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Prospects for Household-level Research on Consumption and Nutrition Effects of PL480 Title II Food Aid

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Summary

Authorities in such diverse fields as nutrition, economics, policy analysis, international health, and anthropology generally agree that knowledge and understanding of the household-level dynamics of food allocation and consumption are very limited. This applies particularly to the area of consumption effects of supplementary feeding programs such as those supported by PL480 Title II.

A review of literature from official and academic sources shows that a number of variables from both program and non-program environments has been related, with varying degrees of reliability, to household consumption patterns and nutritional status of household members. Significant elements of feeding programs include type of distribution (on-site or take-home); mode of delivery (MCH, SFP or FFW); size and composition of the ration; targeting; and related program elements such as nutrition education and community building. From the non-program side, household structure and composition are crucial, while others which must be considered include income and resource availability, seasonality, availability and utilization of health services, and biological factors such as morbidity, maternal parity, and maternal nutritional status,

The literature review and analysis of relevant variables provide

the basis for a conceptual framework modeled on household structure and composition, and in particular the bargaining roles of men and women in different household settings. Based on this framework a number of hypotheses are proposed which relate food aid program participation and commodity utilization to program and non-program variables. Of particular ocncern from the policy perspective are the following hypotheses:

1. The composition of the ration delivered affects program participation and household-level utilization.

2. The total quantity of food provided in the ration package affects program participation and commodity utilization.

3. Commodity type and quantity affect a household's marginal propensity to consume food, particularly calories.

Working on the basis of the priority of these three hypotheses to program and policy concerns, three alternative research designs which are able directly to address these concerns are described. Related issues such as sampling, data needs, data analysis, personnel requirements and costs are addressed.

It is recommended that a series of short-term qualitative studies aimed at refining existing understanding of commodity utilization be conducted but that the bulk of available resources be committed to long-term field studies designed to test hypotheses

and provide broadly-applicable answers to the consumption and utilization questions.

Introduction

This study is intended to assess the state of current knowledge of household level variables that may affect food consumption and nutrition at the household level, particularly in less developed countries, and to evaluate the feasibility of research that would seek to establish the consumption effects of PL 480 Title II commodities in such households. Consideration has been given to variables that are part of Title II programs, as well as to factors external or exogenous to the food aid program. Suggestions are made as to which of the identified variables must be taken into account in research design, which ones can be controlled for, and which ones have such weak or ambiguous effects, or so clearly serve as proxies for other variables, that they need not be considered. Putative models of the interactions of key variables are analyzed, hypotheses dealing with potential consumption outcomes of the interaction of program and non-program elements are proposed, and alternative research designs for testing combinations of hypotheses are discussed. This document cannot be considered and is not intended to provide a full research plan, but a number of potential problems and factors essential to determining the viability of such research are taken under discussion.

The study was undertaken at the request of the office of PPE, Bureau of Food for Peace and Voluntary Assistance, United States Agency for International Development. Several recent studies,

particularly that carried out on behalf of FVA/PPE by the National Academy of Sciences in 1982, have suggested that food aid delibers nutritional improvement indirectly, through income transfer. This view is by no means universally or uncritically accepted, despite the prominence of its adherents and the persuasiveness of their arguments. Within the past two years a number of specific rebuttals of the income transfer hypothesis itself, as well as the relationship upon which it rests--that improvements to income, whether measured at national, regional or household level, will be translated directly into improved nutritional status--have appeared. Those evaluations of food aid programs which have been carried out have not been able to assist in the resolution of the issue, partly because of the structure, nature and goals of such evaluations themselves, but primarily due to the virtually total absence of precise, quantitative data on spects both of the program and the non-program environment. Only detailed, long-term research focussing on specific Title II programs in a limited number of localities or field sites that takes into consideration all relevant variables is likely to be able to provide any answers. As Beaton has recently noted, "...aggregate data, even with models of distribution, are no real substitute for disaggregated data. Knowledge of the distribution of intakes at the level of the households or, even better, at the level of individuals would be preferred" (1983:330).

Yet, although a number of individuals and agencies have called for specific research projects which would provided data for the

resolution of these and other issues (e.g. Beaton 1983, NAS 1982, Beaton and Ghassemi 1982, Musgrove 1984, IFPRI 1983), these calls have been made without concomitant suggestions as to how such work might actually be implemented. Realization of the complex, multi-factoral, biological and behavioral structure of nutritional response has impeded the development of designs for such research; little effort seems to have been made to assess the current state of such knowledge and to review the assumptions and hypotheses that organize that knowledge. It is with such issues that this document deals.

The document is divided into a number of sections. The first section examines available data on the household and individual level dynamics of food transfers in various types of food aid programs (MCH, SFP and FFW). The second deals with those aspects of MCH distribution that have been shown or that are though to have an effect on the utilization of the commodities and on nutritional outcomes. Of particular concern here is the recent argument that income transfer value should be the principal criterion for commodity selection and that nutritional benefits will automatically flow from an improvement in a given household's economic position. Additionally, the importance of other program components, such as mode of delivery and nutrition education, is considered.

Examination of a large body of recently published scientific and technical literature as well as unpublished reports and personal

communication comprises the next section of the paper. This examination shows that although a very large number of variables has been implicated in the dynamics of nutritional status in one or more studies, relatively few of these have a uniformly positive or unambiguous association with particular nutritional outocmes. The reliability, validity and/or completeness of many of the sources can be seriously questioned. The variables identified fall into four groups:

1. those clearly linked to nutrition effects in a large number of social and cultural settings;
2. those clearly linked to nutrition effects in a limited number of social and cultural settings;
3. those possibly linked to nutrition effects;
4. those clearly not linked with nutrition effects at the household level.

Once these variables have been identified, the next section in the analysis undertakes to evaluate existing hypotheses and to suggest some models that will take all of the relevant variables into consideration. In the attempt to develop these models, program as well as non-program household-level variables are utilized in the construction of the linkages.

The last section deals with issues of research design and method. In particular, the definition of significant units of analysis and appropriate design and collection procedures for

quantitative data will be specified. Ways of sorting out the interacting effects of implicated variables are proposed, and particular attention is paid to determiniation of the specific role of food transfers. Some preliminary suggestions are made as to personnel and technical requirements and potential costs of longitudinal field research.

Full biblographic data on all references consulted, not only those cited, is provided at the end of the report.
As the various resources were examined, the explicit and implicit hypotheses that inform the work were extracted and the reliability of the data and testing procedures were analyzed. In the author's view, the report presented here is not a simple literature review, but goes beyond description to the analysis of relevant hypotheses and variables, and the assessment of their utility, promise and/or difficulties with respect to anticipated future research activities.

Throughout this report, the emphasis is on studies carried out in small rural communities or in rural settings where agriculture is an important contributor to income and to food intake. This emphasis reflects the focus of the available literature. Although there is a widespread assumption that urban-dwellers are at greater nutritional risk than rural people, or that townspeople suffer from a higher incidence and severity of nutritional disease than do farming people, there are few studies available to serve as a basis for the confirmation or rejection of this argument

(cf. Graedon 1980). The bulk of the population in developing countries--up to 85%-- continues to reside in rural areas and to engage in food production, accounting for 60-80% of GDP. The emphasis on rural-dwellers thus conforms to realities of population distribution, economic activity, and the location of the larger part of the population of individuals at nutritional risk.

Section I

Title II feeding programs: goals, options and organization

Through the U. S. Department of Agriculture and the U. S. Agency for International Development, the government of the U. S. delivers food aid to less-developed countries. Such aid is governed by the provisions of Public Law 480 and is available in two major forms: donated commodities and subsidized commodities. Our concern here is with the commodities that are donated free of charge under PL 480 Title II to the people of poor countries in four major geographic areas of the world. In FY 1984, nearly 1.9 million metric tons of food valued at over $500 million were provided under the Title II program, and benefitted an estimated 56 million recipients. Commodities available and distributed in recent years include bulgur, corn, sorghum, nonfat dry milk, wheat and wheat flour, rice, and soybean oil. Some processed and/or fortified foods also are available. The size, composition, and nutritional value of the "ration" provided to

participants varies from country to country. The suggested maximum per capita ration ranges from 3.8 to 9.6 kg per month, and is made up of a combination of blended foods, processed and/or whole grain items, and oil. The ration designated for a particular country or program and the proportion of that combination of commodities actually delivered varies somewhat from thess standards and from locality to locality. There is no real rationale for the suggested size of ration packages except that in all cases the clear, if unstated, objective is to provide a substantial proportion (1/3 to 1/2) of the daily energy and protein requirements of recipients. Thus, the principal nutritional objective of food transfers is improved growth and reduction of protein and, more importantly, energy deficits in program beneficiaries, which is appropriate in view of what we currently understand about the principal forms of nutritional disease and how they may best be combatted. The NAS report quite specifically recommends that project food aid should address energy and protein needs, and that micronutrient deficiencies are best addressed by vitamin or other therapy delivered through a primary health care program.

PL 480 Title II programs, and other food aid programs such as those administered by the EEC and the UN/FAO, have numerous and often conflicting goals, which may be obscured or even contradicted by the expressed objectives of the PVOs which ordinarily manage the distribution of food within recipient countries. The validating legislation, USDA, USAID, different

PVOs, the WFP, the recipent country, and the beneficiaries themselves may all express different objectives and needs that are to be met by food distribution.

Early in the history of food aid the principal goals seem to have been more generally directed toward economic and political ends, e.g. the cementing of alliances, the furtherance of foreign policy aims, and the disposal of agricultural surplusses. Now most of those who are actually concerned with the delivery of commodities to their intended recipients regard their principal motivations as being humanitarian in nature: the alleviation of hunger, the improvement of nutritional status, and economic development, particularly among the poorest people. As Reutlinger notes, "In the case of project food aid, there is a...widespread consensus that its primary objective is alleviation of malnutrition and hunger, and that this noble objective is achieved best if the recipients are given the proper foods and consume them in addition to the foods in their existing diet" (1984:254). Given that an implicit, if not explicit, goal of PL 480 Title II food aid is nutritional improvement, and the NAS' point that the principal problem amenable to amerlioration by food distribution programs is PEM, protein and calorie deficits and their biological outcomes, especially among young children, will constitute the focus and the definition of the problem.

Title II commodities are distributed to their recipents in three

principal ways: distribution through systems of maternal and child health facilities (MCH), through school feeding programs (SFP) and as compensation for labor, or food for work (FFW), particularly on government, community, or PVO-sponsored rural development projects. Each of these modes of distritution singles out a specific group or groups in the population that is to be the principal beneficiary, or target, of the ration; apart from improvement in health and nutrition, each mode may have other intended objectives as well.

MCH feeding programs are designed to reach pre-school aged children (generally thought of as those aged five years or less, although in many places the pre-school population may include children aged up to 7 or 8 years) and pregnant and/or lactating women. In the majority of cases the ration is distributed once a month and is taken home and prepared there. Residential feeding programs, and the on-site preparation and consumption of the ration also exist; the significance of these variations in distribution will be discussed in the next section.

Young children and pregnant and lactating women are by far the most nutritionally vulnerable, or "at risk", in any population, and the MCH system of distribution, where receipt of commodities is usually made conditional on clinic attendance and/or participation in nutrition and health education activities, is meant to reach them. Several of the PVOs that manage MCH feeding programs regard the principal objective of food transfers as a

form of economic aid, the effectiveness of which can be judged by changes in nutritional status; an important indicator of success in meeting this objective is thus improvement in anthropometric indicators. There are two principal ways of measuring such improvement: by assessing the status of participants at a point in time and comparing the outcome with indicators derived from non-participant controls, the results of other nutritional investigations in the area or country, or against national survey data; or by longitudinal assessment of the beneficiaries to establish the extent of change and improvement in anthropometric indicators within the group and over time. Assessment has only been carried out on young children; the adult women who are also construed as being "at risk" and who also are supposed to be beneficiaries of MCH programs are not considered. One of the largest gaps in our current knowledge of the actual impacts of MCH delivery of Title II commodities is in their effects on women.

Insofar as the direction of benefits specifically to young children at risk of PCM is concerned, there are problems. Often particular country programs do not impose any criteria or conditions for participation except that of attendance. Thus the "target" of the ration is no longer specifically the poor or at risk preschooler, and his/her mother, but merely the entire population of mothers and their young children, poor, hungry, or not. This may stem from the frequently observed but unjustified assumption that all the people in less developed countries,

especially rural dwellers, are poor, and that all children must experience protein and/or calorie deficits and consequent poor growth; it may also be an artifact of geographical targetting, which attempt to direct commodities to those areas within a given country or region which are the most impoverished and where maternal and child health is poorest. Nevertheless, it appears that on the basis of anthropometric measurements a substantial proportion of young children who receive rations are not malnourished. Broad-spectrum targetting, using highly-aggregated data to identify areas at risk, may direct commodities to adequately-nourished as well as malnourished people. Geographical and economic targetting have sociological implications as well. It has been seen as divisive and/or discriminatory, especially when attempts are made at differential distribution on the basis of economic indicators within a delimited area.

Most of the food distributed in MCH programs is handed out dry for later consumption, such consumption presumed to occur in the context of some sort of household or domestic unit, and this gives rise to further diffusion of the ration through what is known as "leakage", or sharing of the ration among all household members. Most authorities/reviewers/evaluators accept now that the sharing of food within the household is the rule, rather than the exception. Evaluation of the Title II program in Upper Volta suggests that rations provided in sufficient quantity to last for a month if properly prepared and given to the target

individual(s) exclusively were generally exhausted before the end of the month, indicating consumption by additional people other than the intended recipient. Evaluations for Senegal and Cameroon estimate that the target members actually consume only 6 to 11% of the calories intended for their benefit, when diversions due to insufficient supplies, peripatetic MCH attendance, and leakages are taken into account. This then raises a major question: if the supposed beneficiary receives only a fraction of the food, a quantity insufficient to insulate against risk of PEM or to alleviate pre-existing deficiencies, what benefits are actually being delivered to him or her?

A study carried out in 1982 by the NAS at the request of FVA answers this question by hypothesizing that preschool children who are enrolled in MCH feeding programs may receive greater benefits indirectly from the income-transfer value of the donated foods than directly from their nutritional qualities. In this model, household real income is increased due to the economic value of the transferred commodities. The household saves money by not having to buy foods that are being replaced by the program foods, and with these savings is enabled to purchase additional, better quality (i.e., more valuable sources of critical nutrients, particularly protein and calories) foods, a proportionate share of which reach the beneficiary. The suggestion is that the leakages hitherto viewed as negative aspects of MCH feeding programs may actually be more nutritionally valuable to the intended recipient than the actual

commodities themselves. In a similar vein, Reutlinger (1984:250) has argued that "...augmentation of poor people's incomes should be the dominant objective of project food aid." This argument hinges on several assumptions: that donated commodities are effectively targeted to the poor (which is not necessarily the case) and that additional income (however realized) will be directly translated into benefits for all members of a unit utilizing such income. Thus, the principal benefits to recipients are a function of the economic, rather than the nutritional, values of the commodities, such that "If oil conveys three times as much income as wheat, the consumption of wheat (and of oil) will increase by three times as much when the food aid consists of oil rather than wheat" (Ibid). This income-transfer effect, it is argued, occurs in all programs providing rations which are intended to supplement the existing diet.

Not unexpectedly, this hypothesis is controversial. Maria Tagle, an FAO nutrition consultant, summarizes the theory and the arguments for and against it, and reaches the following conclusions:

1. the income-transfer value notion leaves out of consideration many variables known to affect the actual implementation and operation of food aid programs;

2. the approach is based on assumptions, as noted above, whose validity from the nutritional point of view has by no means been

unequivocally established;

3. the approach does not come to terms with increasing evidence that economic improvement does not necessarily entail improvements in health and nutrition indicators;

4. "The approach does not appear to be suitable for the selection of commodities for supplementary feeding programs addressed to vulnerable groups" (1984:12).

Because of the virtually complete lack of appropriately-collected empirical data there has as yet been no adequate test of this hypothesis, although what we do know about patterns of intrafamily resource allocation and the impact of increases in income on the dynamics of such allocation suggests that the model is neither as simple nor as direct as its advocates assume. It is to the resolution of this particular issue, among others, that future field research can contribute.

Levinger (1983) has ably dealt with the issues surrounding school feeding programs insofar as they have been able to meet their stated objectives of increasing school enrollment and attendance, improving the nutritional status of school children, and improving academic and cognitive performance. As is the case with MCH programs, SFPs are quite variable in terms of their place in a particular country Title II program's priorities, the composition of the ration, and the form in which the food is

delivered (e.g. dry delivery for take-home, prepared and packaged elsewhere but consumed on-site, or cooked on-site and provided as a hot meal). The actual nutritional impact of SFPs is questionable. Children of primary school age are less nutritionally vulnerable than either underfives or adolescents and although weight for height and weight for age indices can show improvement in this age group as a consequence of nutritional supplementation, catchup linear growth is not likely to be significant (cf. Kulin et al. 1983).

More significant in SFPs are the effects that may be demonstrated on enrollment, attendance, and performance. Levinger notes that analyses of the impact of SFPs on enrollment and attendance have so far not provided any support to the hypothesized relationships, but do suggest a positive effect in poor rural areas where attendance is low. As far as performance is concerned, Cotten (1984) found in Haiti that 7% of variance in IQ scores could be explained by malnutrition, and that learning can be facilitated if hunger is reduced. The association of mild to moderate PCM with inattentiveness, poor short-term memory, and lethargy is well documented, and there is much anecdotal evidence from teachers to the effect that classroom behavior and capability improve when pupils are adequately fed. Thus there are some strong arguments in favor of continued support for SFPs.

SFPs too can suffer from some of the same problems that plague MCH: most particularly inaccurate targeting, supplies of rations inadequate for demand, and irregular attendance, all of which result in diversion of resources away from the most disadvantaged members of the school age population. Although, for example, a targeting model may direct the establishment of SFPs only at schools in the poorest or least well nourished sections of the country, there is no guarantee that all students are equally underprivileged and hence equally deserving or needful of supplementation.

Cotten in his Haiti study showed that a substantial number of schools had suffered an unexplained evaporation of food stocks, and many had larger enrollments than the figures used as a basis for calculating the amount of rations received. Even so, the hot meal provided in the Haiti program supplied about 1/3 of the energy requirement for a school child, which is regarded as satisfactory assuming that the child receives two other equivalent meals elsewhere every day. This may not, however, be the case, for two reasons: first, the widespread custom of taking no food in the morning, and, second, the substitution effect. It seems frequently to be the case that the food provided by the school substitutes for a meal which would otherwise be taken at home, rather than acting as a true supplement to the usual diet. It could be argued that such substitution has a positive effect at the household level in that

it marginally increases calorie availability for all members. However, the extent to which substitution as opposed to supplementation actually occurs is undocumented. There is evidence that the biscuits provided through the Sri Lanka SFP are more often than not shared with siblings, and provide less than 5% of the recipients' RDA for calories, calculated on an annual basis.

The third component of Title II programs, food for work, is one that seems to be increasing in popularity in some countries. Its principal goals, as noted in evaluations and in the published literature, are not first and foremost nutritional improvement or income transfer, but rather such diverse objectives as employment generation, skills training, development of resources, creation of capital assets, strengthening of local organizations, bolstering of self-esteem, and reduction of dependence on external sources by the creation of self-sustaining development. The principal disadvantage to food for work activities is that the main class of recipients, adult men, is that part of the population commonly regarded as least at risk nutritionally. Women too may provide labor and receive commodities on FFW projects, as noted in Lesotho and India, but most workers are men.

Rations are sometimes distributed dry for the workers to take home, in which case they may be assumed to deliver nutritional and/or income benefits to the entire household; in such cases the ration is usually given in quantities meant for household rather than individual consumption. But the foods are sometimes communally cooked onsite and consumed only by the workers, in which case their household-level impact is clearly diluted. Targeting too is a question: in the case of the rural access roads program in Kenya it was simply assumed that only the poorest people would turn out for employment, but nutritional

status of the workers ranged from overnutrition to severe protein- calorie malnutrition (weight for height less than 70% of standard). If all participants are from the poorest strata in the community, either nutritional status of adult men is not critically determined by their poverty, or there is great variation in the efficiency with which the poor employ their resources for food procurement. In Indonesia, the cash value of the ration offered was so low that the work was equated with a form of community cooperative labor in which all, rich and poor alike, must participate; so that the low value of the commodity package, designed to discourage all but the poorest from seeking employment, actually functioned to divert a proportion of the food resources away from the poorest people.
One possible solution to this problem is to increase the ration to make it equivalent in value to daily wage labor rates.

