In the appropriate answer to each of the following (if not applicable write NA),

Source of Population:  
1. ill subjects (Yes/No)  
2. non-ill subjects (Yes/No)  
3. minors or persons under guardianship (Yes/No)  
4. in study involve:  
   a. physical risks to subjects (Yes/No)  
   b. social risks (Yes/No)  
   c. psychological risks to subjects (Yes/No)  
   d. discomfort to subjects (Yes/No)  
5. will signed consent form be required:  
   a. from subjects (Yes/No)  
   b. from parent or guardian (if subjects are minors) (Yes/No)  
6. will precautions be taken to protect confidentiality of subjects: (Yes/No)  
   a. check documents being submitted herewith  
   b. have waiver proposal - initially submit an abstract (all other requirements will be submitted with individual studies)  
7. Protocol (if required)  
   a. abstract summary (Required)  
   b. statement given or read to subjects on nature of study, risks, types of questions to be asked, and right to refuse to participate or withdraw (REQUlRED)  
   Inform consent form for subjects  
   Inform consent form for parent or guardian  

Procedure for maintaining confidentiality  
Questionnaire or interview schedule  
If the final instrument is not completed prior to review, the following information should be included in the abstract summary:  
1. A description of the areas to be covered in the questionnaire or interview which could be considered either sensitive or which would constitute an invasion of privacy.  
2. Examples of the type of specific questions to be asked in the sensitive areas.  
3. An indication as to when the questionnaire will be presented to the Board for review.

To obtain approval of the Review Board on Use of Human Volunteers for any work involving the rights and welfare of subjects before making such change.

Principal Investigator

Copies of entire protocol to Chairman, Review Board on Use of Human Volunteers.
SECTION I - RESEARCH PROTOCOL

Title: Intrafamily Food Distribution and Feeding Practices

Principle Investigator: Lincoln C. Chen

Starting Date: 1 April, 1978

Completion Date: 30 June, 1979

Total Direct Cost: $46,500

Abstract Summary:

This protocol proposes a pilot longitudinal study on the dynamics and determinants of household food behaviour and feeding practices in about 120 selected households of the Matlab Surveillance Area. Its aims are to delineate intrafamily food distribution; to document maternal and child feeding practices in response to seasonal food shortage and health-related conditions - such as diarrhea, fever, respiratory illnesses, pregnancy and lactation; to identify the determinants of the behavioural patterns observed; and to relate nutritional status to food behaviour, food availability, nutrient requirements, and disease morbidity. The field procedure consists of a cross-sectional survey among 1,000 households in 4 villages to obtain a sampling frame, indepth monthly longitudinal follow-up of 120 purposefully selected households, and several specialized surveys. A better understanding of household food behaviour, it is postulated, is fundamental to more effective nutrition policies and programs.

7) Reviews:

a) Research Involving Human Subjects: 

b) Research Committee: 

c) Director: 

d) BMRC: 

e) Controller/Administrator: 


SECTION II - RESEARCH PLAN

A. INTRODUCTION:

1. Objectives:

   The long-term goal of this protocol is to elucidate the pattern, determinants, and consequences of household food behaviour and feeding practices in rural Bangladesh.

2. Background:

   Introduction: Bangladesh has a serious energy-protein nutrition problem. The recently published, "Nutrition Survey of Rural Bangladesh 1975-76" reported that 60 percent of rural households had deficient calorie consumption; 30 percent were consuming insufficient quantities of protein. The deficiencies were such that 75 percent of preschool children were suffering from moderate to severe malnutrition. As in other poor countries, the causes of energy-protein malnutrition in Bangladesh are multiple: poverty, socioeconomic inequality, low agricultural productivity, monotonous cereal-based diets, unsanitary environments, high disease burdens, and insufficient utilization and maldistribution of existing resources.

   Policies and programs directed toward improving the nutritional status of the population rely upon assumptions, often implicit, on the relative significance of various factors presumed to influence nutritional wellbeing in a particular setting. Figure 1 presents a conceptual framework focusing on the determinants of nutritional status among preschool children. The vertical line under "Nutritional Status" represents the development of a preschool child from conception to birth to age 5. The initiating event is conception, and the subsequent demarcations are birth and the attainment of age 5. Useful measures of nutritional status during this portion of the life cycle are weight gain of the mother during pregnancy, birth weight, and various growth and development indicators during childhood.

   During these stages of development the most important causes of "Nutrient Wastage" are infectious and parasitic diseases. Although not fully delineated, these pathophysiological states may cause nutrient loss through several pathways. An ill child may experience interruption of breastfeeding or reduced food intake due to anorexia or food withholding behaviour. Food that is consumed may be malabsorbed because of functional
defects of the gastrointestinal tract and rapid transit time. Certain infectious and parasitic diseases, moreover, may cause nutrient loss directly by destroying the integrity of the gastrointestinal mucosa leading to the loss of plasma protein and blood. The child may also suffer from catabolic losses whereby body tissue may be broken down and sequestered, inefficiently utilized, or excreted in urine, feces, or sweat.

A child's nutrient intake ("Nutrient-In" pathways) is determined by the diet of the mother and child. During pregnancy, the maternal diet and maternal nutritional status (reserves) are important factors affecting fetal nutrition. In most rural areas of poor countries, breastfeeding is universal and intensive in the first and second years of life. Unfortunately, breastfeeding may be declining in many urban settings. Supplements to breast milk are introduced, usually between 4 to 12 months of age, and eventually the child will be completely weaned, becoming entirely dependent upon his own food intake. The nature, magnitude, and timing of these feeding practices are reflections of household food behaviour.

An antecedent to household food behaviour is total family food availability. The nature and quantity of the food available to a family is dependent primarily on socioeconomic variables, such as wealth, income, and employment. In subsistence agrarian economies, such as rural Bangladesh, landownership is a crucial wealth indicator and income, either in cash or in kind, may be derived either from such assets or from employment. For most of the rural poor, who have insufficient land, agricultural labour is the primary source of family income.

The oversimplified diagram in Figure 1 provides a micro-level framework for identifying and quantifying the determinants of nutritional status of children under age 5 in rural Bangladesh*. Several features of the framework should be underscored. Firstly, although the "Nutrient-In" and "Nutrient Wastage" pathways are depicted separately, they are, in many instances, interdependent and interact with each other. Infection for example, may not only result in biological wastage of nutrients through malabsorption and catabolism but may also influence feeding practices during and after illness. Conversely, host defenses against infection depends, in part, upon the nutritional status of a child which in turn is affected by food intake regulated

*Papers dealing with malnutrition as a holistic problem are references 8, 9, 35, 51, 54, 65.
by a family's food behaviour. Another example of the interaction of these processes are presumed changes of intrafamily food behaviour in response to seasonal fluctuations of food availability.

