ending 31 December, 1982:

1. USAID - US\$515,000
2. GOG - US\$502,000 equivalent
3. PL480 Commodities, 1120 MT estimated to cost US\$480,454 CIF Georgetown.

At August 31, 1981 the USAID account shows the following condition:

Original Commitment	\$500,000.00
Disbursements	<u>479,563.66</u>
Balance remaining	20,436.34
Amendment No. 3	15,000.00
Disbursements	<u>-</u>
Balance remaining	<u>15,000.00</u>
Total balance available as at 31 August, 1981	\$35,436.34

There are known outstanding unpaid purchase commitments in the magnitude of \$14,000 to \$15,000. There are no other presently known charges, or purchases to be charged against the original \$500,000 USAID grant. It is expected that the present balance available of \$5,000 to \$6,000 will be adequate to cover any unforeseen contingencies that may be properly charged to the original grant and its No. 1 and No. 2 amendments. As of this time there have been no disbursements under Amendment No. 3; therefore, \$15,000 remains

available for project evaluation purposes.

The GOG commitment of \$502,000 US equivalent was intended to provide land, buildings, equipment installations, indigenous commodities, and operating expense. Since operating expense is recovered on a revolving basis from the revenue from sales the actual contribution of the GOG to the commitment for this item would in effect be an allocation of GPC working capital required to finance such expense during the short time between when operating expense is paid and the costs recovered from sales revenue. There has been no attempt made to fully segregate, cumulate, and report these contributions to the project.

It can be said with considerable assurance that the GOG has:

1. Provided land, buildings, and equipment installation costs.
2. Provided the indigenous raw materials required for Carex production to date on a timely basis.
3. Paid the operating expense out of its revolving working capital.

It has thus met the basic intent of its commitment, even though the cumulative money amounts may not presently be known. While it would be useful to the final evaluation team to have full cumulative data on these expenditures, by detail account classification, with which to help project future costs, the only item that seems to be contractually required by the project documents is routine reporting of operating expense which is not the equivalent of the revolving working capital required to finance such expense.

The PL480 commodity commitment current status appears to be:

up to date, which provides direct charges to detail accounts, by products, such problems are solved by a detailed product costing system kept necessarily needed for the small volume item. In the larger organizations by the allocation of overhead costs needed for the full line but not a multiplicity of products, small volume items tend to be penalized within the Cerex plant. In most larger manufacturing organizations having between the various activities, unrelated to Cerex production, conducted corporate overhead expense and incurred expense within the Cerex plant principal differences of opinion lie in the areas of allocation of remains an unsettled matter between USAID/Guyana and GPC. The Operating expense reporting for Cerex production and distribution

the project, 31 December, 1982, level, 21480 commodities should last to approximately the end of supply equates to about 10 months supply. Depending upon the demand about a 15.5 month supply. At the September, 1981 level that potential exhausted. At the August level of production and sales it equates to before the 1102 MT maximum allocation of Title II commodities is commodities should permit the manufacture of about 700 MT of Cerex Title II commodities. That inventory plus the undelivered and un-ordered at 8/31/81 the Cerex plant inventory was about 87.3 MT of

Authorization Months	Delivered to Date	On Order, undelivered	Remainder presently available from the authorization
1102	631	112.2	358.8
US\$480,454	299,600	58,000	132,800

of fixed expense items to the Carax accounts. The time period of the

to independently decide, after investigation, legitimate allocation  
accounts of the corporation. It should be the duty of the accountants

Carax, based upon investigation of all of the fixed and variable  
with the specific charge to report only a valid "product cost" for  
(Certified) Public Accountants to audit the books of the corporation  
that consideration be given to the employment of outside chartered  
transpired are not likely to solve the problem. It is recommended

simple discussions, requests, and rebuttals such as have  
recommendations concerning later phases of the project.

respect to operating expense in order to make valid  
3. The final evaluation team will need valid data with

selling prices.  
2. to serve as one item for consideration in establishing

described herein before.  
documents as defined in Implementation Letter No. 9,

1. To more accurately meet the intent of the contract

exists for three reasons:

USAID and GPC need better operating expense data than presently

are taken into account:

unprofitable when the costs of its establishment and maintenance  
be undertaken. It appears that such an effort would probably be  
knowledge of the GPC operation to recommend that such an effort  
product costing system and this writer does not have sufficient  
accordingly. GPC, of course, does not have such a sophisticated,

for its contributions to each product in the line and charged  
for all variable expense. Fixed expense is carefully analyzed

audit should be from the date of agreement signing to perhaps June 30, 1982 in order to have the resulting information available for the final evaluation team. The audit report should provide monthly detail schedules so that the final evaluation team can differentiate between the relatively meaningless start up costs and those likely to continue in the later phases. A collateral benefit that could easily accrue from such an audit would be an accumulation of GOG expenditures, including use of corporate working capital to meet its contractual commitment of \$500,000 U.S. equivalent. Such an audit could provide a sound basis for retroactive deposits to the imprest account required by implementation letter No. 9, if any are due.