Although nutritional considerations are not among the stated priorities of food for work programs, recent studies from Kenya suggest that perhaps potential nutritional outcomes and benefits should be given more emphasis. Latham and colleagues' studies of adults engaged in paid labor on rural access roads showed that up to 59% of male workers in particular localities had a weight for height of less than 70% of the standard; low fat reserves as measured by mid-upper arm circumference and triceps fatfold were related to low worker productivity. However, in the one locality where women were employed as well as men, their nutritional status and in particular fat reserves were superior to those of

the men, although their productivity was lower. Supplementation of workers' diets with 1000 kcal/day of food prepared and consumed on-site resulted in a statistically significant 13% rise in worker productivity; the productivity of those receiving only 200 kcal/day rose 3%. "Also of interest was the fact that improvements in certain anthropometric measurements...were significantly related to gains in productivity. We can conclude that successful supplementation which improved nutritional status significantly increased productivity..." (Latham 1983:36).

There is clearly great variability in the structure and content of food aid programs, and a good deal of confusion surrounding actual program priorities, operations and outcomes. There is general agreement that leakage and substitution affect the level of intake of donated commodities by their intended beneficiaries in both MCH and SFP programs. This is almost certainly less of a concern in FFW projects, but in the latter case neither nutritional nor income benefits to participants is necessarily of primary concern. There is no necessary agreement between donor, PVO and recipient on priorities and goals. Most critical for our purposes, we have only very limited understanding of the way in which these foods are utilized in the home and we completely lack information about impact on certain classes of beneficiaries, particularly adult women.

It seems quite clear that answers to a great many of these questions, as well as empirical testing of hypotheses, cannot be

provided until detailed fieldwork is carried out. Historically, the emphasis in PL480 Title II feeding programs has been on MCH distribution and emergency relief. The goal or objective of the feeding program to those in the field has been to reduce hunger and malnutrition. The criterion used to evaluate program success has been improvement in nutritional status of young child beneficiaries as measured by anthropometric assessment.

More recently, in school feeding and food for work, other considerations (such as promotion of attendance and improvement in cognitive performance in the former, and employment generation and creation of capital assets in the latter) may be more important. MCH feeding programs also are the largest single recipient of Title II commodities, distributing in FY 1984 over 30% of amounts programmed for delivery through PVOs. Section II will discuss program-level variables of concern in understanding their operation and impact and in designing research to examine these.

Section II

Title II feeding programs: variables

Beaton and Ghassemi's 1979 review of 200 supplementary feeding programs operated through maternal and child health facilities (published in the American Journal of Clinical Nutrition, 1982; see references) remains the single best overview of a certain

category of intervention; the onsite or take-home preschool feeding program. The authors are unconvinced that either the true effects or the full benefits of food distribution programs really have been measured in the studies that they review. Recognizing that existing knowledge is inadequate, the authors recommend detailed investigations designed to establish the effects, at individual, household, and community levels, of food transfers. "Until such research has been undertaken, the real scope and benefits of supplementary feeding programs cannot be known" (1982:910).

Considered below are several variables which are part of Title II distribution programs and which are of potential significance in future research activities.

1. Method of delivery. Title II feeding programs can deliver the ration in one of three ways: residential or in-patient care, on-site feeding, and take-home distribution. Residential feeding usually takes place in a nutrition rehabilitation centre and participation is limited to the most seriously malnourished children aged five years or less, in a particular community or locality. The criteria defining admission vary from program to program. In some cases clinical protein-calorie malnutrition presenting as marasmus and/or kwashiorkor may determine eligibility. In other places, weight for height or weight for age below a specified percent of standard, according to international or local reference standards, may be employed. It

should be noted that the cut off point defining certain categories, classes, or grades of protein-calorie malnutrition vary a good deal from study to study, such that a child regarded as mildly to moderately malnourished in one place may be viewed as "normal" or not malnourished in another. Regardless of the standards used, however, those actually admitted to residential care will almost always be the most seriously malnourished in their community, and the objective of the program is cure of an illness. Most residential programs suggest or even require that the mother of a child who has been admitted also be admitted with the child in order that nutrition and health education may be imparted, and the child's caretakers will acquire enough knowledge to take steps towards prevention.

On-site feeding involves the preparation of food at a particular locality, such as a clinic, MCH center, school or worksite. The advantage as far as some observers are concerned is that on-site consumption ensures that only the target individual(s) consume(s) the ration. The disadvantages to on-site feeding are that attendance at the delivery point is necessary on a daily basis; this attendance may have unacceptably high opportunity costs, especially to MCH program participants, in terms of loss of working time, transportation expense, and the like. The substitution effect may also be a significant variable in such programs. Often the food provided by on-site feeding substitutes for a meal that ordinarily would be taken at home, rather than acting as a true supplement to the usual diet. It is therefore

uncertain whether this form of feeding necessarily delivers measurable benefits to the consumer and/or his household.

Provision of "dry" rations which are to be taken home and prepared there for consumption by beneficiaries is the third and most common form of distribution of Title II and other donated commodities. This method of delivery has some decided advantages over the two forms previously discussed. It is much less costly than either residential or on-site feeding in terms of personnel requirements, equipment and supplies, and capital investment. The distribution can be integrated into pre-existing health, school or co-operative services operated by governments, PVOs, religious missions, or private health care providers. It often is seen, or hoped, to function as an incentive for regular attendance at clinics designed to provide nutritional surveillance and preventive, as well as curative or palliative, health care, and at schools and worksites. But there are disadvantages also, the most significant of which are inability both to monitor intake of the commodity and to understand the dynamics of the actual disposition of the commodities. And since it is generally agreed that the principal goal of such programs is improvement in health and nutritional indicators, take-home programs may suffer in comparison with residential and on-site programs in a direct assessment of the extent to which they achieve this goal.

On the basis of published information, there can be little doubt

that over the short term the most effective method of distribution in so far as achieving the goal of nutritional improvement is concerned, is residential feeding; but these sorts of programs are limited to small numbers of clinically-malnourished patients, virtually always pre-school age children. Such programs have high recurrent and capital costs, however, and facilities and personnel are available to serve only the most gravely ill young children in the population. Analyses of long-term effects of such interventions are largely negative, in that the improvement in growth indicators achieved during admission often disappears some weeks or months after discharge; only Korte (1971) suggests maintenance of improved growth over the longer term, and he provides no evidence to support this. Analysis of on-site and take-home options suggests that their capital and personnel costs are much lower but that even if nutritional improvement equivalent to that achieved during residential feeding is accomplished, a much longer period of time is required for this to occur. The problems of leakage, that is substitution effects, sharing, inappropriate targeting, and inadequate supplies, have made it virtually impossible, given existing research designs, to comment meaningfully on either patterns of commodity utiilization or benefits delivered to both individuals and households using these models of ration distribution. Since residential feeding is so highly specialized, available only to the gravely ill, it would not be particularly valuable to explore this option further. It would be useful in the course of research to contribute to better

understanding of the household level dynamics of on-site vs. take-home feeding, however, especially the extent to which the beneficiaries of on-site meals actually do continue to claim their proportionate share of foodstuffs available to the entire household membership.

2. The commodity. Beaton and Ghassemi (1982) found little evidence that the type of commodity or commodities delivered--those actually composing the ration received by the target--affected participation in MCH feeding programs. However, the issue of how the ration itself may affect utilization remains largely unexamined. Such criteria as palatability, acceptability, exchangeability or equivalence with other foodstuffs which are already part of the usual diet, and culturally-identified appropriateness for consumption by particular categories of household members are significant. "Self-targeting" foods, possessing characteristics or qualities making them suitable or appropriate only for consumption by infants, or by pregnant/lactating women, have been proposed as a deterrent to diversion by leakage and sharing. While the use of various types of pastes or gruels as weaning foods or supplements to breastmilk is widespread, the ingredients used are quite variable and there is no commonly-agreed upon set of attributes. Some experiments with such potentially limited-distribution foods have been tried but they pose the problems of additional expense for processing and packaging (cf. Kolasa 1984).

Some studies have raised such issues as creation or stimulation of artifical demand for particular commodities, or functioning of some foods to alter for the worse traditional patterns of infant feeding or intra-family food allocation. Nonfat dry milk is often mentioned in this latter regard. For example, in Cameroon it is noted that people often purchased milk for tea preparation when their Title II supply ran out, and it is suggested that the provision of nonfat dry milk may be a drain on family income, since if it had not been distributed in the first place people may never have found it necessary to purchase additional supplies. It has also been argued that provision of milk encourages shortening of the duration of breastfeeding and the the commodity is employed as a breastmilk substitute, rather than as a supplement. Zumrawi and co-authors (1983) found, however, in a controlled trial in MCH clinics in Khartoum, Sudan, that mothers receiving 2 kg of milk per month were actually more likely to continue breastfeeding than those who received an equivalent quantity of beans, and that there was no evidence to associate use of the milk with increased incidence of diarrhea and other signs of gastroenteritis. It is nonetheless possible that provision of foods that can act as breastmilk substitutes has deleterious effect on duration of breastfeeding, volume of breastmilk, postpartum amenorrhea, birth interval, fertility, and a number of other variables which are commonly regarded as having nutritional consequences or implications (see especially Jelliffe and Jelliffe 1978). The worst outcomes are likely to be found in situations where nutrition education and especially instruction

in the appropriate preparation of the milk are not carried out properly; where bottlefeeding apparatus are widely available at low cost (which is not always the case); and where incomes are low (cf. Research Consortium 1984). Furthermore, since most of the children enrolled in MCH programs are of an age where breastmilk supplements or replacements are essential for good nutrition, the amount of nonfat dry milk available to an individual beneficiary after sharing and other leakages does not seem likely to interfere materially with the usual infant feeding practices of the household and community.

Income transfer value of the commodity is regarded by many as one of its most important characteristics if not the most important. This hypothesis in its most extreme form leaves aside all considerations of palatability and acceptability either to the population at large or the target groups within that population who are supposed to be the principal beneficiaries. The NAS study that initiated the debate on the income transfer issue regards nutritional/physiologicaly concerns (i.e. the appropriateness of the ration in terms of the nutritional problems being faced in a program area) and nutritional cost-effectiveness as the primary commodity selection considerations. "Suitability" and program mode must also be taken into account. If our concern is to be with the extent to which Title II foods achieve their nutritional goals, the acceptability in consumption terms to the population of the donated commodities must be a primary consideration, as well as

concern with what quantities are optimum for best utilization.

The size of the commodity package--the amounts and proportions of foodstuffs provided--is quite variable, depending on program method, frequency of distribution, and availability of stocks, and there is little information available on optimum quantities or the rationale upon which composition of ration packages rests. Franklin et al. (n.d.) state that in Panama, "...the commodity selection and ration sizes...are...approximately correct. The donated commodities tend to be consumed by the households; the donated foods replace foods which are less preferred and the income-mediated effects result in an improvement of the quality of the diet" (17).

In short, there is little empirical knowledge of the impact of particular commodities on utilization by the recipients. Value, palatability and size suggest themselves as significant characteristics which must be taken into account as research is planned; these qualities are likely to have substantial impact on participation, utilization, and the delivery of nutritional and/or economic benefits.

3. Effects of other components

Project food aid is often regarded or designed as a package of benefits, of which the ration is but one element. Other components of this package may include nutritional and growth surveillance, provision of preventive health care (such as immunization against infectious disease, or malaria prophylaxis), treatment for infections or parasitic disease, and nutrition and health education in MCH programs, community building and self-sustaining development in FFW, and integration of health, nutrition, and educational concerns in SFPs. In the case of MCH delivery, not all of these services are necessarily available at all commodity distribution points, but efforts to educate the community in appropriate health practice, food preparation techniques, and elementary nutrition are common to all such programs.

The quality and thoroughness of such instruction varies greatly from one program to the next; but in the individual country Title II evaluations the nutrition education components were subjected to considerable criticism. Personnel shortages, inadequate training, and inappropriate methods, approaches and materials appear to be the major obstacles to the development of more effective nutrition and health education activities (cf. Bailey and Raba 1976). However, what evidence there is suggest that program participants had a better understanding of their own and their children's health and how to manage it for the better than

did non-participants. Thus, in The Gambia all participant mothers interviewed could explain the rationale for the growth surveillance cards used by CRS, and understood the implications of their children's positions on it. In Senegal, participants also showed benefits from nutrition education in that they had adopted the injunction to continue breastfeeding for a longer period of time; they also understood how to prepare an oral rehydration solution using the locally-available baobab leaf, and they were more likely than non-participants to use anti-malaria medications for prophylaxis as well as for acute care. However, this same evaluation notes that "There were no differences in diarrhea incidence between participant and non-participant children and a virtual complete lack of knowledge among the mothers of both groups regarding its appropriate treatment" (83). Although participants' mothers knew how to prepare ~~oralite,~~ they apparently were unable to apply this knowledge to the treatment of diarrhea. Mora et al. (1981) found in urban Colombia that "home education" moderately enhanced improved growth among children receiving dietary supplements, but did not by and of itself improve growth. This result suggests that conventional nutrition education as one element in an intervention package is valuable as a part of that package, but that it has little or no impact independently of its companion interventions. Sahn and Pestronk (1981) present numerous case studies to support the above suggestion.

Although nutrition education is essential in any MCH feeding

program, at least for the purpose of teaching mothers how properly to prepare unfamiliar commodities, other components such as surveillance, preventive care, ante-natal care, and primary care are not always all included nor are they necessarily very well integrated with the other parts of the package. Sahn and co-authors (1981) found in India that health services ancillary to food distribution were not always or even usually available. For many participants, the ration is the major attraction; the other components may be of only marginal importance. Clinics in Cameroon which ceased to distribute Title II food suffered drastic declines in enrollment; erratic distribution and limited availability of the ration also affected MCH attendance in Ghana.

Bailey and Raba (1976) emphasize that "concurrent health education in nutrition is a most important concomitant of supplementary feeding; in the long run it is even more important than the feeding itself" (308). This assertion is by no means proven, as many questions still remain about the effectiveness of education efforts independent of their functions in intervention packages. Nonetheless, nutrition and health education are an important component of such a package and some attempt is made to impart knowledge in the context of Title II MCH feeding programs even if other parts of the package such as preventive care and surveillance cannot always be delivered. Nutrition education, particularly the topics and areas presented and the training and capability of the personnel who impart the knowledge, is a second program variable which must also be taken into account in research

design.

Thus, so far as program level variables are concerned, three factors must be taken into consideration: method of commodity delivery, size and composition of the ration package itself, and the other components, if any of the supplementary feeding package. Thoughts on how these factors, or combinations of them, might usefully be examined in a field research situation, are presented in Sections IV and V.

Section III

Significant variables external to feeding programs

There is a large body of literature on nutritional status assessment, and in the past 15 years or so the scope of many such assessments has begun to broaden. Earlier objectives (prior to 1965) of nutritional survey and assessment work were merely to demonstrate that malnutrition, usually protein-calorie manlnutrition, existed in a particular society, community or class of people, and to establish incidence, prevalence, severity, and associated illness. It must be kept in mind that nutrition is a fairly new science. It is only within the past fifty years that the association between food intake and particular diseases which we realize now to be caused by nutritional deficiencies was clearly established. The clinical nutritional deficiency disease we call kwashiorkor was not

adequately described in medical literature until 1933 (Williams) and the first monograph on it did not appear until 1953 (Brock and Autret). Thus, until recently, the objective of most nutritional investigation was to discover the extent to which such illnesses actually occur and thus constitute public health problems.

The publication of Derrick Jelliffe's "The Assessment of the Nutritional Status of the Community" in 1966 did a great deal to expand the scope of nutritional survey and assessment work. Jelliffe devotes the bulk of his monograph to the discussion of direct methods of nutritional assessment, including anthropometric, clinical, biochemical and biophysical techniques. He also, however, presents a chapter entitled "Assessment of ecological factors" in which the multifactoral or ecological etiology of nutritional disease mentioned earlier by Bengoa et al. (1959) and Scrimshaw (1964) is emphasized. Six categories of ecological factors (conditioning infections; food consumption; cultural influences; socio-economic factors; food production; medical and educational services) are described and methods for data collection are proposed. Soon after this monograph appeared, an increasing number of studies which have sought to combine the insights of social and biological science in an effort to isolate specific causal chains in nutritional disease have appeared (cf. Beaudry-Darisme et al. 1972, Ernster 1976). These studies have isolated a large number of highly specific factors which seem to be associated with the extent and severity of malnutrition in

particular developing countries or specific populations within such countries. The type and quality of the data, methods of investigation, definitions of malnutrition, strength of association or correlation, and reliability and validity of results vary enormously from study to study. In reviewing these variables and the studies analyzing them I propose to follow the advice of Miller and Pyle (1979), who argue that "...the appropriate methodology...is the explicit cataloguing of all competing explanations for observed patterns...and the systematic elimination of as many explanations as possible through objective and/or subjective analysis" (11).

I have somewhat arbitrarily organized the implicated variables into several categories. Within each category I will summarize the available data, present brief case studies where useful and appropriate, and indicate, on the basis of the cases reviewed, whether the variable may be significant in terms of research design, whether its association with malnutrition is too weak or ambiguous to allow its significance to be established, whether the variable is not significant, and/or whether the variable clearly serves as a proxy for some other factor or combination of factors. Each of the variables discussed below has been shown to have either broad or specific effects on the nutritional status of preschool (those aged less than five years) children examined for the most part in a household context. Some of these factors may therefore be assumed to have the power to confound the path taken by Title II commodities from the donor to the individual

beneficiary for whom they are intended.

A. Biological variables

Under this heading are grouped factors which are a function of the biological nature of the human organism. Nutrition outcomes, although influenced and mediated by a large number of factors external to the organism, express themselves as biological conditions, so consideration under one heading of factors which are fundamentally organic in nature is a useful way to organize the discussion.

1. Morbidity/conditioning infections

The association between various diseases, particularly bacterial, viral and parasitic infections, and malnutrition has been realized and accepted since the early work of Scrimshaw and others (1959, 1964). The model generally employed is one of "synergistic interaction" between nutrition and infection, such that infections have an adverse effect on nutritional status, perhaps even precipitating clinical marasumus or kwashiorkor. The interacting effects of reduced resistance to disease in malnourished children and increased nutrient needs in those ill with an infectious or parasitic disease are the components of this synergy. Infectious diseases most frequently implicated in the synergistic interaction are gastroenteritis, intestinal parasites, and measles. Latham (1976), for example, offers the

case fatality rate for measles in developing countries as a "dramatic illustration" of the impact of malnutrition on infection. The case fatality rate for this disease of around 15% in many poor countries is attributed to a combination of poor nutritional status, lowered resistance, and poor general health. "Differences in the clinical severity and the fatality rates from measles in developed and developing countries are due not to differences in virus virulence but to differences in the state of host nutrition" (1976:8; viz. Morley 1973). Surveillance of measles among a total population of 24,000 in Machakos District, Kenya, over three years, found two peaks in the numbers of measles cases (Muller et al. 1977). Mortality was higher during the first epidemic than the second, contributing to 17% of all deaths in the age group 0-15 years during the first outbreak and 11% during the second. Mean weight for age as a percent of the Harvard standard of young children "...was significantly lower in the first period than in the second period" (369). Mid-upper arm circumference of survivors was significantly greater than that of children who died of measles. The authors conclude, "Nutritional status is generally believed to be an important determinant of the severity of measles, and our data support this view" (370). On the other hand, Aaby et al. (1983) found that measles mortality in Guinea-Bissau was not affected by nutritional status, but by family structure, which "...had an important impact on the severity of the disease" (693). Of the 60 children who died in an epidemic ten were at less than 80% of standard weight for age; but the risk of dying was identical for

malnourished and normal children. Children living in polygynous households had a higher risk of dying of measles than those living in monogamous ones, and it is concluded that large households containing many children experienced a higher case fatality rate due to intercurrent infection and/or a heavier dose of the virus.

Similar contradictory findings emanate from field studies of the interactive effects of helminthiasis, particularly ascaris infestation, and protein-calorie malnutrition. As recently as 1976 Latham was able to note that little work had been done on the impact of intestinal parasites on human nutrition, with the exception of hookworm disease and its role in iron deficiency anemia. Since then several field studies have been conducted, which have associated ascaris infection with malnutrition (Stephenson et al 1979). Schultz summarizes the results of these studies as follows: "Substantial doubt remains about the cause-and-effect relationships beween ascariasis and protein-energy malnutrition. In none of the studies, where a positive correlation is claimed, was a significant difference in weight found between infected and uninfected children before intervention. Several recent studies...also showed no significant improvement in nutritional status after intervention" (1982:819). The author advocates more rigorously designed field studies that avoid statistical error and are reproducible under a variety of conditions. One such study (Kloetzel et al. 1982) found no differences in nutritional status after 10 months

between a group of 165 Brazilian children treated for ascariasis and another matched group that was not treated. Further, in these groups ascaris egg counts did not have any significant relationship with changes in nutritional status. The authors somewhat sweepingly conclude that "Ascariasis by itself thus cannot be considered a causal factor in malnutrition..." (43). Pawlowski (1984) reviews the existing literature and concludes that "Scientific evidence of a causal relationship between intestinal parasitic infection and malnutrition is only fragmentary" (257).