A second feature of the framework is its capacity for categorizing specific nutritional policies and programs. Interventions such as agricultural policies, price subsidies, food stamps, ration shops, and food-for-work programs affect nutritional status by generating or redistributing income, increasing total family food availability. Nutrition education and on-site or take-home feeding programs, in contrast, are directed primarily at household food distribution and feeding practices. Public health programs - such as clean water, improved sanitation, and infection control - influence nutritional status by reducing the wastage of nutrients.

The need for basic information in support of more effective interventions becomes readily apparent if individual interventions are viewed within the context of the conceptual framework. In order to improve the nutritional status of a child, income generation and/or redistribution interventions must not only reach the families in greatest need, but must also overcome intrafamily food maldistribution, deleterious feeding practices, and nutrient wastage due to infection. Similarly, infection control may reduce nutrient wastage but, to achieve measurable nutritional impact, attention may need to be given to family food behaviour and food availability as well. Significantly, those less developed countries that have made enormous strides recently towards eliminating energy-protein malnutrition through rapid socioeconomic change have consistently implemented policies and programs that have affected simultaneously all three major determinants of nutritional wellbeing: food availability, food behaviour, and nutrient wastage.

Bangladesh: When applying this conceptual framework to energy-protein malnutrition among Bangladeshi children, the knowledge inadequacies become readily apparent. It is often postulated, for example, that economic poverty is the cause of malnutrition in Bangladesh. If this were so, one would expect high correlation between economic indicators and nutritional status. Available empirical data suggest that this is not the case. In a multivariate regression of 14 socioeconomic factors associated with childhood
malnutrition in Comanigang, Bairagi found that only 11 percent of the variance would be explained by economic (income) and household (mother's education) variables. The remaining 89 percent of the variance was unexplained. Moreover, the processes by which the determining variables operated to affect nutritional status were not elucidated. Analysis of a 1975 nutrition survey in Matlab, similarly, noted a positive relationship between nutritional status and household floor space, a surrogate economic measure (Table 1). The striking aspect of Table 1 is not so much this expected association but the fact that 95 of 151 presumably very poor children were nevertheless well nourished and 35 of 123 presumably very rich children were severely and moderately malnourished. Economic indicators, moreover, would fail utterly to explain why female children are more often malnourished and experience higher mortality than their male counterparts. In Bangladesh, the sex differentials of mortality between ages 1-4 years is extremely striking, with females occasionally experiencing mortality levels twice that of males (13, 62). Much of this mortality differential appears to be due to sex differential of nutritional status, since, on an average, the body weight of female children lags at least 6 months behind their male counterparts (31).

As with economic indicators, the relationship between nutritional status and infection, and thus nutrient wastage, is not necessarily direct or tight. Of all childhood infections, diarrheal diseases have been reported to be most consistently associated negatively with growth and development (43, 59, 60). Yet, preliminary data from the CRL Meheran Growth Study and the Teknaf Dysentery Project both noted that, while an association between nutritional status and diarrheal diseases exists, the correlation is imperfect and infection can only account for a small proportion of the observed malnutrition (37). The longitudinal anthropometric and diarrhea surveillance data from the Matlab tubewell study show similar results (Table 2). (70) These Bangladesh findings are consistent with those reported in many other less developed countries (6).

The inability of economic and infection variables to account for much of the malnutrition in Bangladesh may have several explanations. The most obvious is inadequate and inappropriate measurement of the independent variables. Income is a notoriously difficult to quantitate and infections cannot be lumped together but need to be disaggregated into etiologic, severity, duration and other categories.
A second is the need to measure more proximate variables, such as dietary intake, malabsorption, and catabolism. The third is the usual absence to control for other variables. None of the studies cited earlier, for example, measured and controlled for all three major groups of determinants of nutritional status simultaneously. Finally, current inadequacies underscore the need for in-depth understanding of household food behaviour. Intrafamily food distribution, feeding practices, and other behavioural factors may be considered as intermediate variables through which nearly all determinants operate to affect nutritional status.

Epidemiology of Food Behaviour: Epidemiologic concepts, heretofore infrequently utilized, may be applied productively to in-depth studies of intrafamily food distribution and feeding practices. In addition to the obvious characteristics of the quality and quantity of nutrient intake, the epidemiologic concepts of time and person also appear to be variables of relevance to food behaviour.

The dimension of time is important because a family's or an individual's food consumption might be adequate on an average basis but severe deficiency states may nevertheless result from marked fluctuations of food intake over time. Family level fluctuations may be a consequence of seasonal factors, such as harvest time, employment opportunities, or crop failure. Individual fluctuations may be accentuated or attenuated by family level fluctuations, as well as by feeding practices associated with illness, convalescence, pregnancy, and lactation. The time dimension is important because presumed adequacy of average intake may disguise significant nutritional problems and because such fluctuations may be amenable conceivably to policy and program interventions.

The "person" dimension in nutrition can be equated with the intrafamily distribution of food to individual members of a family. Family food distribution is important because sufficiency of total family food availability may not necessarily translate into adequate nutrient consumption by vulnerable individuals. Conversely, even in the presence of food insufficiency, food intake among mothers and children may be maintained. The person dimension may also assume importance during illness when food is refused or withheld and then "redistributed" to other household members leading to net loss of food to the affected individual. The absence or presence of compensatory redistribution during convalescence may be a crucial regulator of "catch-up" growth. Most importantly, essentially all nutrition intervention programs attempt to influence, either directly or indirectly, the food distribution process.
within families.\textsuperscript{20,23,24,28,47}

Food Distribution: Despite the obvious importance of intrafamily food distribution, the scientific literature on this subject is either fragmentary or absent. One method employed to estimate individual consumption has been to measure overall household consumption and to derive individual intake by applying coefficients.\textsuperscript{63} Empirical studies, however, have demonstrated that these coefficients, based upon physiologic requirements, are grossly inaccurate. After an extended literature review, only two published articles providing quantitative data on intrafamily food distribution could be located. Levy and his colleagues reported family and individual food consumption data obtained by 24 hours dietary recall on 30 households in Upper Galilee.\textsuperscript{39} The authors noted that fathers consumed more energy and protein than mothers and that children under age 6 experienced the largest nutrient intake deficits in comparison to physiologic requirements. The recently published Bangladesh National Nutrition Survey also obtained intrafamily food intake by dietary recall.\textsuperscript{34} The survey also noted that children and pregnant and lactating mothers were consuming disproportionately deficient diets. In neither of these studies were attempts made to delineate the changes of food distribution in response to illness, socioeconomic, and other variables. Moreover, no effort was made to identify the factors responsible for the observed distributional pattern.

In contrast to family-level studies, the literature is rich in scientific investigations of the dietary intake of individuals, particularly preschool children and pregnant and lactating mothers.\textsuperscript{18,32,33,52} A recent nationwide cooperative study in India, for example, noted that, in addition to breastmilk, preschool age children consumed an average of 760 calories and 22 gms of protein daily.\textsuperscript{32} These averages suggest sufficient protein, but a calorie deficit of about 300 calories daily, accepting crude assumptions on the nutritional contribution of breastmilk.