The writer agrees that the expense statements prepared and presented to date are incomplete and inadequate. He also believes that they are unlikely to, be significantly improved (made useful) without an audit in depth.

TABLE 3INDICATIVE COMMODITY PRODUCTION AND PRICESAverage Annual Farm Prices - In Guyana Dollars Per Pound

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Black Eye Peas	0.43	0.45	0.53	0.53	0.60	0.65
Corn	0.08	0.14	0.18	0.18	0.18	0.18

Annual Production In Metric Tons

Black Eyed Peas	250	820	1,000	730	1,090	1,450
Corn	2,720	2,720	5,800	4,310	3,270	2,090
Milled Rice	97,500	153,800	175,400	110,000	210,000	182,000
Sugar	265,700	340,800	300,300	340,000	241,500	324,800

Average Export Price - G\$ Per Long Ton

Milled Rice	521	964	1,036	1,041	1,015	916
Sugar	337	942	1,452	917	894	836

Annual Exports - In Long Tons

Rice	48,000	51,000	82,000	71,000	66,000	105,000
Sugar	225,000	302,000	285,000	297,000	208,000	281,000

Corn Consumption - In MT

Local purchases	—	—	—	1,103	1,640	1,610
Imports	—	—	—	9,567	3,230	1,226
Total Consumption	—	—	—	10,670	4,870	2,836
Purchase Price - G\$ - Imports	—	—	—	507,06	485,01	490,52
Purchase Price - G\$ - Local	—	—	—	462,97	512,57	570,71



## Indigenous Commodity Substitution

The project paper envisioned phasing out Title II commodities during Phase II of the activity. It was envisioned that supplies of indigenous corn and soybeans would become available. Each Title II commodity will be discussed individually.

I. Corn and corn products: Corn production is going down in Guyana. The Caricom farm activity that was activated to promote corn production [among others] has experienced difficulties and thus far its activities in Corn production promotion are basically dormant. There is little or no assurance that a dependable supply of corn will be produced in Guyana within the time frame of the project projections. Sorghum production is deemed to have a better chance of becoming a volume crop than corn but it too is in its infancy. Rice is the only indigenous cereal crop that can be depended upon to produce even the small quantities required for Carex. To the extent that it replaces corn in the formula the protein lost due to rice's lower content must be increasingly supplied by legumes or Milk products.

2. Soy Products: The soybean production program envisaged has not gotten off the ground. It too was being nurtured by the Caricom farm venture and has suffered from the problems of that agency. There is little or no likelihood that a dependable supply will be available within the time frame of the project extensions, contemplated. The most likely leguminous candidate for consideration is the black eyed pea [cowpea]. There has been a relatively dependable small production of this item for some time. The State owned sugar company devotes a portion of its lands to them. It is believed that the domestic supply is growing. Detailed investigation of this item both as to likelihood of a dependable supply and as to its nutritional value for Carex, appears to be well worth doing. It appears to be the only indigenous candidate.

3. Skim Milk Powder: There is no likelihood whatsoever of a domestic supply of

this item within the time frame envisaged. Some, but surely not all, of the property contributed by this item could be supplied by increased use of legumes and possibly sugar. A nutritionally sound weaning food can probably be made without this commodity.

4. Vitamin and Mineral pre-mixes, should remain imported items during the time frame of the project extensions.

5. Soybean Oil: The only candidate for domestic substitution for soy oil is deodorized coconut oil. There is a more than adequate domestic production, This writer has had no experience with coconut oil and does not know its food properties. Food technologists and nutritionists who are familiar with it must consider this possibility.

Usage of the above candidates for import substitution would not produce a product identical in character to the present Cerex. They simply have the possibility of producing an entirely acceptable product with largely indigenous commodities. Nutritionists and food technologists would have to re-formulate the product and assess the probable acceptability of it. Engineers would have to assess the additional equipment needed, if any. There is no obvious need to add equipment for the increased use of rice in the formula. If well cleaned peas could be procured from the sources that presumably clean them for domestic consumption no additional cleaning equipment would be required. If rice were used as the cereal component then quite possibly the peas would not require decortication. The fibre content could be expected to meet the specifications. If these are correct assumptions then the U.S. \$90,000 to \$100,000 equipment investment for cleaning and decortication equipment could be saved. A re-formulated product would require acceptability testing. It would be quite possible to conduct the required investigation between now and September 1st., 1992 the proposed starting time of the planned in depth evaluation.

QUALITY LISTING - RECOMMENDATIONS

Cerex Plant

Maintain cooking temperature at 340 F allowing a maximum deviation of 10 F without requiring adjustment.

If commercial corn and soybeans are to be used for Phase II and thereafter, from any source, then a cleaning and decorticating system will be required at a cost in the magnitude of \$90,000 to 100,000.