Field studies which endeavor to employ an experimental design evaluating effects of treatment vs. non-treatment are fraught with moral, ethical and methdological problems. It is extraordinarily difficult to establish precisely the relationships between disease states and nutritional status in human populations using direct studies or observation, or experimental designs. Many nutritional experiments are conducted using non-human proxies, human volunteers, or institutionalized persons (e.g. prisoners). These sorts of ethical and methodological constraints make the production of unequivocal proof of specific infection-nutrition linkages virtually impossible. That certain disease states, especially gastroenteritis, diarrhea, and febrile illnesses interact with nutrition and/or food intake cannot be doubted (cf. Brown, Black and Becker 1985), but the effects of other infections, especially intestinal parasites, on protein-calorie malnutrition is not so clear-cut. Of importance also is the

effect of infection on food intake; anorexia is a common side effect of illness, and caregivers may be reluctant to coax a sick child to eat if the child displays no appetite. Pawlowski concludes: "...only some infections, some degrees of impaired immunity and some forms of malnutrition are interrelated" (1984:258).

In research design, morbidity in the sample population can be both monitored and controlled for by routine physical examination and collection of data from children, parents, health-care personnel, and (with caution) local statistical information on utilization of services and incidence of diseases. Some conditioning infections, especially febrile illness, interact with and may affect nutritional status and food intake but can be controlled for in statistical analysis if appropriate data collection procedures are used.

2. Mother's nutritional status

Jelliffe noted in 1966 that "Next to young children, pregnant and lactating women are nutritionally the most vulnerable group, especially in developing nations of the world, and yet comparatively little is known of their special nutritional needs" (210). This statement is still valid today; as already noted, although Title II MCH and FFW programs are supposed to deliver nutritional benefits to mothers and children, and entire households respectively. There are no data available to evaluate

the extent to which such benefits have actually been conferred. The constant nutritional stress of sequential pregnancy and/or lactation throughout the reproductive years, coupled with heavy work demands and in some cases food taboos and/or fasting, generates a condition known as "maternal depletion syndrome". Analysis of mother's nutritional status is important not only because of the vulnerability of women, but also in relation to the health, nutrition, and survival of their children. But, the bearing of mother's nutritional status on the nutritional health of the infant as indicated by birthweight can be confounded by a number of other factors: maternal smoking, placental malaria, lack of ante-natal care, obstetrical abnormalities, and most strikingly, maternal age. In a sample of 1256 primiparous mothers from Lima, Perú, low birth weight was related to maternal age, not length of gestation. Among rapidly-growing teenagers the nutritional requirements of pregnancy for the mother seem to be greater than they are among older women; although adolescent mothers gained more weight than older ones, their babies were consistently smaller in size, and at the same level of nutritional status young mothers had smaller newborns than older ones. Newborn weight increased systematically with increasing maternal age from the 12th to the 16th year, after which no age associated differences in birthweights were seen (Frisancho et al. 1983). Birthweight of infants varied seasonally in Ikwiriri, Tanzania; "In the course of the agricultural season mean maternal weight falls, and the incidence of low birthweight rises, indicating that women sustain a

negative energy balance during peak labour periods" (Bantje 1982a:214). Birthweight of infants in Ikwiriri was also directly related to maternal weight, but not to maternal height (cf. Bantje 1982b, 1983). Similar results pertaining to female weight loss and negative energy balance were obtained in a study of women farmers in Upper Volta (Bleiberg et al 1980). Fasting among pregnant women during the Muslim Holy month of Ramadan in the Gambia precipitated a state of "accelerated starvation" during late pregnancy that contributed to low birthweight and a generally poor outcome of pregnancy (Prentice et al. 1983). Since Ramadan is based on a lunar calendar its position vis a vis labor demands and seasonal food availability changes from year to year; this negative picture may not always be accurate. Nonetheless, the suggestion is, that maternal nutritional status, particularly during the third trimester, can affect birthweight of infants, and that the nutritional needs of very young mothers may pre-empt those of the fetus; some studies have shown that nutritional status of the mother during her early childhood, as reflected by maternal height, ~~also affects~~ child's nutritional status (but see Bantje 1983).

Maternal nutritional status apparently has less effect on quantity and quality of breastmilk production; lactation occurs more at the further nutritional expense of the mother than of the child. Breastmilk volume seems to be somewhat lower (perhaps 100 ml/day less among poorly-nourished mothers than among well-nourished ones, but the data are not strictly comparable

(Jelliffe 1978:64-67). Breastmilk of women from LDC's seems to be lower in some trace elements and vitamins than is usually true among Western women; nonetheless, both volume and composition of breastmilk in malnourished mothers is "surprisingly good", an observation seconded by Whitehead who notes that "...generally speaking, it would appear that except in extreme maternal undernutrition the concentration of total energy and protein in breastmilk are maintained at remarkably normal levels" (1981:57). seems to be so as a consequence of further maternal depletion. There is some evidence that supplementation of maternal diets during pregnancy has greater positive effects on lactation performance because it functions to increase maternal fat reserves; supplementation during lactation itself occurs too late to produce these effects (O'Gara, personal communication). Jelliffe goes on to note that the best test of the adequacy of breastmilk volume and composition is assessment of physical growth of breastfed infants; available evidence suggests that the growth patterns of babies in developing countries are comparable to those of Western infants for at least the first four months of life. The introduction of supplementary foods for infants in non-Western countries may be necessary at a slightly earlier age than is the case for children of well-nourished mothers, for whom breastmilk alone is sufficient up to the age of about six months.

Regardless of these evidences of the effects of maternal nutritional status on birthweight particularly, two facts must be

kept in mind: that despite the incidence of low birthweight in developing countries, both weight and height (length) of newborns generally average well over 90% of the Harvard standard; and that this relatively good start continues for the first three to six months of life for breastfed infants. My own data from Kenya show an average weight for age and height for age of over 95% of Harvard standard for all children aged 0-6 months, which declines to 93% or less for height and 85% or less for weight in older children (those aged over 15 months). Dixon et al. (1983) found mean weight for age in a sample of over 500 Kenyan infants to be over 100% of standard during the first six months of life, but declining to 86.8% for older preschoolers. It is at the point when supplementary foods should be or are introduced that these children begin seriously to fall behind their Western counterparts; and low birthweight children, with their initial disadvantage, do so more rapidly than those with a normal weight for gestational age. Data such as these suggest that malnutrition is not solely or even principally a product of biological processes, but is a product as well of other ecological processes. Even so, assessment of maternal nutritional status is an important research consideration, and is in and of itself an important objective and contribution to knowledge.

3. Other biological variables

The variables of maternal age, parity, birth order and birth interval will be discussed together because they are so closely inter-related and because all serve to some extent as proxies for each other. Many studies have suggested that risk of poor nutrition for a child increases as maternal age and/or parity increase, as a function of the child's late position in the birth order, and/or as birth interval shortens. Clearly the first three of these are so closely related as to be facets of a single issue. Parity will increase as a woman becomes older, and the more advanced maternal age is, and the more children she has, the later in the birth order a newborn child will be found. Results of investigations of what might be termed the parity variable are mixed. Bantje (1982a) analyzed records of several thousand births in a Tanzanian village over an eight-year period and found that mean birthweight increased until the seventh birth, then began to decline. The proportion of low birthweight, similarly, decreased until the seventh birth, then rose. Thus only grand multiparity, which is generally characteristic of older mothers and which automatically places the child low in the birth order, seems to be significantly associated with nutritional risk for the child. This three-pronged risk factor can be controlled for in the course of the study.

Birth interval potentially affects the nutritional health of both

mothers and children, a short interval often being marked by early cessation of breastfeeding without the concomitant introduction to the child's diet of a suitable protein and calorie substitute. Jelliffe notes, for example, that in Uganda kwashiorkor is recognized by the local people as a disease of the child displaced from the mother's breast. Shortened duration of breastfeeding has the effect of shortening the birth interval, as the period of postpartum amenorrhea and anovulation is reduced. These two processes interact with one another; in either case the nutritional status of the child can be affected, either by early weaning or by maternal depletion and malnutrition affecting the growth of the fetus. In most rural areas in developing countries, however, prolonged breastfeeding, postpartum amenorrhea, postpartum restrictions on intercourse, traditional methods of fertility limitation, polygyny, and/or periodic or long term absence of adult men as migrant workers jointly function to maintain two to three year birth intervals. While total fertility is still likely to be high (a Kenya sample with mean age of 34.2 years had already experienced an average of 6.08 births each; see Dow 1983), the factors noted above function to space the births fairly evenly. In fact, Dow notes with regard to Kenya that given mean desired completed family size of eight children, women breastfeeding for 20 months (the mean duration of breastfeeding for the current youngest child) have little need for modern methods of fertility limitation or birth spacing. Birth interval is an important variable to be noted and taken into consideration in data analysis, but neither it nor the

parity variables discussed above need necessarily confound research results.

B. Social structural variables

"Social structure" is an anthropological concept used to refer to normative patterns of kinship and community organization, and the rules that govern the expression of such patterns. Domestic groupings and political groupings constitute the most important categories of social structure; in all societies domestic groups are primarily a reflection of systems of kinship, marriage and residence, and take their shape from the underlying rules, from ideology and expectation, and from adaptation to ecological and socio-economic processes. Although every society has a model of what structure should be like--the forms that marriage, family, and household ideally should take--due to pressures of change and development it is not possible for all such units to conform to the models and normative patterns. Such significant variables as land tenure reform, migratory wage labor, Western education, industrialization, agricultural change, and impact of introduced religions have created substantial deviations from ideal models of social structure the world over. Because of this change, flexibility, and adaptiveness, categories of social structure may be extremely difficult to isolate, define and examine. It is important to keep those notions in mind as the following subsections are read.

1. Household structure and composition

It has so far proven impossible to establish a universally applicable or acceptable definition of household, but these units are recognized as "...culturally-defined, task-oriented residence units....recognizably and regularly occurring somewhere between the individual and the larger community" (Netting, Arnould and Wilk 1984:58). As a unit of analysis, household is not equivalent to family and is the focus of study for two reasons: as a concept, "family" usually transcends the boundaries of household units, and families in any sense of the word do not ordinarily function as decision-making and resource-allocating units to the same extent that households, however constituted, do.

A useful recent approach (Jones 1983) is to examine the household as a bargaining unit rather than as a "conjugal estate" or collective decision-making unit. The bargaining model recognizes that household members may have conflicting as well as complementary interests, and may also have differential power in the household decision-making process, often as a function of the nature of the decision that is to be made. Thus, in many parts of sub-Saharan Africa women have virtually complete control over food production, distribution and consumption decisions. Such activities constitute a female domain, in which it is not usual or even acceptable for men to interfere; in any place where women have a significant role in agriculture, this sort of autonomy is likely to be the general rule (cf. Guyer 1978). Looking only at

the ideal model of household as conjugal estate can give a very misleading impression of how decisions are made and how bargains are struck (see the Upper Volta Title II evaluation for a case in point).

Another characteristic of households in both rural and urban areas of developing countries is their variability in composition. Many of us implicitly assume a model of household consisting of husband, wife, and minor children. This conjugal model of household often is equated with the notion of "family". In urban areas and among the educated and/or well-to-do in developing countries increasing conformity with this largely introduced notion is seen. In many areas of the world, though, traditional household models incorporate many other categories of kin, by blood and/or by marriage, or by fictive ties; foster children and certain categories of subordinate clients, including slaves, also existed or exist as integral elements in a household unit, although their bargaining position is quite weak and their dependence great.

In any case, every society has its model of what a household is supposed to be like--its social structural norm--but the processes of change already noted have contributed to widespread and substantial deviation from traditional models almost everywhere (cf. Colson 1962). The ideal Taita model of a household, for example, is composed of a man, his wife or wives, their unmarried daughters, sons, sons' wives, and sons' young

children. Men established their own separate households only after several children had been born and after their fathers had given them bequests of land. In actual fact today the co-residence of married sons with their parents is the exception rather than the rule; most household are only two generations in depth, and over one-third have no resident adult male member and are headed--and managed--by women. Some of these women are widows, some are divorced, some are currently married but with husbands absent as labor migrants, and some have never married at all. Buvinic and Youssef (1978) have recently pointed out the significance of woman-headed households, and their variability, to development planning. Each of these sorts of household has differential access to the critical resources of land, labor and cash. Each has different strategies of acquisition, management, and allocation of resources within the unit, and seeks to reduce risk and maximize access to resources by establishing networks of exchange and interaction with other household units in the vicinity.

The preceding discussion should give the reader some idea of the complexity, elusiveness, and overwhelming importance of household--in terms of form, composition, and the sorts of processes that occur within it--to nutritional issues. It is unfortunately the case, however, with very few exceptions, that the variable has not been adequately examined in the course of nutritional research. Many investigators simply assume that all households in an area will conform to a normative model, and are

blind to deviations from such a model; yet it is patently clear that variation in household structure is accompanied by variation in access to resources, that differential management must accompany such variation, and that different nutritional consequences will ensue.

Those studies that have examined variation in household form in terms of its nutritional correlates have come up with contradictory results. Grewal et al. (1973) assert that better nutritional status was found in those from a sample of 89 Indian preschoolers who lived in joint households, because more adult female caregivers were available in such units and thus the quality of "maternal care" was superior to that provided in single-family households. In Guinea-Bissau, however, nutritional status was slightly better among children living in conjugal households than among those in extended or female-headed households (Aaby et al. 1983). In Taita District, Kenya, somewhat better nutritional status was found in households headed by currently married women whose husbands were absent. Children in conjugal and extended family households fared slightly worse (Fleuret 1984). Of the studies mentioned here, only Fleuret's was primarily concerned with examining variability in household structure at the community level, and relating that variability to other social and economic, as well as nutritional, processes.

Household is thus an institution whose form can vary tremendously

within as well as between societies; the prevailing model and its variations affect decision-making and access to resources, and have clear but unmeasured implications for nutritional outcomes. In any research effort household form and variability and the roles, bargaining power, and resource-managing functions of individual members must be scrutinized with care and detail. This realm is one of the most important variables, and simultaneously one of the most difficult to define and to control for in the research. An important outcome of further study will be an improved understanding of household-level dynamics under a variety of conditions and in a variety of settings.

2. Patterns of marriage

It is still the case that most societies expect all their members to marry, and definitions and rules of marriage have developed that permit culturally-acceptable marital unions to be established and dissolved. The vast majority of all marriages the world over are monogamous, involving the union of one male and one female for purposes variously social, economic, legal and reproductive. In most cases these marriage partners co-reside and raise their children in the same house, so that the expressions "monogamous family" and "monogamous household" are heard, but there are many instances of separate residence of spouses, and marriage does not necessarily a household make.

Polygamy is the institution of plural marriage, permitting

multiple spouses simultaneously. By far the more common variant of this is polygyny, in which a man has two or more wives at the same time. The variant of polyandry, where women have multiple spouses, is so rare that it will not be discussed here. The rate of polygynous marriage is quite variable throughout those areas where it is permitted or preferred, but only a minority of men actually are able to achieve the ideal. Polygyny is expensive, as marriage payments have usually to be made and resources must be available to support all the wives and their children equitably; it is also limited by the supply of women. Although adult women do generally outnumber men in most societies, the oversupply is not sufficient to permit more than a minority of men to accomplish plural marriage. Studies that have looked at the impact of polygyny on nutritional status have yielded mixed and contradictory results. Aaby et al. (1983) found a somewhat lower nutritional status in "polygamous" units than in monogamous ones, but Gans (1963) found no association between polygyny and anthropometric indicators. Wenlock (1980) noted that "short-term nutritional risk is significantly greater among the children of polygamous [sic] marriages than among those of monogamous marriages" (1980:86), but the study employed highly aggregated national sample data from Zambia and the confounding effects of other variables were not adequately controlled for.

In my estimation rates of polygyny are likely to be so low as to be inconsequential in any household level studies that may be carried out, and in any event this effect can be controlled for.

In most polygynous societies each wife and her children forms a separate residential unit, and resources owned by the husband must be equitably allocated among them. Cases of favoritism, dissension and discord among co-wives dicussed in ethnographic literature are countered by reports of co-operation among co-wives to the point of exclusion of their common husband from many of the decisions that are made.

Nutritional effects are much more likely to be a consequence of deviation from the usual marital norms of the community. Widows are generally not disadvantaged by the death of their husbands because of such institutions as levirate (marriage of a widow to her deceased husband's real or classificatory brother), guardianship by a widow of the deceased husband's property on behalf of minor heirs, the right to return to the natal home and receive support from consanguines, and/or obligatory support from adult children (although in Bangladesh women over the age of 45 years consumed substantially fewer calories than their male counterparts; cf. Carloni 1981). The plight of divorced women and their children or never-married women with children is likely to be much more severe than that of widows. Mother's marital status, with particular reference to never-married nmothers, has been implicated in poor nutritional outcomes in several studies. Of twenty severely-malnourished Gusii preschoolers intensively studied by Dixon et al. (1982) in Western Kenya, 35% had been born to never-married women; in contrast, just 3.05% of all children aged 16 and under in the

community were born to never-married women. The authors note that "Illegitimate or unwanted pregnancies are unusual among the Gusii and have severe social and economic consequences for the whole kinship group" (680), but they found no relationship between household socio-economic status and nutritional status and suggest that bonding failures caused at least in part by shame and resentment lead to "psychonutritional deprivation" (682). Jansen et al. (1980) also tentatively note some correlation between mother's marital status and nutritional status, as do Fleuret (1984), Stevens (1975), and Price (1984). In Haiti, the fragility of consensual unions often resulted in "relocation" of children with extended family members, godparents, or a single parent. Children who did not live with both parents, usually as a consequence of disruption of marriage, were at much higher risk of malnutrition than those who lived with both parents (Rawson and Berggren 1973). Mother's marital status thus suggests itself as a significant variable, but one which can fairly easily be ascertained and examined in the course of research activity.

3. Intra-household resource allocation patterns

There is growing concern with inequal allocation of or access to resources within households, which may have negative consequences for the nutritional status of some or all members. While the focus of concern has been with the allocation of food, it is clear that the allocation of other sorts of resources is important here: cash and other income, labor, land, and time in particular. Rogers (1984) has compiled an extensive annotated bibliography of theoretical, methodological and empirical studies of household-level allocation; these studies demonstrate that for most parts of the world, precise, useful and/or valid data on these processes is at best fragmentary. There has been a great deal of generalization based on subjective and scanty evidence.

Nonetheless, fairly consistent patterns do seem to exist. So far as the distribution of food within the household is concerned, the majority of studies that have examined the issue conclude that male household members receive more than their proportional share of available calories, and that adults benefit at the expense of children. Den Hartog (1972) cites numerous older studies from developing countries that note unequal distribution with adult males having better intakes than women and children, especially of animal protein, even when corrected for age and sex. More recently, Valenzuela et al. (1979) studied a sample of 99 rice-farming households in Laguna, the Philippines, and found

that mean protein and calorie intakes were inadequate for all household members, but that adult males came closer to meeting their recommended daily allowances than did adult females; calorie intakes of adults proportionately exceeded those of children, and male children fared better than female. Of all age-sex groups the diet was best for adult men and worst for female children, but adequate for none. That adult male members of the household receive a disproportionate share of available nutrients was found also in Gujerat, India (Gopaldas et al. 1983); Manila, the Philippines (Florencio and Aligaen 1981); and rural Bangladesh (Carloni 1981). Advantages for male children over female children in calorie intake, and consequent higher rates of protein-calorie malnutrition among females, were found in rural Bangladesh (Chen et al. 1981); northern Ghana (Tripp 1981); and Kenya (Hitchings 1982). While dietary surveys in Guatemalan Indian villages showed that the diet of households as a unit was adequate in calories and protein, for preschool children of both sexes intake of these nutrients was inadequate. The discrepancy between household figures and estimates for small children was thought to be partly a function of the practice of giving small quantities of expensive items (milk, eggs, fruit) to children at the expense of cereals and pulses (Flores et al. 1964). McFie found that in urban Nigeria adults of both sexes came closer to meeting RDAs for calories than did children (1967).