Investigations on the factors (beliefs, habits, and taboos), responsible for certain food distribution patterns have primarily been the domain of anthropologists and home economists.\textsuperscript{9,30,71,72,73} These studies have ranged from studies on meal frequency, preparation, and cooking to food beliefs, taboos, and dietary practices associated with religion, social status, illness, pregnancy and lactation. While valuable, these studies usually lack quantitative
content and often assume implicitly ignorance on the part of the study population.\textsuperscript{55} Efforts to discern the "rationality" of certain beliefs and practices are usually omitted, focusing instead on "tradition, culture, and beliefs." Such interpretations, often confounded by cultural barriers, unfortunately lead to nutrition education programs without adequate appreciation of why people believe and behave the way they do.\textsuperscript{10,11,12}

**Infection and Food Behaviour:** Of various childhood infections, those with adverse nutritional consequences are diarrheal diseases, measles, whooping cough, malaria and other fevers.\textsuperscript{6} The mechanisms responsible for the adverse nutritional impact are catabolic losses (well substantiated), malabsorptive defects of the gastrointestinal tract (still controversial), and food refusal or withholding (significance uncertain). Of these three mechanisms the least studies and potentially most significant in terms of nutritional status is feeding practices during and after infection.

Mata and his colleagues reported on the effect of illness on the food intake of a cohort of 45 Guatemalan children during the first 3 years of life.\textsuperscript{44} Food intake was found to be negatively correlated with diarrhea and certain other infections. Rowland in Gambia also reported data on weight loss associated with illness.\textsuperscript{60} Briscoe compared the actual weight losses with expected weight loss from catabolism alone in these Gambian children, and concluded that metabolic effects explained essentially all of the weight loss associated with malaria but that 75 percent of the weight loss during diarrhea could only be explained by reduced food intake.\textsuperscript{6}

In Bangladesh, food withholding during diarrhea, other infections, and certain physiologic states appears to be widely practiced. Lindenbaum observed that, "an infant suffering from loose motion is believed to have a 'hot' stomach, so it is given a diet of 'cool' foods - such as barley water or glucose water with a little lemon."\textsuperscript{40,41} In interviews with 25 consecutive mothers of children presenting to the CRL Matlab Hospital with diarrhea, this investigator noted that all of the mothers reported food refusal or withdrawal during the active phase of illness (Appendix I). Rizvi reported similar adverse feeding practices among urban and rural Bangladeshi mothers.\textsuperscript{56,57}
The issue of food distribution during and after such illnesses is important because the ultimate nutritional consequences of infection may depend as much on feeding practices during illness as well as feeding practices during convalescence. Food not consumed during illness may be saved for convalescence or redistributed to other family members. If during convalescence, the child's diet increases in response to the return of (supernormal) appetite, considerable "catch-up" growth is possible. In marginal families, however, compensatory redistribution may not occur or repeated infections may be so frequent as to restrict the amount of time available for "catch-up" growth.

The amount of food available after illness and the length of time between illnesses to permit "catch-up" growth may be expected to differ between socioeconomic classes. Children from poor families may not only have more frequent infections, thereby restricting the opportunity for "catch-up" growth but food withheld during illness may not be available after recovery. Such factors would presumably be less significant in wealthy families. Interestingly, Copalan reported that Indian children supplemented with 300 calories daily to demonstrate any adverse nutritional consequences of a measles epidemic. These results suggest that the nutritional impact of infection can be minimized (or eliminated) in the presence of dietary adequacy.

3. Rationale:

That energy-protein malnutrition among children chiefly reflects poverty and insufficient dietary intake combined with high morbidity appears to be undisputed. In term of nutritional interventions however, a central question is how families, whether rich or poor, can optimize their nutritional wellbeing within existing socioeconomic constraints. A very poor family, of course, can "optimize" and still starve. Under these circumstances, employment and income are critical. Most families however, have command over food resources, and no matter how limited, optimal utilization of such resources as reflected by sound food distribution and feeding practices seem to be critical ingredients to nutritional wellbeing. In Bangladesh, virtually no information exists on intrafamily food behaviour. It is anticipated that this pilot study would yield useful indepth information on this subject, facilitating the development of specific hypotheses, larger scale studies, and more effective action programs.
3. SPECIFIC AIMS:

The specific aims of this study are:

(1) To quantitate the distribution of food (primarily calories and protein) between members of rural families;

(2) to measure family food distribution and dietary practices according to seasonal fluctuations, changing requirements secondary to work patterns, and during and after infection, particularly diarrheal disease;

(3) to identify the factors responsible for the observed food behavioural patterns;

(4) to relate individual intake to alterations of nutritional status, as determined by anthropometry;

and

(5) to delineate the social and economic determinants of household food availability.

C. METHODS AND PROCEDURES:

Sample Selection: Four villages with about 1,000 households in the Matlab Surveillance Area have been selected for survey to develop a sampling frame (see Map in Figure II). These villages were selected for three reasons: (1) the proximity of these villages to Matlab Center to minimize logistical requirements and to enable dietary workers to reach families before the morning meal and to depart after the evening meal; (2) the study households are primarily Muslim cultivators with sufficiently large subgroups of rich, medium, and poor families; and (3) as part of the VTS area, the precise age of all children under 10 years is known with certainty.

In Table 3 the name, estimated number of households, and birth and death rates for these villages in 1977 are shown. These data suggest that demographically the survey population is similar to other villages of the Matlab Surveillance Area. Baseline data on these study households are available from the censuses of 1966, 1970, and 1974. All children under age 10 have birth registration reports. Moreover, through these birth reports, reproductive and child mortality experience data on essentially all married women in the reproductive ages are expected to be available.
During April-May 1978, a census update including selected socioeconomic and anthropometric data would be collected from all households in these villages containing children under 60 months of age. The variables covered in this survey are listed in Table 4 and the precoded forms are shown in Appendix II. The form will be punched and sorted for sampling purposes in June 1978.

The purposes of this sample survey are threefold. First, field workers would receive training in anthropometry, questionnaire filling, and coding. Second, a sampling frame would be developed for the selection of the in-depth longitudinal study households. Finally, analysis of the baseline data would enable an assessment of how significantly the selected variables relate to nutritional status.

From the surveyed households, 120 families would be selected for in-depth longitudinal study. The families selected would be Muslim cultivators with at least 1 child under 60 months of age, a healthy, owning and operating over 5 acres of cultivated land, 60 would be landless or below subsistence owning less than 1 acre of land. Another 40 would be subsistence, presumed self-sufficient farming families with 1 to 5 acres of cultivated land. Efforts would be made to include at least one entire bari, so that interhousehold food transfers, particularly during crises, may be studied. Some of two households would also be included.