Hoppers into which bagged ingredients are fed should have protective screens above them to prevent foreign material such as bag tags, string, etc. from entering the product.

The highly variable cooked material book- yields, while not believed to be valid, should be investigated in detail to find the cause. Without reliable yield data, management is without a necessary tool to control material costs.

— Consider the economy of, and if favorable, test the quality of domestically produced 3 mil polyethylene bags, as a substitution for the imported, quite satisfactory, laminated bags.

Monitor the performance of the new shipping container in retail channels with respect to Cerex package appearance and damage.

Storage of materials for GPC activities other than those for Cerex should encroach as little as practical on Cerex plant space. Such encroachment should not be permitted at all if it impairs maintenance of proper Cerex inventories.

Plant repair parts orders are delayed by failure of import licenses to issue promptly, leaving production at risk. It is recommended that relief be sought from the Ministry of Finance.

When funds can be made available buy a portable vacuum cleaner for the plant.

Conduct minor building construction to prevent flooding of the plant floor during heavy rains.

By isolation, with a simple housing, materially reduce the noise emanating from the Mikropul Mill.

#### Quality Control

Consideration should be given to the need to continue with daily micro-organism plate counts. They appear to be redundant. Even if GPC Management elects to continue them it appears to be illogical to withhold the product from distribution for 3 to 5 days awaiting the results of the tests.

The use of raw commercial corn without the benefit of cleaning equipment is not good practice. The availability of food grade cracked corn and large granulation corn grits should be investigated. Another alternative worth testing might be light cracking of the rice or even removing the grinding screen when using corn meal and whole rice.

#### Sales - Physical Distribution

Establish and maintain finished product inventories sufficient to materially reduce, or eliminate, the recurring out of stock condition reported. Appears to require only good internal GPC Collaboration between GPC Marketing and Production departments.

GPC Marketing Management should conduct a survey to determine the number and location of retail packaged food outlets. If the numbers and locations are dwindling to the extent indicated GOG intervention may be needed.

The MCH program has not been implemented. High level, vigorous action is recommended.

A plan of price schedule escalation is recommended.

#### Project Financial Status

It is suggested that a Cerex product cost audit of GPC books of account be accomplished July - August, 1982.

#### Indigenous Commodity Substitution

Vigorously evaluate reformulation of the product using the following:

1. Entirely replacing corn and corn products with rice.
2. Replace soy flour with black eyed peas.
3. Consider replacing soybean oil with coconut oil.

Such a materially revised product would require acceptability testing prior to adoption.

adequate supplies of corn and soybeans given the proper facilities, money, and technical skills. The conclusions stated simply mean that the required inputs are not in place at present, and are not likely to be in place in time to produce dependable supplies within the time frame of this project.

What is the alternative to the use of indigenous materials, if the product is to continue to be produced? Obviously importation of corn and soybeans, or products derived from them, as the base ingredients, would be required. The volume of the product required to feed the target group is not high. The basic goal to improve the nutritional level of children remains a laudable goal. The drain on foreign exchange to pay for such imports would not be high; however, the GOC, sorely constrained in foreign exchange must evaluate the opportunity values of its expenditures of foreign exchange. There is no assurance whatsoever that Carex production could successfully compete with other proposed uses of the money.

The rationale for Phase II contributions of P.L. 480, Title II, Sec. 206 commodities appears to have been entirely motivated by the plan to convert to indigenous commodities, If that cannot be substantially accomplished, then it seems that the reason for Phase II commodity support disappears.

Unless the above evaluations can be effectively rebutted this writer recommends strongly that USAID and GPC vigorously attack the problem of re-formulation of the product to use indigenous commodities, acceptability test the product resulting therefrom, and have the answers available no later than September 1st., 1982, the scheduled date of the start of final project, in depth evaluation.

Table No. 3 provides some indicative production and price history for commodities of interest, This information is old, ending in 1978 and is not necessarily

a reliable guide to the present or the future. For example, corn production will go lower in 1981 if the statements made with respect to area planted are correct.

The following commodity price schedule is indicative only. It is calculated from the last known prices found in the literature. For definitive product costing purposes all of these prices should be accurately up dated.

INDICATIVE COMMODITY PRICES

Yellow Corn - Imported, CIF Georgetown	- G\$ 1.05 per Kg.
Yellow Corn Meal - Imported CIF Georgetown	- G\$ 1.25 " "
Defatted Toasted Soy Flour - Imported, CIF Georgetown	- G\$ 1.37 " "
Nonfat Dried Milk - Imported, CIF Georgetown	- G\$ 1.53 " "
Soybean Oil-Salad Grade - Imported, CIF Georgetown	- G\$ 2.87 " "
Milled White Rice - Domestic	- G\$ 0.90 " "
Sugar - Domestic	- G\$ 0.82 " "
Corn - Domestic	- G\$ 0.58 " "
Blackeyed Peas - Domestic	- G\$ 2.09 " "
Deodorized Coconut Oil - Domestic	- G\$ 2.20 " "