The evidence summarized above suggests forcefully that any inequities in intake of nutrients that may exist at the household

level are functions of sex and/or age. Less clear are the reasons for such inequities. The relative status or "value" of males vs. females, particularly as wage-earners or "household heads", is often put forward as an underlying cause of unequal distribution, but this is not an adequate explanation, particularly in those societies where women have significant economic roles, or in situations where they produce and prepare food. Furthermore, these studies did not include anthropometric assessment of adults, so that no evaluation of any discrepancies between adult male and female nutritional status, or indices of weight and height for adults vs. children, could be done. Horowitz (1980) proposes two hypotheses: that scarce resources are directed to the "major breadwinner", and that food ideology restricts women's and young children's intakes of the most nutritionally valuable foods. The latter of these will be discussed in the next section; as already noted, the first of these has no real explanatory value, and is not tenable in woman-headed households or in cases where women are the principal producers of food. It is also important to note that the household setting is not the only place where food is consumed. Most people, both children and adults, have access to snacks, such as precooked and other purchased foods, wild foods, gifts, and stolen food (cf. Hill 1969, Wilson 1974, Fleuret 1983, Bledsoe 1983). Equity Policy Center's "street foods" project, for example, has shown that in urban area over half of all meals may be consumed outside the household. Such foods are not and cannot be taken into account in studies that focus on the

household as a unit rather than taking account of individual members.

Intrahousehold allocation of income, especially cash, is another important issue. The model of the household as a bargaining or negotiating unit, and the diversity of sources of income, must be taken into account. For most rural farming people, cash income can be derived from such diverse sources as sales of crops, craft items, livestock and poultry products, and wild produce; or by casual labor, seasonal labor, or fulltime wage labor, nearby or distant, by unmarried and married household members, male and female. Often the sex and status within the household of the income earner will have a great deal to do with the uses to which the cash is put. In Usambara, Tanzania, for example, the cash acquired by married adult men should be used to pay for land, livestock, agricultural inputs, domestic furnishings, clothing, improvements to the dwelling, and childrens' school fees. Income earned by women is used for food purchases, clothing, and health care expenses of children (Fleuret 1978; cf. Guyer 1978, Migot-Adholla and Okeyo 1984).

Horowitz (1980) argues that level of food consumption among women and children is a function of womens' income. Where females produce food, earn cash and control or direct these resources, they and their children will more directly benefit nutritionally (cf. Safilios-Rothschild 1983). Tripp (1981) found that the factor most significantly associated with good nutrition in

northern Ghana was mother's participation in trade. The small amounts of money that women traders earned went directly to improve the nutrition of children. Calorie and protein intakes of the poorest households in Cebu, the Philippines, improved if the mother was employed. "The additional income of the mother outweighs the loss of maternal time among the lowest income quartile when we examine the calorie and protein intakes..." (Popkin and Solon 1976:160).

The division of labor and the allocation of time to different tasks is another process regulated to a great extent by intrahousehold requirements and negotation. More and more precise, quantitative data on time expenditure for various activities by season, by sex, by age, by household, and by socio-economic status are becoming available (cf. Gross 1984). The sexual division of labor has been studied in some detail. Every society categorizes tasks into those appropriate for or exclusive to men, and likewise for women. Most of these divisions allocate a more public role, and greater access to cash and prestige-earning activities, to men, and domestic/child rearing/agricultural/"enabling" tasks to women. Women often have a heavier workload than men, particularly in areas where they are responsible for food production and for collecting fuel and hauling water. Female children are often expected to begin making economic contributions to the household at an earlier age and more intensively than their male counterparts. It is hence more likely that women's energy output may exceed intake,

particularly during seasons of peak agricultural labor demand (cf. Bleiberg et al. 1980, Bantje 1983). Fleuret and Fleuret (1977) found that Shambaa women of highland Tanzania spent as much time as men in agricultural tasks, but that they did not engage in wage labor at all; instead, they collected firewood and water, did all the cooking and child care, and carried out all of the household's marketing activities. Men had considerably more leisure time than women, and spent some of this free time socializing in town and in the village. Significant differences also emerged between wealthy and poor households: increasing household wealth was accompanied by increasing sex-role segregation and divergence in the occupations of men and women. The poor cooperated in economic activity and women had a greater role in income-earning through sales of beer and charcoal in poor households. Similarly, Seymour (1977) found that in Hyderabad, India, poorer households were characterized by sharing of tasks by husband and wife and by greater involvement in income-generating activities by women, while the wealthy were better able to actualize the ideals and values of seclusion of women and segregation of the sexes.

Franklin and Harrell implicate household time, especially that of women, in nutrition outcomes, such that "An increased opportunity cose of time produces a higher level of food expenditures and may cause changes in the caloric content of the diet sufficient to reduce total calorie intake" (1984:68).

The above discussion should inform the reader that social structure, particularly at the household level, is a significant variable for understanding processes of allocation of critical resources within units and between individuals. Although some cross-cultural regularities in the disposition of vital goods and services is discernable, there is still a great deal that is not known. In particular, it is important to develop useful and testable hypotheses which if verified can adequately account for the patterns and variations in differential availability to and utilization by different categories of household members of food, money, time and labor resources.

C. Cultural Variables

Discussed under this heading are ideology, belief and practice relating to food, nutrition, health and medicine that are likely to affect food consumption and levels of intake. There is much anecdotal reporting in ethnographic literature about food beliefs, taboos, restrictions, prohibitions, prescriptions, and behaviors that may affect intake and nutritional status. Unfortunately, there is still widespread conviction that such beliefs and behaviors are irrational and present a barrier to sound and appropriate nutrition and health practice; they are a "problem" which can be solved only by vigorous nutrition and health education programs (cf. Horowitz 1980:7). Although anthropologists have largely been responsible for informing us about these "curious and aberrant" habits, few of them would agree

that such behavior, where it exists, is necessarily inconsistent with sound nutritional practice. More often than is generally conceded, traditional food production and dietary practices constituted rational, well-balanced adaptations to limitations of environment and technology; beliefs and practices relating to health and disease are also internally logical and consistent systems. Studies that have emphasized local belief and behavior are often designed to demonstrate the place of traditional cultural patterns in the etiology of disease, but they do not assist in resolving the issue of what happens to nutrition and health in the course of processes of social and economic change, the same sorts of processes which, as noted above, have had such profound effects on social structural variables (cf. Fleuret and Fleuret 1980).

1. Infant feeding practices

Methods of infant feeding in non-Western countries vary greatly in detail, but many broad similarities may be found. Breastfeeding is the major--or only--source of food for virtually all infants during the first few months of life (cf. Jelliffe 1968, 1978; Research Consortium 1984) and as already noted is generally adequate to promote normal growth patterns during the first three to six months of life. Duration of breastfeeding may vary from a few months to three years or more; the bulk of studies mention durations of 14 to 22 months. Babies are usually breastfed on demand; Taita infants may suckle 15 or 20 times per

day, which both stimulates milk production and inhibits ovulation. Cessation of breastfeeding is most often occasioned by a subsequent pregnancy. Almost everywhere the first food added to a child's diet, often around the age of six months but in many places earlier (Taita, Malaysia) and in others later (India) is a thin gruel or porridge prepared by cooking flour (processed from wheat, rice, maize, millet, cassava, sorghum or other grains or tubers) with water. Animal milks may also be used but on the whole supplies are inadequate and their role is minor. Fruits and breads may also be introduced during the first year of life, but protein foods (both animal and vegetable) are in many places regarded as unsuitable for feeding young children and usually are not added to the diet until the child has passed his first birthday and/or has a certain number of teeth. Transition to the normal adult diet usually takes place between two and three years of age. There is an increasing tendency in some regions for women in urban areas to attempt artifical or bottle feeding of their infants rather than to establish or prolong breastfeeding. Inappropriate bottle feeding techniques have been cited as a major causal factor in nutritional disease, especially marasmus, labelled "commerciogenic malnutrition" by Jelliffe and Jelliffe (1978).

There can be little doubt that some aspects of infant and young child feeding contribute to protein-calorie malnutrition of early childhood. Late introduction of semisolids and solids, abrupt cessation of breastfeeding, and a diet consisting largely of

bulky foods high in carbohydrates which satiate the child before he has been able to eat enough to satisfy his body's nutrient requirements all are significant. Careful studies of infant feeding beliefs and practices and precise quantitative intake data for infants and toddlers will be a necessary part of the research. More will be said on problems and methods of dietary and food intake studies and data collection in Section V.

2. Food ideology

As already noted, there is a great deal of anecdotal, almost chatty, information on this topic. There also seems to be a widespread belief that food ideology is a major barrier to good nutritional practice. Two things suggest themselves as caveats when gauging the importance of such variables as taboos, restrictions, and food/non-food classifications to nutritional states. First, we are given very little data or insight in these studies as to the extent to which such norms are actually observed or followed by the people; second, the foods mentioned as being inappropriate for certain classes or life conditions of people are almost always uncommon or in extremely short supply in the society in question, so that their proscription hardly affects food consumption patterns of any member of the group. Larger economic and ecological considerations also play a role in many of these food beliefs, albeit implicitly. For example, mention is frequently made of the widespread prohibition on egg consumption by children and women, particularly in Africa. Apart from the

probability that other social categories of people in these societies rarely if ever eat eggs, eggs are more valuable to household when permitted to hatch and become chickens. The consumption of one egg valued at one shilling today robs the household of one chicken worth 40 shillings in the future, apart from the possibility that the egg may become a hen able to produce yet more eggs and chickens.

Literature reviews which discuss food ideology often also fail to call the reader's attention to the very large number of societies which do not in any way restrict or regulate food consumption among vulnerable groups. Neither the Shambaa of Tanzania nor the Taita of Kenya circumscribe food intake of pregnant women or young children. The Shambaa, in fact, prescribe that a substantial gift of protein and oil-rich oysternuts (Telfairia pedata) be given by a man to his wife when she becomes pregnant. The consumption of these nuts is not restricted to pregnant and lactating women, but the existence of customs such as this suggests that perhaps too much emphasis has been placed on the negative side of food ideology and inadequate consideration given to positive aspects or to the neutrality of these factors in the determination of nutritional status. The reader is referred to Wilson (1972) and Jelliffe (1968) for references to detailed ethnographic accounts which present an opposing point of view.

Clearly, beliefs and practices related to food classification and use will have to be examined in the course of research, but they

and unlikely to have much impact on nutritional status or on the use of commodities (cf. Van Esterik 1984).

3. Medical beliefs and practices

Many medical anthropologists have typically been interested in studying indigenous or traditional systems of illness and health-related behavior, and have also sought to show how such belief and behavior act as barriers to the acceptance of Western medicine. More recently, some studies have been directed towards the end of finding ways to make modern health care more culturally acceptable to non-Western people; as in the case of food ideology, traditional medicine is often taken as a problem to be overcome. Although the approaches are different, in both cases the traditional and the modern tend to be viewed as two mutually exclusive, separate and incompatible systems. Analysis is directed towards sorting out the conditions under which one or the other system is utilized; many studies point out hierarchies or strategies of resort for illness treatment in which elements of both systems may be employed as therapy in a logically consistent way (cf. Bledsoe and Goubaud 1983, Romanucci-Ross 1963).

The width of the gulf that separates indigenous and Western notions of disease causation and appropriate treatment may be large, but is not always necessarily so; so that the attractiveness of facilities offering modern care, and the appropriateness of that care for certain categories of illness,

is quite variable from society to society. The patterns of belief and practice that exist in a particular place would thus seem to have nutritional implications for several reasons. Traditional concepts of disease recognition and classification may not include protein-calorie malnutrition as a defined category of illness. This is not altogether surprising given that mild to moderate PCM does not ordinarily present any clinical signs (to the observer) or symptoms (to the patient). If clinical malnutrition among young children is present in the community and is recognized and labelled as a discrete category in the culture, its cause may be attributed not to malnutrition but to supernatural intervention or human sin (adultery has frequently been regarded as a cause of kwashiorkor, cf. Jelliffe 1966). Under these circumstances modern interventions may be regarded as irrelevant, since appeals to supernatural authority, or monetary compensation, may be the proper treatments given the presumed of causes.

Reluctance or refusal to use modern medical facilities, which may be occasioned either by incompatability of belief and practice (including newly-introduced beliefs, such as Pentecostal Christianity), or high opportunity costs (time, physical effort, cash outlay) may be significant also because of the association shown in several studies between facility use and nutritional outcome. In St. Vincent, Greiner and Latham (1981) found that clinic attendance had a statistically significant effect on nutritional status. Number of ante-natal clinic attendances had

a statistically significant association with length of gestation and birthweight in Ikwiriri, Tanzania (Bantje 1982a). Among women who had attended the clinic just one time during the course of pregnancy, 20.5% gave birth to babies of low birthweight--small for gestational age--and mean gestation was 35.6 weeks. Both birthweight and length of gestation increased steadily as the number of attendances rose, so that women with ten or more attendances had a mean length of gestation of 39.7 weeks, and only 1.9% of infants born to them were of low birthweight. Although the study did not control for other factors that might affect level of attendance, or consider why there is so much variability in this one community in the number of ante-natal clinic visits made, it does suggest that those more willing or able to seek modern treatment, regardless of the reasons, may experience a better outcome of pregnancy and give birth to children of higher birthweight. Similarly, Ernster et al. (1976) found that mother's level of education in a rural area of Tanzania affected her decision as to where to deliver, which in turn was related to protein-calorie malnutrition in the infant. Those children who had been born in health centers and hospitals were less likely to suffer from malnutrition than those born at home whose mothers had been attended only by traditional midwives.

It must thus be a concern of the research to examine systems of medical belief and practice at the local level, and also collect information about use of modern facilities and the positive and

negative features associated in the thoughts of the local people with them. Any similarities and differences in the characteristics of regular consumers of modern health care and those who infrequently use the services of such facilities should be scrutinized, in order to determine if facility use per se is associated with higher nutritional status, reduction in incidence of low birthweight, and longer gestation, or if it merely serves as a proxy for other qualities of the regular user, such as socio-economic status, level of education, occupation, or location of residence.

D. Socio-economic variables

In study after study, socio-economic factors have been found to be most consistently related to nutritional patterns at the community, regional or national level, although their relationship may be less direct when it is the level of the household that is being examined. The general argument is that improvement in socio-economic status as measured by any one or a combination of several factors results in improvement to indicators of health and nutritional status. Often these socio-economic variables serve as proxies for one another, and there tends also be a consistent association among such characteristics as occupation, level of education, income, and size of landholding. Several of the factors discussed below may also have ramifications for some of the social structural variables, especially household resource-allocation patterns. Wherever possible these sorts of interactive effects will be pointed out for each of the socio-economic variables discussed below.

1. Income and wealth

Income, also referred to as socio-economic status or economic level of living and established on the basis of a number of indicators, is widely believed to be the single most important determinant of nutritional status. In St. Vincent, "economic level of living had by far the greatest impact on nutritional

status as indicated by weight for age figures" (Latham and Greiner 1981). A national-level study in Zambia showed that provincial distribution of malnutrition and fetal deaths was associated with differentials in the distribution of per capita income and off-farm employment opportunities (Kwofie et al. 1983). Both landholding and household income were found to be positively and significantly associated with almost all measures of nutritional status in the Terai of Nepal; "...socio-economic variables...were found to be significant determinants of nutritional status....These findings reinforce the view that protein-energy malnutrition is a problem of poverty and suggest that substantial improvement is likely to come from raising the standard of living" (Martorell et al. 1984:85). Smith et al. (1983) argue that in rural Haiti, socio-economic variables, especially the amount of food and food money available, had the greatest impact on children's current nutritional health as measured by weight for age. Socio-economic status as measured by father's occupation was associated with variance in patterns of infant feeding and illness episodes in India, such that children oflow-income laborers gained less weight and were in every age group less well-nourished than children of higher socio-economic status (Wijga et al. 1983).

But the relationship between income or socio-economic status and nutritional status is by no means as unambiguous as many of these studies suggest. Twenty years ago, Gans noted that in Lagos, Nigeria, "The incidence of protein malnutrition, starvation and

birth injury was not unexpectedly greater among children whose parents belonged to the two lowest socio-economic groups than among those of the three top groups, though parental affluence by no means protected their children from either mal- or under-nutrition" (1963:9). De Walt (1983) also challenges the view that increased income automatically leads to improved diet and nutrition. Increased income in Temascalcingo, Mexico, was associated with consumption of purchased foods, especially foods of animal origin, and was not associated with the consumption of staple foods produced within the household. Diets dependent on purchased foods did not necessarily meet nutritional requirements more adequately than diets which relied on agricultural products and gathered foods. Households in the middle of the wealth-income distribution had a more diverse diet than the wealthy or the poor, and had better access to energy, protein, vitamin A and vitamin C than others. In a study of household food consumption in Tunisia, Perisse and Kamoun found that "...it is clear that there is no close correlation between income level and the adequacy of food intake....The probability of a food deficit merely increases as income decreases" (1981:9). Further analysis of the Tunisian material confirmed the conclusion that "Adequate consumption is not entirely income-related" (Francois, Perisse and Kamoun 1982:38). A report prepared for FVA by IFPRI on the effects of supplementation notes that "These data suggest that an income criterion is not sensitive in the identification of households with an inadequate food intake. Some high income families appear to consume too few calories. Conversely, not all

poverty level households have insufficient caloric intakes..." (15). And Kumar's work (1977) in Kerala found that total household income had a small and non-significant effect on nutritional status of member children. Much more important was production for own consumption, so that those with even miniscule farm plots were better off than those without.

As previously noted, a flaw in many early studies of nutrition and a problem among those who work with highly-aggregated data sets is the assumption that all individuals and or households in rural areas of developing countries are more or less homogeneously poor. We now know that this is not the case; income and wealth can very enormously between households within a given small rural community, and more and more methods are being devised for measuring the extent of such differences (cf. P. Fleuret 1979, Castro et al. 1980). Those who have realized that such differentiation exists and is significant have employed a number of variables to serve as indicators of or proxies for income, wealth, or standard of living; among these are house construction, type of sanitary facilities, ownership of certain categories or types of consumer goods, parents' occupations, cash or wage income, work as a casual laborer, amount of food produced, form of land tenure, landholding size, farmgate price of household grain production, and per capita income. Most studies have selected just a few of these measures, rather than looking at all possible sources of wealth or income and constructing a composite index that takes account of all relevant

factors. Conclusions reached so far on either side of the issue may very well be premature, if the income proxy employed is not a true indicator of SES.

Relatively few studies make any attempt to establish the amount of food produced for home consumption or to calculate its value. Research by anthropologists and agricultural economists has shown how difficult these calculations can be (cf. Lewis 1981). Even if reasonable estimates of yields of food for household consumption can be made, such estimates tend to leave out of consideration such important "income suppelements" as wild foods, inter-household exchanges, and food eaten away from home. Often the translation of such foods as have been included in the estimates into cash equivalents is not appropriately done. Both Reutlinger (1984) and Martorell et al. (1984) propose or employ farmgate price of key foodstuffs produced to calculate income; but Chibnik (1978) clearly demonstrates that the only reasonable analogue for the value of foods produced for household consumption is market price. For "subsistence" crops, the value is a direct reflection of the amount of cash they represent as food purchases they replace, not the amount they would bring if grown specifically to sell.

Many studies do not give any consideration to the role of production for consumption; some seem to feel that such foodstuffs do not represent income, nor that the people who engage in this sort of farming can properly be regarded as

employed. Thus, Horner (1982) argues that the food for work program serving the Miskito Indians of eastern Nicaragua does not conflict with other income-earning activities as "the vast majority of villagers had no regular income" (26); apparently the subsistence agriculture and turtling which supported community members are not to be regarded as employment or as income producing activity.

Apart from subsistence production, rural households have many other sources of cash or kind income that may be exploited by various members at various times, singly or in combination. Collection and sale of wild produce (foodstuffs, honey, forest products); casual labor or day labor compensated with cash or food; gifts or tribute received from clients, subordinates or patrons, or redistributed on ceremonial occasions; traditional or modern skills or crafts, such as weaving, carpentry, or medical/ religious practice; management and sale of livestock and poultry products; income from rents, interest on loans, or sharecropping; sales of crops in periodic markets, through middlemen or wholesalers, to co-operatives, or at retail; remittances from household or family members employed outside the local area, which may take the form of cash and/or gifts; government allowances, e.g. social security, pensions; regular wage labor nearby or at a distance; and various sorts of illegal activity, all are possible sources of household income. Measuring, or attempting to measure, cash and goods derived from all these potential sources is a complex task, and it is therefore not

surprising to find that most studies employing income measures use only one or two of these categories. Unfortunately, use of proxies or inadequate measures can totally distort results.