Anthropometry: One male field worker accompanied by a female village worker would visit the study households monthly to obtain anthropometric data according to the schedule shown in Table 4. Basically, monthly anthropometry would be obtained on mothers and preschool aged children while adolescents and other adults would be assessed trimonthly. The field procedures for these measurements follow the methods recommended by Jelliffe. For children, a Salter W scale (discrimination up to 50 gms) would be calibrated daily and used in the field. Adult weights would be obtained by balanced beam scales. Standardized height sticks and length board would be used for body length measurements. Children under 5 years would have length measurements, if permitted by the equipment; those who are too tall would have height measurements. Midarm circumference and tricep skinfold thickness would be obtained on the left upper arm by standard measuring tapes and Lange skinfold calipers.
Copies of preliminary field forms are shown in Appendix III. Further field testing and modification would be undertaken prior to finalization.

**Dietary Methods:** Field methodologies for obtaining quantitative data on household nutrient consumption possess competing characteristics in terms of validity, reliability, cost, time, and skill requirements. At the household level, the most common methods are weighment, recall, and food accounts. Food accounts, where families maintain household food diaries, require a literate population and unusual client cooperation. Recall may be less demanding in terms of client cooperation but is subject to memory bias and to purposeful misreporting. While extremely accurate, weighment, is time consuming, expensive, and is also not without reliability problems. Where a study requires individual consumption data in addition to household food intake, these difficulties are amplified manyfold. The most commonly employed method for estimating individual intake is 24-hour recall utilizing "food models" to prompt responses and to get rough gauges of quantity. Weighment has not been attempted in the past, presumably because of cost, time, and the need to deal with cooked food in liquid form. In all cases, it appears likely that the relative importance of these methodology characteristics will vary with cultural setting. For any one research project - with its own specific goal, resources, error tolerance limits, staff skills - methodological development and validation would be required.

Before presenting the dietary methodology proposed in this study, several features of dietary field work in rural Bangladesh deserve mention. Brown has provided a useful review of methodological issues associated with child food intake measurements for the purposes of another protocol. Firstly, previous surveys in Bangladesh have repeatedly shown that over 80 percent of calories and proteins in rural diets are provided by cereals. Rice is the major staple although wheat and millet may assume significance among poor families during periods of food scarcity. Thus, if a study's focus is directed to macronutrients (energy and protein), the measurement of cereal intake is crucial and other food groups of lesser importance. Secondly, there may be marked seasonal variation in food consumption - especially of vegetables, fruits, and fish. Seasonal variability of food consumption is particularly large with micronutrient consumption and the dietary pattern of poor families. Thirdly, it is possible that day-to-day and intra-week dietary variation in rural Bangladesh may be less marked than in affluent countries where work, food purchase, and
cooking patterns vary significantly according to the day of the week. Studies on household consumption in India have found little day-to-day or intra-week variation. In rural Bangladesh, agrarian households consuming primarily self-produced foods would similarly be expected not to exhibit pronounced day-to-day variation. An exception to this generalization would be expected to occur during periods of extreme hardship where daily consumption levels may depend upon the success of a family in procuring food for each specific day. Fourthly, the limited number of dakhis, bowls, mugs, plates, and utensils owned and used by rural households may provide a means of quantifying individual consumption through volume measurement. Finally, non-home consumption may represent a significant source of food intake in rural Bangladesh.7 Children may consume snacks, or even meals, in other households of the same bari; women may also do odd jobs in other households, receiving cooked food as compensation; and men may consume food in the fields or bazaar. These hypotheses require validation.

In the 120 intensive households, pre-measured spoons and cups would be given to the families with instructions to use these utensils in subsequent distribution of food from the cooking pot. This would be done prior to direct field measurements which would be on a bimonthly basis. See Table 5 for a summary of the work schedule. On the day of the field work, dietary workers would weigh all precooked food, as is customary with 24 hour weigment of household consumption. Special procedures would be developed to deal with food cooked on previous days. After cooking and before food distribution, the worker would note the full volume of the cooked foods in the cooking pot. Tools such as wax pencils and volumetric cylinders may be used for this purpose. Then, through observation, the worker would record the volume of food distributed to each family member. This could be estimated by counting the number of spoonfuls or bowlfuls of food distributed; plate waste could be estimated using the same utensils by the field workers. This procedure contains a double-check mechanism since the volume of the spoon (or cup) is known and the sum of the distributed food should equal the total volume recorded for the cooking pot. Such a procedure could be applied easily to rice and lentils; larger errors would be expected with other foods.

During the study day, the dietary workers would also observe and record, whenever possible, food consumption from sources other than the study household. Before completing the day's work, the field worker would supplement these observations with direct inquiries to each member of the study family for non-household consumption. Among children,
non-meal time snacks, snacks from other households, meals in other households, and non-reported scavenger intake (e.g. fruits) would be reviewed. Bazaar food and food in conjunction with wage labour would be reviewed with men. Women too may consume non-household food in exchange for household work. These individual recall diet histories would be double-checked by a screening inquiry with responsible women in other households of the same bari at the close of the work day.

It should be noted that there are no plans to quantitate the composition or quantity of breast milk consumption by preschool aged children. Qualitative inquiries would be made on the frequency, pattern, and intensity of breastfeeding to gauge crude changes of breast milk intake. Total nutrient consumption by breastfeeding children would be estimated by assuming average breastmilk composition according to qualitative data on breastfeeding practices. The intent here would be less a precise estimation of total child food intake and more a capacity to control for changing breastfeeding patterns.22

Morbidity: Data on illness diagnosis, severity, debilitation, and duration are as complex and as fraught with methodological pitfalls as dietary investigations. For the 120 households, crude morbidity data would be obtained on a weekly basis by female field workers. The use of a female paramedic and weekly visits would be compared with physician diagnosis and bidaily visits in an adjacent study area. Information to be obtained include symptoms, duration, degree of incapacitation. Symptoms would be grouped according to the following: watery diarrhea, dysentery, upper respiratory infection, lower respiratory infection, measles, chickenpox, ear infection, stomatitis, skin infections, fevers of unknown etiology, other non-specific disorders. Manpower and logistics constraints will preclude diagnostic work-up by physicians or clinical pathology of these illness episodes.

Socioeconomic Data: Process-related socioeconomic information would be obtained in the 120 intensive households on a bimonthly basis. In addition to "static" variables (such as family structure or education), detailed inquiry on changes of assets and income and expenditure would be obtained. A particular focus among agricultural families would be data on farm management, cropping patterns, food storage and processing. These agriculturally-related topics are presumed to be important determinants of family food availability.15,26,38,65
Pretests with income/expenditure questionnaires has not been encouraging in terms of accuracy. A complementary activity could be a list of all foods consumed on the day of dietary work indicating their source: own production, purchased, etc.

One feature of the intensive inquiry would be 24-hours time budget data obtained by the field workers on a bimonthly basis coincident with dietary investigations. Information on activity combined with weight measurements should provide crude estimates regarding the adequacy of dietary energy in meeting nutrient requirements. This information is considered necessary for determining the "rationality" of high energy intake by adult males in comparison to adult females and children.

Health Services: As the study's aim is to identify the determinants of malnutrition, it is felt necessary to prevent malnutrition deaths and to provide selected health services to the study population. Diarrheal disease treatment would be offered through referral to the Matlab Hospital. If home-based diarrheal services do not interfere with an oral therapy protocol under discussion, oral rehydration in homes would also be offered. In addition, preschool aged children under 5 years of age found to suffer from third degree malnutrition by anthropometry would be referred to Matlab Hospital for outpatient nutritional rehabilitation, which would include infection control and a take-home food component. For other health problems, such as respiratory and skin infections, symptomatic therapy would be offered. Severely ill study children would receive professional services at the Matlab Hospital.

Other Specialized Studies: Four small-scale specialized studies are planned if feasible and staff resources permit. The first relates to food beliefs and practices associated with diarrheal and other infective illness. Mothers of children with diarrhea would be interviewed during and after episodes of diarrhea to inquiry about food practices associated with diarrhea. Serial intrafamily food distribution measurements would also be made on a small number of households to identify the ultimate consumer of withheld food and feeding practices during illness and convalescence. Second would be indepth discussions with families regarding food practices with appear "irrational" in terms of nutritional wellbeing. Rich families with poorly nourished children and poor families with healthy children would be visited to determine possible factors accounting for the lack of correlation between available family food resources and nutritional status. In this component of the study, it is expected that the principle
investigator would visit many of the study households personally during the study year. A third specialized study would be inquiries about food beliefs and "ideologies" related to the nutritive and social value of various foods. What foods are considered "prestige" and "non-prestige" foods? Which foods and how much should be consumed by ill children and pregnant and lactating women? How do these ideologies vary across socioeconomic groups? The final special study would attempt to relate intrafamily food distribution to selected intervention programs. Either within the context of the Matlab MCH-FP services or other field programs, an attempt would be made to examine the food distribution effects of various food intervention programs, such as take-home feeding or nutrition education; "substitution" effects would be quantitated and the rationale of non-target group consumption would be examined. All of these indepth inquiries may provide useful information on the underlying factors determining feeding practices for possible nutritional intervention.

Data Collection and Analysis: All field forms would be precoded, where possible, for direct transfer to IBM punch cards. In addition family data summary sheets would be maintained for subsequent hand and counter-sorter analysis. It is expected that coding and editing would be done first in Matlab by the field survey staff and secondarily double-checked by a coding assistant in Dacca.

Three matched data files would be maintained. First, data obtained on the initial cross-sectional household survey would be maintained for each child under 60 months. Second, the 120 intensive households would also have a matched central file. This file would include household information along with individual data for each member of the household.

The third group of records would be specialized surveys. Some of the third group of data would be matched with the appropriate families and individuals, but most would be maintained separately and analysed for specific purposes.

The analyses would focus on macronutrient (calories and protein) consumption. Conversion from food groups to nutrients would be based upon Indian food tables. Analysis of the 1,000 households would be limited. Basically, the aim of the cross-sectional analysis would be regression of gross asset, income and other socioeconomic and biologic variables in relation to child nutritional status. It is not expected that this analysis would yield new insights into the problem.
Time series analyses of the 120 households would focus on individual families and family members over time to discern seasonal variability. Comparison of dietary intake with requirements estimated from activity records, morbidity, and changes of anthropometry should reveal the effect of intrafamily food distribution on the nutritional status of individuals within a family.

Analyses of special studies during and after illness would focus on the nutritional impact of dietary practices during illness. Particular focus would be on the changes of food distribution during illness and convalescence. One hypothesis to be examined is that adequate intake and "catch-up" growth during convalescence can compensate fully for the growth retarding effect of illness. It may be the frequency of illness causing the loss of opportunity time for "catch-up" growth and limited total family food availability which precludes full compensation during convalescence. Full compensation therefore may be observed in infrequently ill children from well-to-do families.

The causes of the observed distributional patterns would be examined from both an economic and food belief viewpoint. It is hypothesized that deleterious food practices may play a significant role in energy-protein malnutrition among the wealthy. While similar, the food beliefs and ideologies of the poor may operate under such adverse resource constraints that their nutritional significance becomes essentially marginal; exceptions to this could be some feeding practices (supplementation timing and food withdrawal during illness) and certain micronutrient deficiencies that may be minimized by reducing deleterious food practices.

SIGNIFICANCE:

That energy-protein malnutrition is associated with poverty is beyond debate. The challenge however, is to improve nutritional wellbeing, particularly among vulnerable children, through policies and programs that promote long-term social change while operating within existing social and economic constraints. One fundamental issue underlying any intervention is how can poor families optimize nutritional wellbeing within given social and economic limitations. Conversely, even among families with adequate food resources, why is there nevertheless malnutrition. The root of these questions is intrafamily food behaviour. Such behaviour often have rational bases not understood by policy-makers and program designers who often perceive the root of the malnutrition problem as "ignorance" or "knowledge insufficiency." The information generated by
this study should identify how much latitude for nutritional improvement is available to direct programmatic interventions, and how such interventions may be implemented more effectively.

E. FACILITIES REQUIRED:

The facilities required for this study involve field office space in Matlab for training, record keeping, equipment storage, and coding. Two desks would be sufficient for this purpose. In addition, limited outpatient hospital facilities would be required for nutritional rehabilitation for study children detected as severely malnourished by anthropometry. On the basis of third degree weight-for-height criterion, it is expected that of 120 study children under age 5 years, about 10 children would be involved. As the rehabilitation would be conducted on an outpatient basis, hospital resources would not be over-stressed. Other than personnel, routine logistics support, and data processing facilities in Dacca, as shown in the detailed budget, no other special facilities should be required.

F. COLLABORATIVE ARRANGEMENTS:

The Institute of Nutrition and Food Science, University of Dacca has agreed to participate in this study and would be welcomed to participate in the analysis of the field data to the full extent of the interest of the Institute's staff.
REFERENCES

1. A. Ashworth, R. Bell, WPT James and JC Waterlow, "Calorie Requirement of Children Recovering from Protein-calorie Malnutrition," Lancet 2: 600-603, 1968. (Wt gain about 10g/Kg/day with protein intake 4g/Kg/day).


42. S. Lindenbaum, "The Value of Women," JR. McLane (ed.), Bengal in the Nineteenth and Twentieth Centuries, Asia Studies Center, Michigan State University, Fall 1975 (South Asia Series Occasional Paper No. 25).


49. MM Rahaman and S Chakma, "Food Intake of the Chittagong Hill Tribes of Bangladesh, Bangladesh Medical Research Council Bull. 2: 35-41, 1975.