Other aspects of income or wealth are easier to measure and calculate, so that we have seen a proliferation of studies that use material possessions as analogues for income. Type of house, ownership of consumer goods such as bicycles and radios, ownership and/or use of tractors, ox-plows, hybrid seed and chemical fertilizer, type of cooking fuel, and ownership of livestock have all been taken as representative of income and/or wealth. Again, however, the tendency has been to examine only a narrow range of such factors in any one study rather than exploring all of the ways that income may be translated into indicators of wealth in particular societies, so that again a partial and distorted view may result: in particular, the investment in children's education is consistently overlooked or ignored as a wealth/income indicator. These methodological issues will be considered more fully in Section V.

Until recently income has been fairly uncritically accepted as an important determinant of nutritional status, and many have felt that simply raising household income or improving the "standard of living" will have a direct, positive effect on nutrition and health indicators. More recent studies, some employed highly aggregated data and others based on disaggregated community and household level data, have indicated that this relationship is not

nearly so direct or so simple as it seems. There are many problems of method and definition in the collection of income data; anthropologists have long known this sort of research to be among the most delicate and sensitive areas of inquiry. The determination of household income and its translation into indicators of wealth and ability to invest will be a crucial part of future research activity. So many of the previous studies are conceptually and methodologically flawed that while income intuitively must be to some extent associated with nutritional outcomes, re-examination of the entire relationship using rigorously-collected data is essential.

2. Occupation and education

In most studies, occupation is employed as nothing more than a proxy for income. Particular occupations, regarded most often as qualities of males rather than females, are thought to be indicators of socio-economic status and income. There is thus a tendency to lump all those pursuing a particular occupation into a single economic category, without any regard to variations in amount or regularity in income that may exist within such a category. Some interesting results have emerged from studies that have examined the occupational roles of both males and females separately. In northern Ghana, father's occupation as a long distance trader or a wage earner was significantly associated with good nutritional status, but an even stronger association was found between mother's trading activity and good

nutrition. Thus, parents' occupations as traders in addition to farming have an independent, positive effect on nutritional status (Tripp 1981). Both men and women in Lagos, Nigeria, were assigned to a socio-economic group dependent on occupation and income. Mother's socio-economic group was associated with the child's weight such that children with mothers in the higher categories weighed more after six months of age than did those of lower SES mothers; but father's SES had no association with the child's weight (Gans 1963).

These studies suggest, as already noted, that mother's occupation and her income-earning activities are very directly related to nutritional status. The effects of parental education are somewhat more ambiguous. Long-term growth of rural Haitian children as measured by height for age was most affected by mother's education, especially her nutritional knowledge (Smith et al. 1983). Gans found in his Lagos study that "...the average weight of children whose mothers had attended school is considerably higher than that of children whose mothers were illiterate" (2963:5). Protein-calorie malnutrition was lowest among children of educated mothers, suggesting literacy may be more important than income. The Zambian national food and nutrition study (Wenlock 1980) indicated that lack of education was associated with malnutrition. However, other studies show no association between level of parental education and nutritional status of children (cf. Martorell et al. 1984), and Fleuret found that a group of unmarried Taita women whose children had an

average weight for age of less than 80% of standard had significantly more years of education than another group of married women whose children were significantly better nourished (1984).

Data on occupation and education will have to be collected as part of research. Care must be taken to ensure that occupation and education are not used arbitrarily to assign people to SES groups or income classes, since the diversity of income sources and wealth indicators already mentioned shows that no single characteristic is an adequate proxy or analogue for socio-economic indicators. As off-farm and urban employment opportunities become more and more restricted in developing countries, any relationships that might now exist among education, occupation and SES are likely to become weaker, and the occupation and education variables will become even less useful as wealth indicators.

3. Labor migration

Labor migration can take several forms. Most often it involves the movement of men from rural to urban areas and back again. Entire families and single women also migrate but much less frequently. Male migration may be seasonal (such as the annual pattern of movement from rural Mali and Niger to Ivory Coast for the cocoa harvest, during non-farming seasons); temporary (for six months to several years to earn cash for marriage payments or to

purchase land); or semi-permanent (several years or more; periodic visits to the rural home are generally made and many such migrants are married men who contributed to the support of a rural family).

It has often been surmised that labor migration has negative effects on the nutritional status of the migrants themselves and on the population that remains in rural areas. The migrants are thought to be at a nutritional disadvantage because they must now purchase the food, shelter and services previously acquired through their own efforts and those of household members. Since the majority of such migrants are adult males, their departure on a seasonal, temporary, or semi-permanent basis constitutes a drain of labor from rural food-producing communities. In reviewing the literature on nutritional effects of migration, Graedon (1980) notes that migrants in any given city are more likely to be employed than the urban-born, and that their health and nutritional status compares favorably with that of rural control groups. Empirical studies of the nutritional impact of migration upon the sending communities are rare; several authors point to changes or shifts in cropping patterns as a response to labor drain, and suggest some possible nutritional consequences. Fleuret (1984) found that the children of Taita labor migrants were better-nourished than other rural children. Using remittances sent to them by husbands with urban wage-earning jobs, women were able to hire workers to replace the labor ordinarily supplied by husbands. The wives of migrants all

engaged in food production but had less need to trade in periodic markets and more cash with which to purchase meat, rice, milk and extra maize meal. In this community neither migrants to town nor those maintaining the household in the rural setting suffered measurable adverse nutritional consequences. Graedon's review of the literature, complete through 1980, supports the hypothesis that rural to urban migration is more likely to have positive than negative nutritional consequences, both for migrants and rural-dwelling family members. This sort of migration is a variable to be investigated, particularly as it may affect intrahousehold resource and labor allocation patterns, but it need not confound research results.

4. Agricultural development

Many of the issues surrounding the nutritional impacts of agricultural development have already been reviewed (cf. Fleuret and Fleuret 1980, Dewey 1980, Pines 1982). However, the role of commercial agriculture in the determination of nutritional status remains ambiguous. Many assume that the transformation of agriculture from a system of food production to a system based on commercial transactions must have a positive effect on nutrition indicators because it increases cash income. However, Dewey (1981) has shown that greater reliance on cash income rather than food production increases nutritional risk in Tabasco, Mexico, by reducing dietary diversity and calorie availability. The cash earned cannot replace the calories lost; purchasing power of cash,

in calories, does not equal the caloric value of subsistence production. Other studies have shown that the payment of commercial producers in one or two lump sums annually can increase nutritional risk as the cash cannot be apportioned to meet food requirements over an entire year. As Smith et al. note for Liberia, "Even the income hypothesis provides no assurance that the nutritional benefits possible from higher incomes necessarily outweigh the possibility of nutritional losses from changes in production patterns that take place in order to earn those incomes" (1981:32).

Studies based on highly-aggregated data have mixed results. Kwofie's analysis of national-level data from Zambia showed that "...malnutrition and fetal deaths are highly concentrated in all the provinces where a disporportionate percentage of the population are living in highly-dispersed agricultural communities; and where the principal occupation is subsistence agriculture" (1983:542). On the other hand, infant mortality rates in the 24 districts of Rio Grande do Sul, Brazil, were significantly higher in those districts characterized by large properties, cattle raising and wage earning. The authors feel that IMR is largely a function of nutritional variables and tie its distribution to "...the factors influencing access to an adequate diet..." (177), mainly food distribution and production factors. Districts dominated by small farms, subsistence production and largely rural populations had lower IMRs, implying better nutritional status.

Several recent studies using household level data suggest that a mixed production strategy in which both food crops and cash crops are grown may be associated with better nutritional outcomes. Rabeneck (1982), working in Machakos, Kenya, tested the relationship between coffee growing, food availability, nutrient intake, and protein-energy malnutrition among preschool children in two Kamba villages. She found that among households that produced food as well, coffee-growing was not associated with malnutrition or lower food availability/intake. Children from households growing both food and coffee were significantly taller for age than those from households growing food crops only. Similar findings are reported by Fleuret in a comparison of two Taita villages. Households in one village produced vegetables and coffee for sale in addition to food crops, but few households in the second village had entered the commercial market. As a group, children in the first village had significantly better heights and weights for age than those in the second. The results of both of these studies, as well as that of Baer (1984), suggest that continued food production insulates farmers against the risks of commercial cropping, especially price fluctuations and lump sum payments. Those who have become reliant on commercial production as their principal source of income, and those who practice subsistence farming exclusively, particularly in areas where other employment opportunities are scarce, may not be so fortunate (cf. Korte 1969, Hitchings 1982).

Although the two Kenya studies discussed above suggest that cash cropping may be nutritionally advantageous under certain circumstances, these results are by no means conclusive. The extent to which particular households practice one or the other or both forms of production will be a significant variable and its association with nutritional outcomes at the household as well as the village level must be examined. Of particular interest is the attempt to see at what point the demands of cash cropping compete with or pre-empt those of food production. It has been noted, for example, that in many parts of Africa cash crops are a male domain and that men control the expenditure of income derived from sales of these crops, but that women are often expected to contribute labor to their cultivation which is diverted from food growing and for which they receive little or no compensation. Jones (1983) has shown that women who worked on their husbands' rice fields on the SEMRY scheme in northern Cameroon were compensated at a rate that exceeded the opportunity costs of their labor; but this outcome appears to be the exception rather than the rule (cf. Fortmann 1981).

5. Landholding size and availability

Although the amount of land that is owned, controlled, and/or worked by a household unit is often taken as a proxy for income or wealth, the association with nutritional status is not necessarily direct. Numerous studies have shown that land tends to be concentrated in the hands of the wealthier members of a given community. But for many the critical link in the land-nutrition relationship is not the absolute size of the landholding, but the quality of the land and the availability of labor to work it. Thus, while Valverde et al. conclude that in rural Guatemala "...land availability was significantly associated with the nutritional status of young children and may thus be used as an indicator of health and nutritional status of the family..." (1977:6), and Wasonga et al. (1982) found a weak association between prevalance of stunting and size of landholding in Eastern Province, Kenya, the results of other studies have not corroborated these findings. Tripp (1981) measured all the fields cultivated by 18 farming units in northern Ghana and found that neither the amount of land worked per farming unit nor that worked by an individual farmer bore a significant relationship to nutritional status. Although some Taita households owned numerous parcels of land, much of it remains in short-term fallow because those households do not command the labor necessary to increase the amount of land under cultivation during any one cropping season. Cultivated land

areas as a function of the amount of labor that could be recruited to work it was critical rather than the total size or availability of landholdings. Allen et al. (1980) found that while area of cultivated land per capita on the Nembi Plauteau of New Guinea was equivalent to that in other parts of the New Guinea highlands, yields were substantially lower due to soil exhaustion. Malnutrition is a consequence of overall net food shortage occasioned by long term declines in yields due to soil exhaustion, not to land shortage per se.

Another consideration so far as landholdings are concerned is the difficulty in determining their size. In many places no actual measurements of farmplots have been done and investigators rely on farmers' own estimates, which frequently overstate plot size (cf. P. Fleuret 1979). Where measurements have been made, sharecropping, pawning, rental, loaning, fallowing and subdivision of plots, both legal and illegal, affect calculation of actual amount of land available to a particular unit. Different forms of tenure also affect patterns of availability and utilization; in Taita, Kenya, those withough secure title invest fewer inputs--fertilizer, improved seed, labor for weeding--into their farms plots, and yields consequently are lower than among those with security of tenure.

In some areas land ownership is a matter of title deeds and registration; in others customary rules which recognize ownership by individuals still apply; in yet others use-rights are

individual but ownership-rights are corporate. In yet other cases, combinations of various forms of tenure are found. Some Taita farmers from Kenya have title deeds to highland plots, but simultaneously practice shifting cultivation on bush land where use-rights are subject to the rule of first-come, first-served, and where patterns of plot utilization and plot sizes change from season to season. Similar patterns are found among the Kofyar of Nigeria (Netting 1962).

For research purposes, methods of access to and control over land must be carefully studied, the amounts of land actually put under production by individual households in different cropping seasons should be measured, and the labor resources, human and otherwise, that are employed in farming activity must be examined as well. These strategies should permit the role of land, as a wealth indicator and as a producer of food and other income, to be assessed.

E. Environmental variables

Farming people in all areas of the world are vulnerable to the impact of environmental factors whose management is quite often beyond the control of the individual, household or community. In developing countries particularly, farming practices and resource management have developed in response to such vulnerability and risk. Plot dispersal and fragmentation, mixed cropping strategies, use of locally-developed and adapted crop varieties,

and co-operation in the deployment of labor are among the strategies employed to manage risks imposed by seasonal variation and fluctuation. Other exogenous factors may be quite beyond such efforts at control, including drought, natural disaster, epidemic disease, forced relocation, failures of national or regional infrastructure, and violent political change. All of these forces can have quite profound effects on health and nutrition, so that fieldwork sites will have to be selected in areas or countries where the possibility of an earthquake or a revolution taking place is slight. The environmental variable which seems most likely to be of concern for research purposes is that of seasonality.

The early work of Audrey Richards (1932, 1937) first brought the impact of season on food intake and physical activity to our attention. Richards noted that the annual "hungry season" that immediately preceded the harvest among the Bemba of Zambia was a cultural institution as well as an environmental phenomenon. The people recognized that a hungry time when food stocks were low and other resources not available would occur as part of the annual cycle. During this time both physical and social activity were deliberately restricted, as food intake from dwindling reserves also declined. The immediate post-harvest period saw a revival of co-operation and social interaction, much of it organized around food consumption.

Since Richards' pioneering work a number of other studies on

seasonality, diet and nutrition have appeared, some emphasizing the cultural aspects (Ogbu 1973, Nurse 1975) and some the physiological (Robson 1964, Hunter 1967, Pagezy 1982). The broad spectrum of actual and potential effects of season has been summarized by Longhurst and Payne (1979), Chambers (1979), and Chambers et al. (1979). These authors point out that there is a notable difference in concepts and effects of seasonality between areas with two rainy seasons per year, and those with just one. Since most agriculture is rainfed farmers are dependent on the timing and amount of precipitation for success in crop production. In areas with bimodal rainfall distribution, seasonal variations in food intake and nutritional status were much less marked than in those, such as Zambia and northern Ghana, with a unimodal pattern; hunger here reaches a peak during the rainy season prior to harvest when work burdens are high and food reserves low. Longhurst and Payne conclude: "The nature of 'hungry seasons' must be analysed with care. It is clear that variations in periods of plenty and scarcity are more marked in areas where there is dependence on one harvest only. In such situations the rural poor replenish their body stores after harvest time in anticipation of losing weight towards the next harvest. They are no doubt aware of what is coming and ration their food stocks accordingly..." (1979:29). They also claim that "...overall, seasons are an important, if not the most important, determinant of nutrition in less developed countries" (29-30).

While it is clear that season can affect nutritional status on a cyclical basis, particularly in places where but one harvest per year is possible (weight reaching a low immediately prior to harvest and increasing in adults by ten pounds or more in the first two months after the harvest in an area with unimodal rainfall distribution; viz. Fox 1953), the evidence is not sufficient to conclude that season may be or is the most important determinant of nutritional status. Fleuret (1983) found no significant differences in weights and heights of Taita children at three different seasons. This area of Kenya has a bimodal distribution of rainfall, and a number of perennial crops which produce food all year are grown (such as bananas). In many areas, the availability of food for purchase in local shops and markets insulates against seasonal shortfalls; highland or hill areas with considerable vertical zonation and microclimatic variation also have a greater variety of resources available to protect against the effects of seasonal variation. In order to minimize the confounding effects of season, the research sites selected should have similar patterns of rainfall distribution, frequency of harvests, and cropping cycles. Anthropometric assessment, an essential component of the research, should be carried out frequently enough so that seasonal patterns, if they exist, can be noted and accounted for.

Conclusion

The review of current literature has identified a number of

non-program variables with actual or potential links to nutritional status. The most significant of these, which will be most critical in research design and data collection, are household structure and resource allocation patterns, income and wealth, seasonality, and distribution, availability and utilization of health services. Less apparently significant but still important are patterns of morbidity, parity, and maternal nutritional status. In the next section models of the interaction of these variables and their implications for research activity will be discussed.

Section IV.

Conceptual framework and hypotheses

The discussion in Sections II and III concluded with the indication of significant variables within food distribution programs and outside of such programs that can be expected on the basis of existing knowledge to play a significant role in a household's utilization of food resources received from food distribution programs as well as other sources; by this path, such variables then affect food availability, food consumption, and nutritional status. At the level of the program, significant factors include the method of delivery, type of distribution, characteristics of the commodity or ration itself such as size and composition, the health education component of the program, and other services (such as primary health care) that may be received as a benefit by participants. Beyond the boundaries of the program, consideration must be given to household structure and organization, resource allocation patterns, income and wealth, seasonality, and the distribution and utilization of health services, as well as to patterns of morbidity, parity, and maternal nutritional status.

Any study that seeks to measure the impact of food distribution on the recipients of the food must center research and data collection efforts on the individual and on the most significant

social unit(s) of which he or she is a member. In most sedentary, agriculturally-based societies the most important social unit, the focus of most day-to-day activity, and the unit by and through which resources are allocated and decisions are made is the household.

The difficulty of defining "household" and the possible fluidity of membership of such units from season to season and year to year have already been mentioned. It was also noted that although particular societies generally have ideal models of household structure and composition one cannot reasonably expect all of the household units within the community or society to conform to such models. Even within one community or village a great deal of variability will be found, and variability in household characteristics goes along with variation in the access to, and allocation of, resources by particular units. Consequently, income and wealth may also be significantly affected by the structure and composition of a given household.

Netting, Wilk and Arnould (1984) have emphasized the flexibility and responsiveness of households in the face of even seasonal, short-term or minor variations in the opportunities and constraints that they face. It is, they contend, more productive to focus on household activities and functions than on attempts to classify them. Messer stresses that nutrition-related activity should be preceded by attempts to define households and their membership, in terms of residence, kinship, food exchanges,

or other factors, keeping in mind the flexibility of the units and their arrangements. It may be more useful, she argues, to think in terms of the "conceptual units of domestic groupings" (1984:10), which include eating units, food budget units, child-rearing units, and social networks. Such "functional activity groups" are not necessarily identical with households but the "eating unit" is defined principally with respect to residence, which is also the key criterion of a household. Although it is certainly true that not all of a given individual's food or consumption-related activity will take place within the household, it is equally unlikely that examination of "eating units" defined in terms of residence and participation can provide insights that a household focus cannot. And while it is also valid to suggest that eating units and child-rearing units are not themselves coterminous and may not be identical with the household, neither can they be located or defined without prior understanding of household structure, composition and dynamics.

It is important here to clarify what is meant by "structure" and "composition". "Composition", or "organization", refers to the actual morphological characteristics of a household, including its size and demographic makeup eg. adult/child ratio, male/female ratio, dependency ratio. Composition or organization is highly variable in a given household over time, as it proceeds through its developmental cycle, and also is variable within a community: members are born, die, move away, come back, marry, divorce. "Structure", on the other hand, is

used here not to refer to morphology, or physical characteristics, but to the behavioral domain, in particular the paradigm of rights, duties and obligations to which members (however recruited or related) are expected to conform in their internal relationships and in relation to other, similarly-constituted units. Structure is a fairly inelastic social model, composition a fluid one. In the real world neither the social ideal of structure nor that of composition is adhered to totally. In our own society, as in others, many households do not conform to an ideal model in structure or in composition, suggesting that one, circumscribing set of assumptions about the structure and composition of households in our own or any other society is likely to obscure as much as it reveals.

To speak of household structure or composition as though it were realistic to assume permanence in the arrangements or faithful adherence to a society-wide set of standards oversimplifies the dynamics of the situation. This is not to suggest that a particular culture does not have norms or expectations about the form and content of domestic units and relations, because of course it does; and often a large number of the units will at least on the surface appear to conform to such expectations. It is to suggest that focusing on those expectations or conventionalities without simultaneously taking the exceptions into account, as well as the flexibility and variability that characterize human social relations, would not be a very

productive strategy. At the same time, however, it is possible to describe both cultural ideals and the principal deviations from them, not as rigid types but as a series of flexible variations on a basic theme.