EQUIPMENT:

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit Cost</th>
<th>Amount</th>
<th>Project Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height sticks</td>
<td>available</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Salter scales (25 kg)</td>
<td>&quot;</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Length boards</td>
<td>&quot;</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Tape measures</td>
<td>&quot;</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Bean balance scales</td>
<td>&quot;</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Salter 5 Kg Food Scales</td>
<td>$40/each</td>
<td>3</td>
<td>120</td>
</tr>
<tr>
<td>Calculator, electronic</td>
<td>$20</td>
<td>3</td>
<td>6.35</td>
</tr>
<tr>
<td>Lange calipers</td>
<td>$125</td>
<td>3</td>
<td>375</td>
</tr>
<tr>
<td>Wooden scale boxes</td>
<td>Tk. 100</td>
<td>3</td>
<td>300</td>
</tr>
<tr>
<td>Volumetric cylinders</td>
<td>assorted</td>
<td>-</td>
<td>50</td>
</tr>
<tr>
<td>Large food scale (15 Kg)</td>
<td>$60</td>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>Small food scale (1 Kg)</td>
<td>$40</td>
<td>1</td>
<td>40</td>
</tr>
</tbody>
</table>

Sub Total: 300, 705

PATIENT HOSPITALIZATION:

Number of patient days (50) at Tk. 130/day
6,500
Sub Total: 6,500

OUTPATIENT CARE:

None except possible take-home program which is not yet developed

TRANSPORT:

Dacca-Matlab-Dacca: 1 round trip per week (52 x Tk. 300)
15,600
Matlab speedboat services (400 hours @ Tk. 100)
40,000
Sub Total: 55,600

TRAVEL AND TRANSPORTATION OF PERSONS:

Local Dacca travel (500 miles @ Tk. 1.6)
700
International travel (meeting)
2,500
Sub Total: 700, 2,500
6. The socioeconomic and morbidity data will require interviews. Socioeconomic information will be obtained by a male field worker from the household head and morbidity by a female worker from the mothers of a household. The former is expected to require about 20 minutes; the latter 5 minutes.

7. To understand the relative importance of disease, feeding practices, and socioeconomic variables in causing malnutrition should result in more efficient and effective intervention programs.

8. No organs, tissues, bodily fluids or records are required.

LCC:sp
CONSENT FORM FOR "FOOD & NUTRITION STUDY"

The Cholera Research Laboratory (CRL) is interested in undertaking a "Food & Nutrition Study." The purpose of this study is to understand the causes of the poor nutrition, including the effects of food consumption, feeding practices, and illness. For this study CRL field workers will be visiting your family on a regular basis over the next year. One female worker will visit your home weekly to enquire about illness among members of your family. She will be able to provide some health services for the reported illnesses. Some female workers will visit every two months to measure your family's food consumption. A team of male and female workers will visit monthly to measure the nutritional status of your family members and they will also obtain some socio-economic information every two months.

This is to seek your co-operation and approval to participate in this study. You may refuse to do so and you may also withdraw at anytime during the study. Your refusal will not affect your family's access to regular CRL health services. If you agree to participate, please sign the consent form.

Signature/L.T.I.
of Head of the household

Name of the Head of the household

V.T.S. No.

Village

Date
নি পারে এত 'বাণ্য ও পুনঃ নির্দিষ্ট' না করে একটি গবেষণাযুক্ত কারণে উদ্দেশ্য গ্রহণ করে*। বাণ্য গ্রহণের এভাবে, বাণ্যভাগ নির্দিষ্ট রেখার প্রতিক্ষয় হয় অপ্রত্যক্ষ কারণ নির্দিষ্ট করার জন্য এই গবেষণায় উদ্দেশ্য। এই গবেষণার উদ্দেশ্য সাফল্য করার জন্য নি পার এর কারণ অনুধাবন এক বৎসর ব্যক্তিত্ব প্রদর্শন করতে পারেন। প্রাপ্তর পরিবারের সামগ্রিক দরকার এর কোন অন্য কর্মকর্তা সকল সম্প্রদায়ে একাধিক প্রাপ্তর অংশকে প্রদর্শন করতে পারেন। যেহেতু এই নন্দন ব্যবস্থার ছোট নিষিদ্ধকরণ করবেন। এত পুরো যখন একাধিক একাধিক পরিবারের প্রতিক্ষয় প্রদর্শনের প্রথম মুখ্য গ্রহণ করবেন। এই প্রতি অন্য পুরুষ ও প্রাপ্তর সকল একাধিক প্রাপ্তর পরিবারের সামগ্রিক গবেষণা পুরুষের অন্যান্য পরিবর্তন এবং এত পুরো যখন একাধিক প্রাপ্তর নির্দিষ্ট এবং প্রাপ্তর সকল একাধিক পরিবারের প্রথম গ্রহণ করবেন অগ্রে।

এই গবেষণাযুক্ত অবকাশ পুনঃ নির্দিষ্ট এবং সম্প্রদায়ের কারণ নিষিদ্ধ শরীরণ।

আপনি এই গবেষণার অংশ গ্রহণ করা উচিত প্রক্রিয়া পারেন অবস্থান
চালাতে হবে কারণ সমস্ত নির্দেশ হবে গ্রহণ।

এই গবেষণায় প্রাপ্তরের অংশ গ্রহণ এর অভাবহীন বন্ধন প্রাপ্তরের নির্দিষ্ট
চিন্তাগুণ পুনঃপ্রদর্শন হইতে প্রাপ্তর বা প্রাপ্তর পরিবারের অভিনব করে যা।
আপনি যদি অংশ গ্রহণ সম্প্রদায় হয় তবে এই সম্প্রদায গ্রহণ/চিন্তা সম্পাদন
গ্রহণ করুন।

মুদ্রণ/চিন্তা শর্ত -------------

পরিবারের প্রধানের নাম -------------

তিনি, তিনি, এবং নাম -------------

গ্রহণ -------------

পাতার শর্ত -------------

* এ শব্দের ব্যবহার একটি নির্দিষ্ট অর্থ বোঝায়।
<table>
<thead>
<tr>
<th>Floor Space (sq. ft.)</th>
<th>Weight-for-Height&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;70</td>
</tr>
<tr>
<td>&lt;100</td>
<td>5</td>
</tr>
<tr>
<td>100-299</td>
<td>53</td>
</tr>
<tr>
<td>300-599</td>
<td>16</td>
</tr>
<tr>
<td>&gt;600</td>
<td>2</td>
</tr>
<tr>
<td>All</td>
<td>76</td>
</tr>
</tbody>
</table>