The situation becomes more complex when it is realized that this central variable, household, is also the unit of study and analysis. Despite the limitations on the typological approach, in any one society it is possible to discern a range of household types. Outlined below are several household types that are likely to occur in rural and urban areas of developing countries. These types are discussed in terms of one structural feature, marriage; and one aspect of composition, physical presence or absence of the male head. Possible linkages between these household characteristics and resource allocation, wealth, and income patterns within them are also discussed. It should be emphasized that in Africa especially it may be inappropriate (even though standard practice) to designate one individual as "household head". In households where there are both male and female adults who are active in household affairs, it is often more correct to speak of male head and female head. Rarely do we find that the power to override decisions in particular domains is vested absolutely in one partner or the other; rather, there is independence and flexibility and the concession of autonomy in given domains by one adult to another. In particular, food is a woman's domain, in which men often may not interfere.

1. Households consisting of unmarried women and their children. Such units are increasingly common in rural as well as urban areas. Some unmarried women may be well-educated professionals such as teachers or civil servants; others may be successful businesswomen. More and more frequently is seen the rural woman whose formal education was terminated by pregnancy and who supports herself and her children by farming, petty trade, and/or casual labor. In Kenya, an estimated 25% of secondary school girls leave the classroom each year because of pregnancy. Without adequate education and without access to productive assets such women, and their children, suffer serious economic disadvantages. Although women play prominent roles in agricultural production the world over, only rarely do they unambiguously own land or other productive assets; the rare instances of ownership come about principally as a consequence of marriage, or very occasionally through purchase (cf. Migot-Adholla and Okeyo 1983; Price 1984; Burnham 1980). Clearly, in such a household, a woman does manage the allocation of what resources, both productive and consumable, there might be. But the paucity of off-farm employment opportunities in most rural areas seriously limits cash income available to such households, and the tenuous position of unmarried women with respect even to the use, much less the ownership, of land or other fixed property, means that the bulk of such households have little to show in the way of investment and thus of objective measures of wealth. The linkage seems clear: children without marriage to a rural woman means poverty. Her failure to command either disposable or permanent

assets leads to increased risk of nutritional deprivation for herself and her children.

2. Households consisting of previously-married women and their children. Both divorcees and widows fall into this category. Many divorced women are able to re-marry, so that their position as household head is temporary; but those who cannot or do not wish to take a subsequent spouse are to a large degree also dependent on their own efforts. In their case, however, more support is likely to be forthcoming from both their own relatives and their former in-laws. Divorcees often return to their own parents' homes; they may or may not have to support their own children depending on the descent system, the rules regarding payment of bridewealth, the reason(s) for the divorce, and the age(s) of the child(ren). Divorce is on the whole less opprobrious than unmarried motherhood, and divorcees are in a less tenuous social and economic position than never-married women. They may still have some claims upon land resources belonging to former husbands and may be able to utilize their former marital ties to mobilize labor. In the same way that never-married women do they manage the allocation of resources within the household, but they may well have more to allocate and be at lesser risk of nutritional complications.

Widows, in most cases, especially ones with children, enjoy certain advantages. Among these may be the protection of the deceased husband's brother(s), sometimes in a marital situation;

in Africa especially, the role of guardian of property, including land and livestock, on behalf of future heirs; material support from adult children and other relatives, both their own and the husband's. Of all women currently without a spouse, widows are likely to be in the best social and economic position. In particular, they often have the power to allocate the resources of the household as long as the sons are minors and often afterwards; the prosperity the household may have enjoyed while the husband was alive does not necessarily vanish when he dies, because many of the assets (e.g. land, perennial treecrops, small businesses, trading relationships, and livestock) responsible for providing that prosperity remain with the household.

3. Households of migratory wage laborers. Men are frequently absent from rural farming communities on a seasonal, temporary, or almost permanent basis, as off-farm or wage employment opportunities are limited in such localities and must be sought at urban centers often distant from home. Wives and children often do not accompany such labor migrants, but tend rather to remain in rural areas, to manage the land and other fixed resources. Most migrants, even those who work in a distant place for twenty years or more, have the intention of retiring to a home area, and they make some effort to invest their available resources in the maintenance and improvement of that home. Some migrants do not carry out these plans. They may bring wife and family to town on a temporary or permanent basis, or, by

contracting polygynous marriages in town and maintaining families there may divert resources away from the rural household. But the majority, particularly in sub-Saharan Africa, continue to participate to the degree possible in the affairs of the rural home and return to that area, in cash and in kind, more than they remove. This tends to place the rural households, where most decision making and resource allocation is performed by wives in the husband's absence, in a relatively good economic position. Available cash may be used to purchase land from less-fortunate villagers, to improve the house, to purchase consumer durables, and to invest in children's education. On a day to day basis the resources are managed and allocated, and the rewards of relative prosperity reaped, by the wife and children.

4. Co-resident households. In this situation husband and wife reside together in the rural home with their children and co-operate to a greater or lesser degree in various productive activities. There is no necessary pooling of resources or income, however, nor even joint decision making about the uses to which resources are to be put. Spouses may well farm and engage in other income-generating activity independently, and use the proceeds separately to supply different sets of needs and wants. Available data, as already indicated, suggest that wives' income is more likely to be spent on food which conveys nutritional benefits to children than is husband's income.

Co-resident households are of varying size and composition. Some

may incorporate married children and their families and thus may be quite large; others conform, albeit perhaps only temporarily, to a more Western notion of household; a married couple and their unmarried minor children. In some cases daughters who have given birth without marriage remain in the parental home. Men with more than one wife tend not to maintain all of their spouses and children in the same unit, but to house each wife and her children separately, often at some little distance from one another, and to accord each wife considerable autonomy in the management of day to day activities.

Co-resident households are the most variable category because locally-resident men may vary enormously in the extent of their control over land, livestock and labor resources and their command of cash income. P. Fleuret (1979) found in a study of Tanzanian farmers that co-resident households possessing the greatest indications of wealth had male members who had been born in the locality, who were members of locally-dominant kinship groups, and who had been able to obtain local off-farm employment, salaried or as a skilled craftsman, such that the maximum amount of cash could be devoted to the improvement of the house, investment in land, purchase of consumer goods, and experimentation with innovations.

Van Esterik argues that intra-family food distribution is most appropriately studied with the household as a focus or context, and also "...assumes that research on the distribution of

household food must focus on women as key actors, even when others--usually adult males--may have substantial influence on the decisions women make. To understand this complex process, we must view women not as victims of discrimination or as a vulnerable group, but as active participants in the decision-making process in the distribution of food" (1984:12). In van Esterik's model, decisions about utilization and distribution of food at the household level are influenced by household resource availability, household structure, organization and socio-economic status, personal characteristics of the decision-maker(s), local systems of food classification, consumption and commensality, and social/biological characteristics of the individuals to whom food is being distributed. The preceding discussion of household types gives added force to van Esterik's stress on women as key actors, as does Hitchings' finding that there is less malnutrition in rural Kenyan households in which the production decisions are made by women than in those where such management is in the hands of men (1982:70); such an emphasis is particularly pertinent for the examination of MCH systems of food distribution in which mother-child units are the recipients and presumed users of commodities.

Looking at the models derived from the interactions of household structure/organization/composition, patterns of resource availability and allocation, and income/wealth dimensions, the following propositions can be put forward.

1. Adult women in all categories or classes of households play the leading role in the allocation and distribution of food and other consumable resources within the household. In all societies, women perform food processing and preparation tasks; in many they are responsible for the entire range of production, distribution, and preparation activities. In African societies particularly households consisting of mothers and their children are independent resource allocating and consuming units; rarely are food consumption and distribution decisions within the household the concern of members who are not adult females.

2. The allocation of resources (food and other) among household members is not equitable but is based on local models of social structure and social value governed by the interaction of such variables as sex, age, role and physiological condition of the members. Particular household members may be differentially provided at different times dependent on their position in the life cycle vis a vis other members. The relationships are not simple or direct enough to assert that males are rewarded at the expense of females, or the older at the expense of the younger; rather, combinations of attributes at different points in time and in relation to those of other household members must be explored.

3. Patterns of decision-making about the allocation of consumable household resources are affected as much by the

regularity, reliability, frequency and permanence of such resources as by the total quantity or amount. Households poor in land or cash but with regular and predictable income may be better able to manage their resources in the satisfaction of day to day needs than those with larger but irregular, intermittent or fluctuating assets. The risks associated with "lumpy" sources of income such as one-time payments for cash crops have often been noted (Fleuret and Fleuret 1980).

4. When the resources available to a household are in short supply, chronically or seasonally, intra-household resource allocation patterns are strategically changed to cope with the shortage. Long-term shortages of resources, including land, cash, other income, and food, are commonly found among the poor. Food shortages may also be a function of seasonal variation in which case social, cultural, and even biological "coping strategies" deployed by the society at large almost certainly exist. Seasonal shortages may affect household-level activity and resource allocation through reduced frequency and variety of meals, possible increases in work burdens, and potential redirection of resources towards particular household members.

Considerable space and detail has been devoted to this discussion of the concept of household, the definition of its various dimensions, the importance of flexibility in composition and structure and responses to various contingencies, the critical determinants of access to resources, and the ways in which resources may be utilized in different situations. The variables most directly related to the household, including its structure and composition, access to and allocation of resources, and income, comprise a cluster of several of the extra-program factors already identified as significant in mediating consumption and nutrition-related outcomes, and form a conceptual framework for proposing a series of hypotheses about the impacts of Title II commodities. This conceptual focus is particularly relevant since it is now commonly accepted that while a particular individual may be the intended recipient, or target, of Title II foods, utilization of the package is by the entire household (cf. NAS 1982:109). The hypotheses are divided into two groups: those stemming from program-related variables, and those generated by a consideration of non-program elements. The latter are discussed first.

I. Non-program variables

Hypothesis 1. Household structure and composition affect participation in Title II food distribution programs.

The aspects of structure and composition which are particularly significant so far as the determination of participation is concerned include size, dependency ratio, presence or absence of adult male member(s), marital status of adult female member(s), position of the household in its developmental cycle, and roles (especially economic roles) of adult members. In particular, young households with high dependency ratios, early in their developmental cycles, are more likely to be eligible for and to participate in, for example, MCH programs, than are those further along the developmental path which may have more productive members. In another case, households with economically-active women may not participate because the loss of income necessitated by participation exceeds the value of the ration and any other services provided.

Hypothesis 2. Household structure and composition affect the utilization of commodities received through Title II programs.

Size, dependency ratio and presence or absence of adult males in the household would seem to be particularly relevant to variations in the uses to which rations are put. Commodities may be utilized for consumption or for sale; utilization also encompasses the distribution of the ration, or income or other food acquired by its sale, among household members. The smaller the unit, clearly the greater the amount proportionally available to each individual. The absence of adult males, typically regarded as the largest consumers of calories, may also

proportionally benefit other members.

Hypothesis 3. The identity (especially the sex) of the household member who physically receives the commodity affects its utilization and proportional consumption.

A number of studies have now shown that when income is earned or received by women the result is increased food consumption and improved nutritional status for household members (cf. Carloni 1984). It seems reasonable to hypothesize that a similar outcome attends the acquisition of non-cash income: and the IFPRI study found that receipt of in-kind rather than cash income is associated with a higher marginal propensity to consume food.

Hypothesis 4. Access to resources affects the participation of a household in food distribution programs.

One may in particular work with the propositions that land and/or cash-poor households would be more likely to participate in Title II programs because of need. On the other hand, in households short of labor or of time, participation may represent a net loss (cf. Franklin and Harrell 1984:68: "...the consistent implication of the theoretical and empirical perspective is that the time costs of participating in food transfer programs must be high relative to the alternative uses for that time").

Hypothesis 5. The access of households to resources and the

allocation patterns of such resources within the unit affect commodity utilization and relative consumption.

Households with more resources at their disposal may be more likely to allocate the additional foodstuffs to more vulneralbe household members; those with relatively little in the way of productive assets may be compelled to distribute them more widely among household members, and may also utilize them as a true supplement to existing or available food supplies.

Hypothesis 6. Total household income affects both program participation and commodity utilization.

A number of evaluations of Title II programs have shown that both the wealthiest and the very poorest households in communities with access to such programs do not participate in them. For the well-to-do the foods offered may be superfluous to income and/or food needs, or community sanctions may be imposed on the affluent who participate. The poorest may lack effective knowledge of the program, or may face the sorts of time constraints previously noted. So far as utilization is concerned, it seems reasonable to suggest that the poorer the household, the more likely that commodities received may act as a true supplement to total household (and individual) food intake (Katona-Apte, Bangla Desh WFP study); as income increases the likelihood of substitution or of disproportionate allocation to particular household members increases.

Hypothesis 7. Sources and regularity of household income affect program participation and commodity utilization.

There is evidence that regularity of income, not simply total amount, is critical to food consumption/allocation decisions. "Lumpy" income is associated with greater nutritional risk and reduced ability to allocate consumable resources evenly over time, so that participation in a food aid program may be part of the strategy employed by such households to bridge gaps in their food supply. Variability in actual utilization can be expected to correspond to timing and amounts of income actually received.

Hypothesis 8. The identity of a household's income earner(s) (especially with reference to sex) affects program participation and commodity utilization.

The greater the participation of female household members in the generation of income--in cash or in kind--the less likely the participation of that household in a Title II program, especially an MCH program. This seems likely for two reasons: first, that women's income is already efficiently channelled to satisfying food consumption needs; second, that allocation of time to participation would be an inefficient or income consuming use of that time. On the other hand, if there is a tendency for younger, unmarried male householders to allocate their income to the satisfaction of personal needs, food aid may compensate for

their net drain on total household food resources.

Although the household and the constellation of features associated with it form the central conceptual focus, a range of factors external to households also affects their decision to participate in programs and differentially to utilize commodities received from such programs. Some of these variables are part and parcel of food distribution programs themselves, while others are part of the wider environment. Three such factors, already suggested as particularly significant in relation to food consumption and nutrition issues, are season, availability and utilization of health services, and patterns of morbidity.

Hypothesis 9. The participation of particular households in food distribution programs and their utilization of commodities received through such programs will vary as a consequence of seasonal patterns of the availability of food, income, and other assets.

It has already been observed that attendance at health care facilities, collection of rations provided by MCH distribution programs, and participation in food for work programs is peripatetic. Close examination of the variation in participation may reveal a seasonal pattern. During seasons of heavy labor demand attendance at facilities declines, as the cost of attendance for all but the most critical problems exceeds the value of time used for food production or other productive

activities. An interesting problem is that seasons of peak labor demand--for land preparation and planting in particular--may often coincide with periods of the highest incidence of particular diseases; it will be difficult to estimate the extent to which seasonal underutilization of facilities and services can be laid to the pattern of disease, or to economic demands that outcompete the need for food aid and/or medical care. A similar situation occurs later in the farming cycle; participation may also decline at harvest seasons, although at this time heavy labor demand coincides with increased food availability.

Season may affect utilization in that during times of plenty, commodities may be channeled to particular individuals, but in pre-harvest and pre-planting situations when food stocks are low the food may be more generally distributed within the household. Right after the harvest, food aid may represent a surplus over and above household requirements, so it may be stored, or be sold and the cash used for non-food purposes. During times when food is scarce, the likelihood that commodities received from food aid programs will supplement the existing diet increases. The convertibility of a particular ration, or part of a ration, may vary from season to season, and thus the ways in which it is utilized by a given household over the course of an annual or seasonal cycle will vary also.

Hypothesis 10. Patterning and particular episodes of morbidity, particularly in young children, will affect a given household's

decision to participate in a program and its utilization of commodities received from the program.

It is well-documented that the main consumers of health care services in developing countries are women and their children, and that mothers are motivated by their concern for their children's health. A Tanzanian study (Kreysler 1975) has shown that the most common reason given by mothers for failure to use preventive and surveillance services provided by a rural hospital was that their children were not sick and they therefore had no reason to attend the clinics. Recurrent or episodic illness in a child is the most common stimulus for utilization of health services, and the desire to relieve illness and provide good health for children can consume a significant proportion of a household's time and money. In so far as food aid programs provide an additional strategy for securing the health of their offspring, and helping to alleviate particular illness episodes, households may choose to participate in order to attain these ends.

Morbidity, whether or not it was a major motive for electing program participation in the first place, may also affect a household's utilization of commodities received. Particular food items may be directed to or withheld from sick members in accordance with local food ideology or with the objective of treating the illness or helping the patient regain his strength.

Hypothesis 11. Program participation may be affected by pre-existing patterns of health-service availability and with community perceptions of their accessibility and effectiveness.

Participation at the community level is likely to be higher if other health-related facilities and services in the area have a good reputation for efficiency, effectiveness, and "consumer friendliness". Many accounts can be found of the alienation of communities because of hostility, inefficiency or condescending behavior of health services personnel, or lack of availability of drugs or other forms of therapy. If health care is not available, or if it has acquired a strong negative image, it may be necessary to overcome these community perceptions before a high level of participation can be achieved.

II. Program variables

At the end of section II of this report it was concluded that a number of the characteristics of the food distribution program itself were relevant variables in the consideration of program participation and impact. Delivery mode, ration characteristics, nutrition education components, and other services provided were isolated in this regard. Below is presented a series of program-relevant hypotheses concerning the impact of commodities.

Hypothesis 12. The composition of the ration delivered affects

program participation and household-level utilization.

"Composition" here refers to the actual foodstuffs that make up the package, and the palatability and cultural acceptability of the foods provided clearly will affect the interest of households and communities in the program in the first place. The local value and convertibility of the food items that make up the package also are of concern. Reluctance to participate may stem from the presence in the ration of unfamiliar foods, or of foods that are difficult, time-consuming, labor-intensive or fuel-intensive to prepare. Low cash-equivalent value of the ration may also influence participation decisions, if time may more profitably be used in other activities.

Ration composition may also affect utilization, particularly if the foods are regarded as appropriate for certain classes of people or certain life conditions. CSM, for example, is often given specifically to young children because it is thought of as a weaning food. Whole grains and even legumes may be directed more to adults because they are not thought of as good for children. NFDM may reach virtually the entire household membership if it is used to prepare tea or coffee. Processed grains (maize or wheat flour, for example) may be prepared as gruels for sick people, or as porridges or breads which the entire household may enjoy. Valuable or totally-convertible items may be sold and the cash devoted to food or non-food purposes. Unpalatable or unfamiliar items may not be used at all.

Hypothesis 13. The total quantity of food provided in the ration package affects program participation and commodity utilization.

Generally speaking, the larger the ration provided the greater its economic value and its desirability. Increases in the amounts provided may boost participation if the value of the package is made to exceed transaction costs; clearly, these amounts will vary from locality to locality. Franklin, Harrell and Demousis (n.d.:17) found that ration sizes, as well as the actual foods provided, are "approximately correct" in rural Panama as the foods are eaten by the recipient households, replace less desirable dietary items, and result in an overall improvement in the quality of the diet. Carefully-monitored experimentation will be needed to establish the limits within which the sizes of ration packages may vary for maximum benefit. Utilization may be affected, for example, if the amount provided is sufficiently large to permit cost-efficient sale, the income from which may or may not be devoted to food acquisition.

Hypothesis 14. Commodity type and quantity affect a household's marginal propensity to consume food, particularly calories.

The IFPRI study (1983) demonstrated that in-kind income is more directly related to the marginal propensity to consume than is cash income. Commodities that are not convertible may therefore have a greater impact on food consumption in the household than

commodities that are freely convertible and/or routinely sold, as the cash thus generated may be used for non-food purposes. Even non-convertible commodities may affect intra-household food distribution, however, if the extra purchasing power generated by increased total household food availability is used to acquire more nutrient-dense foods (meat, for example) which may be directed away from particular household members. Several studies (cf. Dewalt 1983) have suggested that increased income does not guarantee dietary improvement for all household members; but income in the form of food apparently more directly increases consumption at the household and individual levels.

Hypothesis 15. The program type (MCH, FFW, SFP) affects program participation and commodity utilization.

The greatest impact of program type is almost certain to be on the identity (especially with respect to sex and age) of the recipient, because of targetting. Women and infants are the intended beneficiaries of MCH feeding; school-age children of SFPs; while the household as a whole is often the target in FFW programs, in many cases men are the participants and it is to them that the commodities are delivered. Households lacking members in any of these particular categories of potential beneficiaries will be excluded from participation. It has already been hypothesized (#3 above) that the identity of the recipient affects household-level commodity utilization. Insofar as the program type explicitly or implicitly selects for

particular age and sex groups as recipients, effects will be felt on the intra-household allocation of the commodities received or of additional income made available.

Hypothesis 16. Method of commodity distribution (particularly on-site vs. take-home) affects its utilization as well as the household's internal allocation of all the food available to it.

Several evaluations of on-site feeding (SFPs in particular) have observed that the food rovided in this way does not act as a true supplement to the child's diet, but instead largely substitutes for food which the child would have been given at home. Others have argued that in some MCH on-site feeding programs true supplementation has been achieved, with the usual home-consumed diet as shown by 24-hour recalls unaffected. It has already been noted that there are a number of ways in which take-home rations may be utilized, much being dependent on other factors such as ration composition and household structure. If meals are consumed on-site, however, it can be certain that foods targetted to particular individuals are being eaten by those individuals, whereas in take-home distribution there is no such certainty. So far as on-site consumption is concerned, the question that does remain to be answered is that of the allocation of food available in the domestic unit at large to those who are differentially provided with meals in on-site programs.

Hypothesis 17. The quality of a food distribution program's

nutrition education component affects household utilization of the commodities received, as well as utilization of its other food resources.

Griffiths (1985) has shown that appropriately-designed nutrition education projects can generate improvements in diet and nutrition even in the absence of food aid or increased income. It therefore follows that well-managed health and nutrition education programs offered in conjunction with food distribution can enhance its effectiveness. In particular, nutrition education may assist households, or key actors within them, in efficient utilization and intra-unit allocation of donated food and foods already available.

Hypothesis 18. The provision of other services in the context of a food distribution program affects participation.

Food aid is often regarded as an incentive to increase utilization of primary health care or other services, but the reverse might also be true: that is, participation in a food distribution program might be boosted if other services such as health care are provided as well, or if opportunities for community-building, income generation, or establishment of co-operatives, women's groups, or the like is provided. One MCH distribution program in Kenya, for example, provides a ration equivalent in net cash value to the wages received for four days of casual labor; participants receive an average of two rations

per household. Distribution takes place once every four weeks and requirs a full day of time for participants in travel and waiting. Participants are assigned a specific day of the week for collection on the basis of community of residence. The women from each community have organized themselves into a group which is able to hold meetings as its members wait to collect their rations. Baskets manufactured by the members are collected at these four-weekly intervals by a local middleman who pays them in cash on the spot. Members also bring food items from their own production which they sell and exchange among themselves. Plans are underway to pool a portion of the profits from these activities and with them to purchase improved chicks, which would be raised, slaughtered, and sold to a hotel with whose management negotiations are already underway. Level of participation in the food distribution program is at maximum capacity and there is a waiting list. Some attendance gaps were noted by the administrator, principally on a seasonal basis. Although health care is not integrated into the food distribution program, primary care is available in an outpatient clinic less than a quarter of a mile away from the distribution site. This mix of services, and the very active role of the woman in charge of the food distribution in the women's group activities give the program a very positive image in the eyes of the local community; similar mixes of opportunities would no doubt enhance participation in other localities as well.

Conclusion

A series of hypotheses developed with the household as a conceptual focus and utilizing relevant variables drawn from within and without food distribution programs has been put forward. These hypotheses are testable in the context of intensive, household-level field-based research. Some preliminary consideration is given in the concluding section of the report to prioritization of hypotheses, alternative research designs appropriate for hypothesis-testing, and data collection.

Section V.

Design and product considerations

The position taken through this paper is that the answers to the questions raised about the actual impacts of feeding programs upon recipients and other household members, as well as testing of the hypotheses presented in Section IV, can best, and perhaps only, be accomplished by the collection and analysis of detailed household and community-level data, over an extended period of time. It is often suggested that gathering such data is both time-consuming and expensive. I would argue that, given the amount of foreign assistance funds devoted to Title II programs, careful research aimed at discovering the effects on beneficiaries of commodities so delivered should be done even if considerable time is required; and the expense of such data collection is relative. The usual evaluation of a feeding program, fielding a team of consultants and paying salaries and expenses for a period of weeks or months, also requires a substantial outlay of funds but is a considerably less cost-effective way of increasing our understanding of the actual impact of programs and the rations they deliver on beneficiaries than the possible research options discussed in this section.

Testing all of the hypotheses put forward in Section IV would obviously require a substantial commitment of money, time and

personnel. It thus becomes necessary to single out for particular consideration those research questions whose answers would provide the greatest amount of knowledge useful for program design.

The first 11 hypotheses are framed from the perspective not of the program, but of the household, conceptualized as a highly variable unit likely to utilize program benefits in highly variable ways, as well as of the environment in which the households are situated. Examining these hypotheses is useful from the program perspective; it is important to understand how the people who receive food aid use it and what kinds of benefits it delivers to them, and data on some of the issues raised have direct relevance to program design. For example, if hypothesis 3 is tested and it is found that consumption and nutrition outcomes are better in households where women receive take home rations than in those where men receive them, other things being equal, then perhaps programs should be structured such that women are the exclusive recipients. Likewise, if, as stated in hypothesis 6, the poorest households in recipient communities do not participate in the feeding program, then perhaps efforts should be made and strategies developed for ensuring the inclusion of the most disadvantaged.

The most useful information from the program perspective is, however, likely to come not from hypotheses 1 through 11, but from examination of hypotheses 12 through 18, which are based on

program-relevant variables. Hypotheses 12, 13 and 14 are central. They deal directly with the commodities supplied by USDA and USAID under the provisions of PL 480. The actual method of delivery, or the other components of the food aid package, are real concerns but not to the same extent that ration-related issues appear to be.

Accepting a ranking of hypotheses that gives primacy to those deriving from the program context, particularly ration amount and type, and secondary consideration to those generated on the basis of relevant non-program variables, the next step is to suggest some design frameworks that would permit modification, refinement and/or testing of the key research questions. For each of the several such frameworks discussed in the pages that follow, the following topics will be considered: design alternatives, data sets, personnel requirements, cost estimates, and other questions that may be answered or hypotheses that may be tested.

A. Design options

1. Short-term studies

While I feel strongly that priority should be given to developing long term research plans, there are certain advantages to preceding a long-term commitment with more qualitative short studies. Such studies would give presently unavailable information on household level commodity utilization, and provide

a basis for modification of hypotheses and focussing of research design.

a. Ration microstudies

This option draws upon van Esterik's suggestion (personal communication) for microstudies of particular ration packages at the household level. A number of such studies could be carried out in a number of geographical sites, in the context of different methods of delivery, and with different sizes and compositions of the commodity packages themselves. The advantages to this strategy are that each study would be relatively low-cost, that the data would be available in just a few months from the initiation of any one investigation, and that so many diferent places and programs could be examined more or less simultaneously, and with the same format. These microstudies would be short-term and the data collected would be quite specific and quite detailed. If this approach could be utilized in conjunction with other, longer-term or ongoing research or interventions, the value of the microstudies would be increased. It would be especially useful if something already was known about household structure and composition and the range of household types in the areas investigated, so that it would be possible to assess whether those households actually studied were somehow representative. Also useful would be baseline data on food consumption practices and allocation decisions in the area, permitting some suggestions as to how the

food aid program might have affected these practices.

If the microstudies were conducted as ends in themselves rather than as an add-on to an existing project, one would work not from a community basis but would begin at the commodity distribution point and select informants from among those who are already participating. Essentially, the data derived in this way would answer some questions about utilization but would not address questions about what it is about the program that affects the decision to participate in the first place. As I envision them the microstudies also would not serve as adequate tests of any of the hypotheses because the sample sizes would be quite small and the samples themselves would be non-randomly selected. Hypotheses 2, 3, 5, 6, 12, 13 and 14 could be refined and our understanding of household allocation patterns and decision-making could be expanded, however. The trade-off: low cost, short time-expenditure for data availability, and potential to investigate a number of different sites and programs, versus no true test of hypotheses, limited understanding of a narrow range of the variables thought to affect both nutrition outcomes, consumption patterns, and program participation, and a limited ability to generalize from the data. One strategy might be to carry out half a dozen or more of these small studies and use the data so gathered to refine the hypotheses further before proceeding with the creation of a research design for a long-term study.

Data collection in the microstudies would be quite narrowly focussed, dealing with household structure and composition, the role of the ration in total household food supply, the utilization of that ration (consumption or sale), and the allocation of food within the household. Getting accurate information on the use of the ration, as well as other food supplies, would require daily visits to the participant households from the day that the units receive their rations until the next scheduled ration distribution takes place, assuming that the rations are distributed once a month. The study would then require two months to complete: training of data-gatherers, a month of data collection, and time for analysis and write-up.

The data could be collected either by locally-recruited and trained assistants, or by non-local researchers familiar with the locality. The employment of local people to collect the data would reduce costs, but nonetheless they would require training and supervision, and almost certainly a consultant would have to write up the results of the study. Cost of a given microstudy would depend on the size of the sample (one data-gatherer would be needed for every 4 to 6 households studied, depending on how close to each other the households investigated are located and on whether meal preparation and eating are to be observed) and whether or not a consultant could be recruited locally. Assuming that a professional who can recruit and train local data gatherers is already on-site or can carry out this task in

conjunction with some other contracted or ongoing activity, and that four data-gatherers are employed for a sample of 20 households, an approximate cost would be around $3,500.

2. Long-term studies

Although the microstudies discussed in 1a above provide a substantive basis for refining hypotheses and research design, studies of a year or more in duration as the main thrust of research activity are preferable. Two options for designing such a major study are described below.

a. Comparisons of communities with variations in programs

A more expensive and time-consuming strategy, but one which would permit true tests of some hypotheses rather than just providing non-randomly collected data as a basis for hypothesis reformulation, involves the comparison of two or more different communities served by two or more different sorts of food aid programs. The differences in the programs could be on the basis of delivery mode, size/composition of ration, or both. The communities selected should be ethnically and ecologically similar so that some of the extra-program and context-specific variables could be controlled for.

If the programs serving the study communities vary with respect to both ration characteristics and type of distribution, it will

be difficult to determine whether any differences seen among households in the sample are a product of the distribution mode, the differential sizes and compositions of the ration package, or the interaction of these two factors. At least initially, if possible, only one program element should vary. In this case, for example, two MCH programs providing different rations could be examined; this would permit hypotheses 12, 13 and 14, which have been identified as the most crucial from the program point of view, to be tested. If the rations being delivered by two different programs are equivalent in size and composition, hypothesis 15 can be tested. If the same size and composition of ration is delivered to similar households by different programs and the result is differential utilization, then a good deal could be learned about program appropriateness. If, alternatively, similar rations are similarly utilized regardless of program format, then it would be important to focus on the ration itself as the most critical program variable.

It does not seem likely that, for example, two MCH programs in the same area would deliver significantly different rations. In order to test the notion that ration size and composition affect participation, utilization, and marginal propensity to consume, deliberate manipulation of the ration delivered by one of the programs would probably have to be undertaken. I also think it would be difficult to introduce a totally different assortment of commodities for one program to experiment with, so the most feasible alternative is probably to increase the quantity of the

ration provided per recipient but continue to deliver the same foodstuffs and in the same proportions as in the comparison community.

There is no basis for predicting the duration of time over which a changed commodity package would have to be delivered in order for changes in utilization and household resource allocation (assuming there will be some) to be seen. I would advise, however, that any such experiment should be conducted over at least a one-year period. For both experimental and comparison communities, a year-long study would additionally permit some assessment of seasonal variation in utilization of the food aid (so part of hypothesis 9 could be examined).

Sample selection and composition could be dealt with in two ways. Costs could be held down if the sample were recruited from among existing program participants only. Random selection of participants could be made from the program records. The exclusion of non-participants means that the total sample size could be smaller, and fewer data-gatherers would be needed, simplifying project management and data analysis as well. By looking at participants only, over the course of a year, in two communities each served by similar programs differing only in the size of the ration provided, hypotheses 2, 3, 5, and parts of 6 through 9 and 12 through 14 could be examined. But the cost reduction and ease of management would be gained at the expense of answers to any of the questions about the role of household,

environmental, and program factors in participation. Our understanding of differential utilization under different circumstances would to some extent be clarified, but the power to explain the links between program variables and participation in the first place would be minimal.

This leads to another option for data collection, that of including randomly-drawn samples both of participants and non-participants in the study. It has often been argued that program participants and non-participants differ in fundamental ways, but precisely what these are is unclear. What is unique about participants, and what is it about the program that makes them choose involvement? A comparison of household dynamics and decision-making between those who have elected to join a program and those who have not would be of interest in and of itself, and also would help to provide data relevant to the participation components of hypotheses 1, 4, 6 through 9, and 12 through 14. The trade-off between these two strategies: the first is able to deal with the most important aspects of the three key hypotheses (12-14) as well as providing data of relevance for examining several non-program hypotheses, and does so in a year's time with sample of a manageable size at reasonable cost. The second strategy would cost more and management and analysis would be more complex (sample sizes would have to be twice as large as in the first option) but the three key hypotheses could be dealt with completely, as could a number of the household-context hypotheses, with the collection of additional data sets.

For the first option, the household information data set (a) is critical, because household variability can be expected to affect consumption in important ways. Detailed data will also be needed on patterns of diet and food consumption (e) in order to measure the effects of the two different ration packages on food-related behavior. Parts of (d), farm survey, are important if rural areas are studied, because of the contribution that farming makes to food consumption patterns. Participant-observation (j) is a critical method for collecting information on dietary practices, as well as a source of important non-quantitative and contextual data. Information also will be needed on such background variables as availability of markets, food prices, and the like, as they affect the convertibility of rations. Collection of these data permits critical evaluation of hypothesis 1 and parts of 12-14.

With the addition of further data sets, the number of hypotheses that can be examined will increase. Thus, with inclusion of the income survey (f), preferably coupled with the wealth index (b), some insights into the parts of hypotheses 6-8 related to utilization may be added. Time-allocation data (g) would also be useful here. Collection of information on morbidity and health-seeking behavior (h) would permit some testing of hypotheses 10 and 11. This, in a sense, involves another trade-off, in that the more data collected, the more complex the problems of project management and analysis; but at the same

time, failing to collect information on variables relevant to consumption decisions and nutrition outcomes may result in incomplete answers and leaves one open to charges of failing to control for those factors. The cost of additional data sets is minimal when compared with the utility of the information that would be obtained.

In this regard, I think that anthropometric assessment of nutritional status in young children and women in their child-bearing years is critical. There are several reasons for this. First of all, for the programs that consume the bulk of Title II commodities, improvement of nutritional status is the fundamental program goal. Physical measurement of the target population is the only way of determining that this goal has been met. Second, food consumption data, although often used as a proxy for anthropometric data, are not a true analogue. Anthropometric data are individual; consumption data virtually always reflect group practices, usually being collected at the household level rather than by detailed examination of individual activity. Third, accurate consumption data, whether for individuals or for groups, are much more difficult to collect than anthropometric data. Others may not agree with this statement; but it is nonetheless valid. Even in literate societies it has been shown that recall underestimates intake by as much as 40%, even when the recall takes place within one hour of consumption (Grivetti, personal communication). It has also been noted that the presence of an observer at mealtimes or

conducting weighed intakes can bias the entire consumption process; the sources of potential confounding are numerous. Fourth, there are many unanswered questions about the evaluation of consumption data; there is no agreement, for example, on the correctness of RDAs for the various nutrients, and hence no true test of dietary adequacy. This is not to argue that anthropometric assessment is going to provide the answer to all of our questions. But there is an internationally-recognized set of standards against which such data may be evaluated, its collection is easier in that ordinarily the subjects come to you rather than the other way around, resultant data are likely to be more reliable and are certainly easier to interpret, and data on such issues as morbidity, parity, birth order and breastfeeding may be simultaneously collected on a properly-designed form. I would therefore argue very strongly for the inclusion of anthropometric assessment in any long-term study that might be carried out. There are any number of experienced fieldworkers available to advise on the organization of such an assessment.

The second option calls for collection of data in two communities, served by Title II programs varying in the size of the ration that is delivered, from both program participants and non-participants alike. Haaga et al. (1984) regard the comparison of participants and non-participants as a weak design for evaluation of program impact because of the self-selection issue. At the same time, however, as already noted, several of

the hypotheses pertaining to participation in the program can only be meaningfully examined by looking at people who are not part of the program. Although a number of observers have commented that many impact evaluations using this framework have not yielded any results, impact evaluators labor under a number of constraints that would be absent from a long-term, research-oriented activity. Limited amounts of time for data collection, lack of familiarity with local languages and social institutions, and use of biased samples would not face researchers doing long-term work with randomly-selected samples.

Personnel needs and cost estimates for this research activity are provided in Appendices A and B respectively.

b. Comparison of communities with different types of programs, and non-participant control communities

In the absence of baseline data about social, economic and health conditions in communities prior to the institution of feeding programs, this option provides the best alternative as well as a situation which permits a substantial degree of hypothesis-testing. The communities selected would have to be as ethnically and ecologically similar as possible, so that as many as possible of the non-program variables may be controlled for. It may be most realistic to think in terms of selecting a country, or countries, as the focus for this activity. Countries such as Lesotho, Swaziland, or Haiti, with their

largely rural populations, their mix of programs, and their cultural homogeneity, would be interesting and appropriate potential sites for research employing this option. Within the country or countries selected, a number of different sites would be required; one or two communities unserved by programs, one with an MCH distribution, one with a school feeding program and a high rate of school attendance for both boys and girls, and a food for work program, preferably one where participants are largely either male or female, but not both. Even better would be two food for work programs, one with male participants and one with female. Clearly such a project would be quite large and relatively expensive, but the mix of programs, communities and households studied in one fairly homogeneous setting would yield a wealth of relevant data.

There is one potential source of serious confounding in this design, and that is the question of whether the ration itself or the way in which it is delivered is responsible for observed differences in allocation and consumption at the household level. If a FFW program for men is compared with an MCH program, for example, then there are three immediately-apparent hypothesized linkages with consumption effects: program, composition/quantity of ration, sex of participant. It will be difficult under these circumstances to determine which factor is most directly linked with observations, or if it is the sum of these factors that yields the observed effects. One way to manage this would be to begin by studying one program. Male and female FFW recipients

might be compared with each other (and perhaps with non-recipients in the same or a different community) in the same way as in option 2a above, but for a shorter period of time. It would also be important to ensure that the households and communities being studied have access to or participate in only one program. The observations would not be very useful if the informants were simultenously receiving benefits through MCH and FFW programs, for example.

If sex of recipient does not prove to have explanatory value, then an MCH program providing a similar ration might be added. If consumption effects are comparable given two different forms of delivery but of the same ration, the next step might be to add an on-site SFP with a calorically-equivalent ration, if possible, and look at the effects of on-site, individually-targetted feeding vs. take-home distribution. If over the course of time there are no marked divergences in outcome, then some experimentation with the ration itself might be undertaken.

This option is quite flexible; it builds from a small beginning and can become as inclusive as available resources allow. It has the greatest potential for providing feedback on the wide range of program context issues and hypotheses; the stepwise structure permits the activity to stop at the point where answers are found. The disadvantage is that if answers are not found until the last step, then costs will be high and the burden of management and data analysis substantial. The focus of the activity is quite clearly on the program relevant hypotheses; the strategy is to eliminate or control for the variables in hypotheses 15-18 first, then concentrate on the critical ration related issues of hypotheses 12-14. Participation-related issues can be examined, as in option 2a, by the inclusion of a control group of non-participants from the initiation of the research. This could be done by choosing a community where there are no programs in operation, or by drawing a stratified sample of non-participants from communities served by programs. Clearly more would be learned about the mechanics of participation by employing the latter strategy.

As in option 2a, some of the data sets described later in this section are essential in order to test the program-relevant hypotheses. The household information survey (a) and the diet and food consumption data (e) are of the first order of importance. Time-allocation data (g) and wealth (c) and income/expenditure (f) surveys are highly desirable. At the

same time that expansion of the data collection effort above the minimum requirements for the activity gives added weight to conclusions drawn, it permits testing of household and environmental context hypotheses which also have their implications for program activity. Less would probably be learned about seasonality in this option than in 2a, because the program variables being investigated are not being held constant over a sufficiently long period of time. But the addition of complete wealth, income, farm (for rural areas), morbidity/health (h) and decision-making (i) modules--in other words, collection of most of the data sets discussed--permits exploration and/or testing of all other hypotheses outlined in Section IV. Although hypotheses 1 through 11 are not central to program concerns, testing them, as already noted, would provide data relevant to such issues as program design, targeting, and nutrition education efforts.

As in option 2a I would argue very strongly, and for the same reasons, for the inclusion of anthropometric assessment of nutritional status as an important methodological component in any long-term research activity. Personnel and budget considerations are included in the appendices.

In the preceding pages I have discussed several possible ways in which operational research could be organized so as to refine and/or test program and non-program derived hypotheses. In the following pages I will describe data needs, analysis, and

validity.