<sup>a</sup> Percent of Harvard Standard
<table>
<thead>
<tr>
<th>Floor Space (sq. ft.)</th>
<th>&lt;70</th>
<th>70-79</th>
<th>80-89</th>
<th>&gt;90</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100</td>
<td>5</td>
<td>51</td>
<td></td>
<td>71</td>
<td>24</td>
</tr>
<tr>
<td>100-299</td>
<td>53</td>
<td>332</td>
<td>580</td>
<td>234</td>
<td>1199</td>
</tr>
<tr>
<td>300-599</td>
<td>16</td>
<td>156</td>
<td>280</td>
<td>123</td>
<td>575</td>
</tr>
<tr>
<td>&gt;600</td>
<td>2</td>
<td>33</td>
<td>64</td>
<td>24</td>
<td>123</td>
</tr>
<tr>
<td>All</td>
<td>76</td>
<td>572</td>
<td>995</td>
<td>405</td>
<td>2048</td>
</tr>
</tbody>
</table>

a. Percent of Harvard Standard
Table 3
Six Matlab Villages by Population (1974) and Crude Birth and Death Rates (1977)

<table>
<thead>
<tr>
<th>Village</th>
<th>Census 1974</th>
<th>Births 1977</th>
<th>Deaths 1977</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Household</td>
<td>No.</td>
<td>Rate</td>
</tr>
<tr>
<td>R</td>
<td>Charmasua</td>
<td>267</td>
<td>1602</td>
</tr>
<tr>
<td>C</td>
<td>Sarderkandi</td>
<td>505</td>
<td>3030</td>
</tr>
<tr>
<td>D</td>
<td>Charmukundi</td>
<td>235</td>
<td>1410</td>
</tr>
<tr>
<td>V1</td>
<td>Kadamtali</td>
<td>112</td>
<td>672</td>
</tr>
<tr>
<td>Availability</td>
<td>Distribution</td>
<td>Loss</td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------------------</td>
<td>--------------------</td>
<td></td>
</tr>
<tr>
<td>Household</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wealth, assets</td>
<td>Family structure</td>
<td>Housing type</td>
<td></td>
</tr>
<tr>
<td>Agricultural patterns</td>
<td>Marital status</td>
<td>Water</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>Family size</td>
<td>Sanitation</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td>Beliefs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father</td>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Employment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>Occupation</td>
<td>Breastfeeding</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>Education</td>
<td>Infection</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Employment work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment</td>
<td>Previous child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food storage, processing</td>
<td>mortality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>Infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>Immunization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth order</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spacing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breastfeeding</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Member</td>
<td>Weight</td>
<td>Length</td>
<td>Arm Circumference</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>-------------------</td>
</tr>
<tr>
<td>All Mothers</td>
<td>Monthly</td>
<td>Once</td>
<td>Monthly</td>
</tr>
<tr>
<td>Preschool Age Children (&lt;5 years)</td>
<td>Monthly</td>
<td>Monthly</td>
<td>Monthly</td>
</tr>
<tr>
<td>Other Children (5-14 years)</td>
<td>Trimonthly</td>
<td>Trimonthly</td>
<td>Trimonthly</td>
</tr>
<tr>
<td>Other adults (&gt;15 years)</td>
<td>Trimonthly</td>
<td>Once</td>
<td>Trimonthly</td>
</tr>
<tr>
<td>Frequency of Visit</td>
<td>Worker Requirement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Anthropometry</td>
<td>1.0</td>
<td>-</td>
<td>1.0</td>
</tr>
<tr>
<td>Socioeconomic</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Dietary</td>
<td>-</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Morbidity</td>
<td>-</td>
<td>1.0</td>
<td>-</td>
</tr>
<tr>
<td>Coding/leave/supervision</td>
<td>1.0</td>
<td>1.0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>4.0</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Figure 1

Antecedents

Family Food Availability
Landholding
Income
Employment
(Household Consumption)

Intrafamily Food Behavior
Beliefs
Practices
Women's Role & Work
(Individual Consumption)

Nutrient In

Supplementation
Intake

Nutrition Status

Conception
(Maternal Diet Nutr. Status)

Birth
(Weight)

Infection
(Withholding Malabsorption Catabolism)

(Morbidity)

(Mortality)

School Age Child

Nutrient Waste

Income
Generation, Redistribution
agricultural policies
price subsidies
food stamps
ration shops
work programs

Food Distribution
on-site feeding
take-home feeding
weaning foods
nutrition education

Public Health
water-sanitation
infection control
nutritional rehabilitation
nutrition education
TO: Nutrition and Diarrhea Therapy Working Groups

FROM: Lincoln C. Chen /EC

DATE: 23.2.78

SUBJECT: FEEDING PRACTICES AND DIARRHEA

On 16-17 February, Mr. M.R. Khan, Ms. Chakraborty and I undertook a brief survey of mothers of 25 consecutive admissions under age 5 to the Matlab Hospital to obtain preliminary information on feeding practices in response to diarrhea. The inquiry was undertaken to provide background data for a more formal study later. John Briscoe's earlier memo on this subject should be reviewed as background to this memo.

Characteristics: All of the mothers were Muslim excepting one Hindu; 10 were from landless households. The age of the children were concentrated in the 6m-2year group; only 2 were less than 6 months and 2 were 2 years or older. The children under 6 months were fully breastfeeding; half of the 6-11 month group were receiving significant supplemental foods; and only 1 of 10 children over 12 months were not supplemented. There was some variability in individual supplementation patterns however; 1 child over 12 months old had not yet been supplemented, while another child of 6 months was receiving substantial supplemental foods.

Food Practices: No socioeconomic differentials in practices were noted. Contrary to expectation, there was no consensus as to whether diarrhea is a "hot" or "cold" illness. 16 responded "hot", 8 "cold", with 1 no response. Also contrary to expectation, 15 mothers reported increased breastfeeding frequency
during diarrhea; 8 reported decreased (the remaining 2 older children had been completely weaned). In 20 applicable cases, all mothers reported decreased dietary intake among the children. Interestingly, while customary foods were withheld, about half the mothers reported the introduction or enhancement of specific foods in response to diarrhea. These "therapeutic" foods included: (1) glucose water; (2) green coconut water; (3) rice broth with sugar (two); (4) soaked beaten or puffed rice gruel (two); (5) barley water (two); (6) mustard oil; (7) barley water with sugar; (8) bark of mango tree in water; (9) rice supernatant with salt and sugar; (10) hot rice broth with touch of spices.

Other Practices: About two-thirds of the mothers had consulted a local indigenous practitioner before travelling to the CRL hospital. In many of these cases, various homeopathic, kobiraj and other medicines (tablets, syrups, etc) were prescribed. Interestingly, 15 families had undertaken other therapeutic practices, such as blowing over the child's body while reciting the Koran or hanging thread or amulets around the neck or extremities. Only 2 mothers reported using the kaolin mixture by CRL village workers.

Conclusions: Firm conclusions are not possible from this limited inquiry. Some useful background information however was obtained and certain hypotheses were generated.

(1) A list of commonly used foods during the weaning period was obtained. This should be helpful in later studies.

(2) Inquiry about the "active" properties of these various foods revealed lack of uniformity. Some foods, such as eggs or meat, were universally identified as possessing "hot" action, while mixed responses were obtained on other foods (e.g. milk). In all cases where food mixtures were introduced in response to diarrhea, "cold" foods were given. This occurred even in cases where mothers felt that diarrhea were a "cold" illness. All of this suggests that "beliefs" about various foods may be less important in introducing oral therapy or nutrition education - so long as the therapy or dietary education reinforces and resembles the types of foods ("cold") now being used.
(3) The mixed response to breastfeeding may reflect a mother's behavioral response to a child's desires during diarrhea. An agitated child may be put to the breast more frequently. A thirsty dehydrated child may seek breastfeeding more frequently. Anorexia or vomiting may reduce the demand for breastfeeding. Future research should attempt to dissect out these possibilities.

(4) The uniform reduction of food intake suggests that this is an important area of research. Why were foods withdrawn? Anorexia, vomiting, behavior of mothers? How can it be discouraged? What is the food tolerance of children with diarrhea? What types of diet is best tolerated? What happens to the diet of the mother?

(5) Equally important would be feeding patterns after diarrhea has ceased. "Catch-up" growth is possible and feeding should be encouraged. Studies on feeding practices during diarrhea should also examine post-diarrhea practices.

(6) The extensive reliance on village-based indigenous healers suggests that more information is needed on this cadre of health providers. They constitute obviously an invaluable resource in implementing any intervention (oral therapy, education, etc.).

(7) Regarding oral therapy, it is encouraging that sugar or qur is a common ingredient of foods customarily utilized to treat diarrhea. Several of the solutions employed, in fact, closely resemble oral fluids. Successful introduction of oral therapy may capitalize on some of these similarities. For example, labon-gur may be recommended in a rice broth; or a packet containing the proper salts may be mixed at home with sugar added.
HOUSEHOLD FORM

1. Date of visit: ___________________________ Worker Name: ___________________________

2. Identification:  
   village: ___________________________ VTS No.: ___________________________  
   bari: ___________________________  
   household: ___________________________

3. Religion:  
   ☐/Muslim  ☐/Hindu  ☐/Others  

4. Household Characteristics:  
   Number of members: ___________________________  
   Family Structure: ☐/nuclear  ☐/extended  ☐/other  
   List all children under 60 months:  
   Name: ___________________________ Date of birth: ___________________________ Age(months): ☐/☐  
   ☐/☐  
   ☐/☐  
   ☐/☐  

4. Head of Household:  
   Occupation: ☐/agriculture  ☐/fishing  ☐/business  
   ☐/service  ☐/others  
   Education: ☐/none  ☐/1-4 yrs.  ☐/5-9 yrs.  
   ☐/matric  ☐/higher degrees  

5. Housing:  
   Roof quality: ☐/katcha  ☐/tin-1 roof  ☐/tin-2 roof  
   ☐/tin-4 roof  ☐/pukka  ☐/others  
   Total number dwelling units: ___________________________  
   Latrine: ☐/fixed  ☐/field  ☐/around house  
   ☐/others  
   Source of drinking water: ☐/tubewell  ☐/tank  
   ☐/river  ☐/canal  
   ☐/ditch  ☐/others.
Household Assets:
Number of possessions: watch _____ radio _____
    hurricane _____ loo _____ choki _____

Number of animals:  Cow _____ Goat _____
    Poultry _____

Number of boats:  Kosha _____ Bhusha _____
    Bero _____

Agricultural Assets:

Cultivated land:  Owned _____
    Rented-in _____
    Rented-out _____
    Not operational _____
    Irrigated _____

Income:

For your household, please list all sources of income in the past month.

<table>
<thead>
<tr>
<th>Kind</th>
<th>Cts.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remittances</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Wage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Payment in kind</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Self production</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CHILD FORM

Date of Visit: ______________ Worker's Name ________________________________

Child's Name ____________________

1. Identification:

<table>
<thead>
<tr>
<th>NAME</th>
<th>VIS NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village</td>
<td>__________</td>
</tr>
<tr>
<td>Bari</td>
<td>__________</td>
</tr>
<tr>
<td>Household</td>
<td>__________</td>
</tr>
<tr>
<td>Father</td>
<td>__________</td>
</tr>
<tr>
<td>Mother</td>
<td>__________</td>
</tr>
</tbody>
</table>

2. Father:

Occupation: [ ] agriculture [ ] fishing [ ]
[ ] business [ ] service [ ] others

Education: [ ] none [ ] 1-4 yrs. [ ] 5-9 yrs. [ ]
[ ] matric [ ] higher degrees

3. Mother:

Status: [ ] married [ ] widowed [ ] divorced, separated [ ] others [ ] deceased

Earnings: Do you have any earnings? ________________________________

If yes, what kind? [ ] field work [ ] wage [ ]
[ ] work in other households [ ] others

Age: ______________

Education: [ ] none [ ] 1-4 yrs. [ ]
[ ] 5-9 yrs. [ ] matric [ ] higher degrees

Number of living children: boys _______ girls _______

total _______

Number of children born alive but now dead: _______

4. Child:

Date of birth: ____________

Sex: [ ] male [ ] female

Birth order: ______________

Age (months) of complete weaning: ______________

Why did you stop breastfeeding: ______________

Age (months) when supplemental foods were introduced: __________
Number of months between this child and next older sibling: ______________________

Number of months between this child and next younger sibling: ______________________

Has the child been ill in the past month? [ ] yes [ ] no

If yes, what illness and for how many days

<table>
<thead>
<tr>
<th>Illness</th>
<th>No. of days</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
</tbody>
</table>

Mother's Anthropometry:

Weight: ______________________ kg. ______________________

Height: ______________________ cm. ______________________

Arm circumference: ______________________ cm. ______________________

Tricep skinfold: ______________________ mm. ______________________

Child's Anthropometry:

Weight: ______________________ kg. ______________________

Height/length: ______________________ cm. ______________________

Arm circumference: ______________________ cm. ______________________
<table>
<thead>
<tr>
<th>N A M E</th>
<th>Individual Census No.</th>
<th>Mother's No.</th>
<th>Date of Birth</th>
<th>Age</th>
<th>Sex</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wt</td>
<td>Ht</td>
<td>Ac</td>
<td>TSF</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name</td>
<td>VOLUME FOOD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Meal 1**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Meal 2**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Village**

**Bari**

**H.H.**

**Worker**

**Individual Food Consumption (post)**
### Dietary Form - 1

Worker: ___________________________ Village: ___________________________ Bari: ___________________________ H.H.: ___________________________

**Household Food Consumption (pre-cooked)**

<table>
<thead>
<tr>
<th>Meal 1</th>
<th>Meal 2</th>
<th>Meal 3</th>
<th>Snacks/non-Home Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Time</td>
<td>Time</td>
<td></td>
</tr>
<tr>
<td>No. Served</td>
<td>No. Served</td>
<td>No. Served</td>
<td></td>
</tr>
</tbody>
</table>