B. Data sets

1. Preliminary considerations

a. Site selection. The communities selected to serve as sites where the research will be conducted should consist of settled people, rural or urban. If possible they should be members of a single or closely related ethnic group(s), in order to reduce problems created by cultural variability within the sample population. Each area should contain a sufficiently large population of households so that the sample to be drawn will come from a pool of potential informants adequate to allow for attrition, migration, household reconstitution as a result of divorce, death or marriage, or refusal to participate in the research. The nature of the activity should be made clear to residents of the community before any data collection effort begins. The nature of the data to be collected, the ways in which they will be used, the significance of the procedure, and the potential benefits to the community should all be clearly and fully explained, using local languages.

b. Site-specific variables. Once sites, or communities, have been selected, a thorough survey of existing literature, official documents and the like should be undertaken in order to identify locally significant variables which may have some bearing on

household dynamics, nutritional status, or both. Examples of the sort of thing meant here include: high rates of polygyny, female seclusion (purdah), multiple cropping seasons, presence of markets, distribution of health services, source of domestic water, and the like.

c. Census. This is essential if non-participants in programs are to be included in the sample, and highly advisable even if they are not. It should consist of a simple six or seven question survey of all households in the community, aimed primarily at establishing the actual number of households in the community and the approximate total population, and at providing a basis for drawing later special-purpose samples. For each household relevant questions to ask include the name and sex of the household head, his or her marital status, whereabouts of a spouse if not currently residing in that dwelling unit, and types and numbers of other persons living in that household (e.g. children, in-laws, siblings, parents, lodgers, employees, other dependents). In this way basic population data may be collected. Once this initial census has been completed the accuracy of the data can be verified by repeating the census in a 5 or 10% random subsample of the households.

d. Sample selection. The census forms the basis for selection of the actual sample households in the community who will provide the micro-level data to be used to isolate the actual impacts of food transfers, and the dynamics of participation and

utilization. There are several ways in which such a sample may be selected. The first and preferable option is random selection, but a large enough number should be chosen to ensure adequate representation of all household types in the study and to give reliable statistical information for long-term analysis. The random method ensures a sample that is representative of the community at large.

Alternative strategies are to use stratified or cluster samples. The stratified sample helps the investigator to focus on those households that are or particular interest (participants only, for example, or equivalent numbers of female headed and jointly managed households whether or not their distribution in the population at large is equivalent. Once the significant variables have been chosen the sample is randomly drawn from among the population of households having the desired characteristic(s). Examination of a stratified sample might be more appropriate at a later stage in the investigation and for highly specialized or time-intensive studies such as weighed intakes. In cluster sampling one selects particular aggregations of households or dwellings within the community as the sample. This does not seem appropriate in view of the kinds of confounding that might be introduced by leaving large parts of the area totally out of consideration. In any case, once the desired sample size has been achieved, an extra 20% should be included to serve as backup in case of attrition, refusal and the like. After sample selection has taken place the

confidentiality of households and their members should be protected by the use of pseudonyms or numbers rather than names. None of the randomly-selected households should be forced or coerced into participating in the data sample.

2. Data sets

a. Household information questionnaire. Once the household sample has been selected and the members of the units have agreed to participate, the first detailed data-gathering instrument can be developed. This will be designed to gather basic demographic data about the unit and will form a permanent record of the household. Data gathered should include age, religious affiliation, level of education, and birthplace of head of household and his/her spouse (if there is one); sex, age, level of education, marital status, type of employment, and place of residence of the children, and similar data for any other kin or non-kin residing in the household. These data are important because of the multiple correlations that have been noted between such variables as education, religious affiliation, and off-farm employment on the one hand, and relative wealth and capacity to invest on the other. Even birthplace is important because it may well determine the rights of household members to use and/or ownership of land in the locality.

b. Anthropometric and clinical assessment. Weight, height, mid-upper arm circumference, and triceps fatfold measurements

should be recorded for all children and selected adults, particularly adult women, in the sample households. This assessment should be performed at regular intervals (preferably three times per year) in order to control for possible seasonal variation in food intake and/or availability. Simultaneous clinical evaluation by a physician will provide information on patterns of disease (nutritional and other diseases) in the population. Anthropometric assessment, particularly weight and height measures, is the method of choice for the detection of sub-clinical protein-energy malnutrition in populations of below school age children, and adults. As Monjour et al. (1983) remark, "We have concluded that in evaluating the growth of rural African children, anthropometric measurements will remain crucial. They are the simplest, cheapest and the most practical for all" (231). Routine evaluation of sample children and adults from both participating and non-participating households over an extended period will provide the sort of data needed to evaluate program effectiveness insofar as improvement of nutritional status of beneficiaries is concerned, so long as proper controls and statistical procedures are employed, and so long as potential for error is reduced by the employment of the same teams of personnel throughout.

c. Wealth index. This data set provides an objective measure of the extent to which households have resources available for investment in permanent, non-essential, and/or durable items.

The index can be developed by observing characteristics of house construction, common kinds of consumer durables, patterns of landholding, livestock acquisition, and educational and other investment patterns, by discussions with local community leaders, teachers, and persons generally recognized as being above-average in wealth by the rest of the community, and by informal observations of patterns of expenditure in local shops and markets. Once such an instrument is developed it should be pretested by administration to a small sample of local community residents, both participants and non-participants. The results should be discussed with the individuals who assisted in the development of the index and with the persons(s) who administered the questionnaire. Once satisfied with the accuracy and usefulness of the scale, it can be administered to the entire sample. A scale of values of the items based on their purchase price when new gives a relative and unbiased way to rank individual households in terms of purchasing power. Many examples are provided by Castro, Hakansson and Brokensha (1980), with the caveats that due consideration must be given to local variations in availability of consumer goods, building materials, land and livestock and that the scale must be appropriate to the particular region and community.

d. Farm survey. A logical next step in the data collection sequence is development of an instrument to obtain data on farming procedures and practices in the immediate area, and on land holdings and provenience of land among the sample units.

Structuring this questionnaire requires some familiarity with the local agricultural system and is best designed with the aid of local people. Basic information of interest here are the number of farm plots or size of the farm owned by the members of the household, the number or amount currently being cultivated by the unit, how land owned is being used if not currently under production, and the provenience of land under cultivation that is not actually owned by household members; the crops grown, the use of inputs such as commercial fertilizer and pesticides, improved seeds; the source of labor for cultivation (household, co-operative, hired); the types of cultivation practices employed (e.g. manual cultivation, animal traction, machine plowing) and how obtained; if available, the size of the farm plot(s)in any local or universal unit of measure; and the provenience of all land (inherited, borrowed, rented, purchased, etc.). The total amount of land owned by a household may be an indicator of relative well-being, as may be the amount actually under cultivation at any one cropping season; the use of agricultural improvements such as improved seed, and the cultivation of perennial crops with a significant lag between planting and first harvest are also indicators of relative prosperity, and of the availability of certain types of resources (particularly food, and peripatetically cash) within particular households.

e. Dietary information and food consumption. The collection of data about food intake is full of pitfalls, and only rarely have researchers been able to build up a complete picture of the

diet. In addition to the usual recall surveys of food consumption, a number of other methods must be employed in order to generate a more comprehensive idea of what is eaten, how it is eaten, and what people believe about it. Twenty-four or 48-hour recall surveys, particularly when the data are gathered from adults, tend to emphasize those foods eaten at meals, and may underestimate the consumption of some categories of food substantially, or leave them out altogether. Thus, extensive direct observation of both children and adults should be conducted in order to obtain information about foods and beverages consumed other than at mealtimes. The eating habits of school children should be investigated by direct observation and by questionnaire. Crop inventories should be carried out during each growing season. Surveys should be carried out to determine which foodstuffs--wild, processed, cultivated--are ordinarily for sale in shops and markets and which are normally kept on hand in local kitchens. Weighed intakes, which under the right conditions permit a more precise determination of the calorie consumption of individuals, should be undertaken in a subsample of households of various types so that the actual distribution of calories among household members by the decision-maker(s) can be established. Investigators are becoming more aware of the tremendous importance of informal, unstructured food consumption--snacking--and this should be carefully monitored and observed. For women and children in particular snacking may be a significant source of calories whose consumption may not be regulated in the same way that foods eaten

at home are.

f. Income survey. As the data-collection proceeds and its non-threatening nature becomes clearer to the sample households, instruments designed to gather more sensitive sorts of data can be developed. One of these is an income survey. In some places it may be possible to ask householders specifically about sources and amounts of income, but this is not likely in rural Africa. As already noted, the problem of in-kind income--food production, for example, or exchanges of goods for services--confounds the results. The problems inherent in straight income surveys can be at least partically offset by exploring not income itself, but sources of it. From these data models of potential returns to particular types of economic activity may be constructed, or it may be possible to extrapolate on the basis of published figures. Variables to be explored here should include past or present salaried work either locally or as a migrant; casual labor, particularly agricultural labor, performed in the local community and remunerated in cash; artisanal, entrepreneurial, skilled or semi-skilled jobs performed locally on a piecework or part-time basis (such as carpentry, tailoring, running a small shop, making baskets); sales of home-produced goods such as foodstuffs, agricultural produce, dairy products, other animal products, foraged items (wild fruits, herbal medicines), or handcrafted goods (rope, mats) in local markets or to local householder; sales of commercial crops through co-operative societies, to professional middlemen, or by travel to larger distant markets;

estimated income from illegal activities (brewing, charcoal burning); anticipated or desired cash earnings over a month's time; estimated monthly cash outlays of all household members. Tendencies are for people with more income to purchase casual labor rather than to provide it; to sell goods in larger quantities at more distant markets rather than engage in petty trade; and to have previously or currently worked in salaried or skilled employment.

These investigations of income may be coupled with inquiries into patterns of expenditure. Literate informants may be asked to keep accounts of expenditure on a daily basis by noting what item(s) (including services) were purchased and at what cost. This is particularly likely to be useful if money is pooled in the household and purchases made from a common fund. If each household member with income manages his/her own cash and makes his/her own purchases, the task becomes more difficult and may have to be assigned to a research assistant.

g. Time-allocation studies. One resource allocated and utilized at the household level which tends to be overlooked in some studies is time. Particular household and seasonal situations may constrain productive activity by reducing the amount of time available; other households may exhibit patterns of underemployment neither desired by nor advantageous to members. Johnson (1975) and Gross (1984) have dealt with the significance and methodology of conducting time-allocation observations; such

observations will be an important part of the research, and some association between the allocation of time to particular activities and the patterns of utilization of other sorts of resources can be expected to emerge. This data set is particularly important in view of Franklin and Harrell's contention that "...food aid, while nutritionally beneficial, does reduce the allocation of time to productive activities" (1984:59).

h. Morbidity and health-seeking behavior.

Although the anthropometric assessment, if conducted with the collaboration of a physician, does provide an opportunity for the collection of data on current morbidity among the children and adults assessed, a broader range of information on illness and, in particular, on individual and household responses to illness epidosdes, should be sought. One source is available data from health-care providers in the area such as government, PVO, and/or private hospitals and health centers, and physicians and other personnel. Vital statistics in developing countries are well-known for being poorly kept, but some knowledge about prevalent illnesses and their seasonal and geographic distribution can be obtained from these sources. The informants themselves should be asked to identify the alternatives for health care that are available, and information on specific illness episodes, treatment sought (if any), and approximate costs in time, money and other resources should be solicited. For example, householders might be asked to indicate whether any

household member had been ill over the past month, and, if so, what the illness was and what was done about it. It is also important to find out if there are certain diseases for which only very specific therapies are thought to be appropriate. With data of this sort collected from a random sample, preferably at different seasons, some conclusions about costs, accessibility, and attitudes towards different forms of health care may be drawn. A properly-designed questionnaire of this sort is also a good source of information on actual patterns of morbidity and mortality in a community.

i. Household decision-making.

It is important to get some information about the roles and responsibilities of particular individuals--particularly by age and sex--in the household. This data collection effort has both quantitative and qualitative aspects. The routine tasks of classes of individuals--female children, for example, or adult women--can be derived from appropriately-designed time allocation surveys. But more is needed here, especially in terms of the expectations that might exist about which individuals are to provide certain resources--land, cash, food, etc.--and how decisions as to the allocation and utilization of these items are made. It is difficult to design a questionnaire that can be administered by a research assistant that would get at these issues. Unstructured interviews preferably conducted by, or in the company of, the project manager, will be the best source of data on these processes. This is more an ethnographic than a

situation in which data that have been collected are irrelevant, than one in which crucial data are missing.

In the analysis of data, attention must be given to selecting appropriate subsets from among the range of households considered so that hypotheses may adequately be tested, while maintaining conditions for valid comparisons. If, for example, two groups of households with differing consumption patterns participate in MCH take-home programs receive different rations and also vary with respect to income and resource allocation strategies, it will be difficult to isolate income, allocation, or ration as the source of the variability. If income data were not collected in the first place, the problem is irresolvable. If the income and other critical data are there, intergoup comparisons can be made among sets of households with different outcomes, yet relative similarities regarding other important variables.

It is also necessary to ensure that the project manager(s) have previous familiarity with the sort of research proposed as well as the kinds of relationships thought likely to emerge. It would be fatally easy for someone without the necessary knowledge and experience to fail altogether to look for or to find relevant relationships. This is particularly true given that some of the data will be of the qualitative and contextual sort, rather than quantitative and/or extrapolated.

While many of the authorities cited in this report have appealed

for intensive household-level data collection as the only solution to providing what is necessary to resolve questions about the consumption effects of food aid, they have addressed neither the mechanics of such data collection nor the broad applicability of such research results. How useful will the results of such inquiry be for program and policy development? What can we really expect to learn? How broadly applicable are such research outcomes?

The answers to these questions depend in large part upon the care with which the research actually is designed, the data collected, the analysis carried out, and the hypotheses tested. Much of the work reviewed in Sections II and III of this report has proven to be of limited utility because of inadequate data collection, failure to control for exogenous variables, use of inappropriate proxies, and/or incomplete analysis. To the extent that these sorts of problems are avoided in the design and conduct of the research, its results will have greater power and validity.

The best strategy to maximize the usefulness and generalizability of the results is to design the activity in two stages. Short-term microstudies similar to those discussed on pp. 124-128 above would provide data of the sort appropriate for rethinking and reformulating the hypotheses set forth in Section IV. With more sharply-focussed research questions, issues of design such as duration, program aspects to be studied, number and location of sites, and sample sizes required could be approached with more

confidence.

There are some broad, common-sense guidelines which should be observed if the usefulness of the work is to be enhanced. Given the conceptual framework, a thorough understanding of the household--structure, composition, activities, organization, functions--clearly is necessary then to explore the dynamics of food and other resource allocation. Data collection must be careful and complete, so that statistical controls most frequently utilized at the level of analysis can in fact be employed. Confidence in the results can further be increased if several sites are investigated simultaneously using the same conceptual framework, hypothesis testing, data sets and analytic procedures.

No one research project, or even series of projects, will provide immediate solutions to all of the issues that have been raised in this report. The major potential problems in the realms of data analysis and policy relevance can arise from several sources: inadequate data collection, limitations on statistical usefulness of some data, the tedious process of reducing data to a form appropriate for computer management, effects of exogenous variables. None of these is insurmountable, however; and sophisticated data collection and analysis of household-level empirical data, given even these problems, would take our understanding of the dynamics of food aid at the household level far beyond its present state.

Appendix A: Personnel considerations

On the basis of the hypotheses to be tested and the data needs minimum personnel requirements would be the following for each study site selected.

1. Field director or project manager: preferably an anthropologist with previous experience in the country in question; if not an anthropologist, a rural sociologist or an agricultural economist with anthropological training. Familiarity with the local language(s) is essential.

2. Consultant physician: should be locally recruited on a part-time basis, to participate in the anthropometric assessments and evaluation of patterns of morbidity and maternal nutritional status. Necessary only if it is decided to conduct anthropometric assessment.

3. Statistician, economist or programmer: on a consultant basis to assist in data analysis. As the analysis is fairly straightforward and statistical packages already are available, travel to the field site(s) should not be required.

4. Local assistants, male and female. Literacy in the local language(s) should be a minimum requirement for consideration. Secondary education and literacy in English or French would be

preferable. These assistants must be residents of the study area(s), initially hired on a probationary basis, and trained by the field director and consultant physician prior to beginning work. The number to be recruited depends on the size of the sample ultimately selected.

5. Graduate students, expatriate and/or local, who can assist in data collection in their areas of specialization. Disciplines from which they may be recruited include nutrition, public health, anthropology, sociology, economics, demography, and medicine. Whether or not any graduate students are employed, and the sorts of scientific fields from which they are recruited, will depend on the sample size and the data sets to be collected.

Appendix B: Budget considerations for long-term studies

1. Salaries and fringe benefits. A full-time salary plus fringe benefits of 25% of salary will be required to support the project manager in the field. The physician will be committing about 25% of his/her time to the project and a salary equivalent to one-quarter of that paid to the project manager, plus fringe benefits, seems appropriate. I see no reason for the economist or statistical consultant to have to travel to the field, and this individual should be compensated at the appropriate daily rate; two person-months of effort will probably be adequate. Graduate student stipends of $600 to $800 per month would be quite generous. My own and my acquaintances' experiences in Kenya suggest that salaries for locally-employed assistants should not exceed the equivalent of $100 per month. Calculating on the basis of a salary of $40,000 for the project manager and a daily rate of $150 for the statistician, plus support for one graduate student and four locally-recruited data gatherers, personnel costs for a putative first year of effort should total approximately $85,000. Additional data-gatherers, if necessary, would add only minimally to these costs. In my Kenyan research I employ one data-gatherer for about every 40 households in the sample. In July 1984 I paid each of these individuals 1,000 Kenya shillings per month, or about $68.00. This was considerably in excess of the salary paid by the government to a clerk with a high school education. In summer 1985 I plan to raise this to about 1200

shillings per month. Total personnel costs will decrease if it is decided not to conduct anthropometric assessment.

2. Equipment and supplies. The research envisioned in this report will result in the collection of a great deal of detailed data; the best way to be certain that such information will be appropriately stored and rapidly analyzed is to provide a personal computer, complete with printer and appropriate software, for the use of project personnel. Another essential equipment need is for standard anthropometric tools: scales, calipers, length boards, tapes, and perhaps anthropometers. Cameras and lenses, tape recorders, and typewriters also will be essential. Critical supplies include film, cassettes, stationery, computer paper, and medical supplies; not only for the researchers themselves, but to provide to the study population, particularly at the times anthropometric assessment is carried out. If a computer is provided equipment and supplies will cost approximately $10,000 for the first year, less in subsequent years.

3. Transportation. In addition to air fare to and from the field site and a modest amount of travel allowance for the locally-recruited assistants and the consultant physician, the project manager will almost certainly need a vehicle. This is a costly item, but purchase is more cost-efficient than rental, particularly in countries where resale of used vehicles at a good price is generally possible; money recovered from the sale of a

car or jeep at the end of the fieldwork can be used to cover data analysis costs, for example. An allowance should be included for insurance, maintenance, petrol and spare parts. Car prices and the availability and reliability of used vehicles vary greatly but at a minimum $10,000 should be set aside for purchase and another $5,000 for upkeep and fuel. Roundtrip airfares for project manager and one graduate student (assuming that they are not locally recruited) and local travel allowances for physician and fieldworkers, plus some perdiem allowance for the first month or so in-country for the foreign personnel, brings estimated first-year transportation costs to $24,000.

4. Other: Communications and postage, housing/office allowances, a furnishings allowance (or shipping costs, in the case of expatriate personnel), and an allowance for local clerical and/or data entry assistance will come to approximately $7,000.

5. Contingency fund. Ten per cent of the previously-outlined direct costs: $12,000.

These estimated costs total $135,000 for an initial year of research activity, assuming all the data sets described are collected and a total sample of 150 to 200 households is investigated. Although the expenses of automobile and computer purchase will not be incurred in subsequent years, salary increases and rising prices for supplies and living expenses mean that this approximate figure is equivalent to what

might be required for future years of effort as well.

This estimate is exclusive of indirect or overhead costs and is appropriate only for the collection of the data sets discussed in Section V of the document. If additional information, requiring the assistance of other scientists or the use of other diagnostic measures (biochemical tests, proximate analyses) is desired, costs will correspondingly increase. In some countries it will be possible to find qualified local personnel to fill all of the positions described, which would result in cost reductions in some of the budget categories.

I have quite deliberately excluded informants' fees or compensation to individual households as a budget category. I found it more useful in my own work in Kenya to make a cash contribution to some major public activity, such as community fund raising for schools or health facilities, than to give a cash pittance to individuals. If informant's fees are given to sample households only, and those households comprise only part of the total population, then those left out may feel cheated or discriminated against. Other anthropologists might not agree with this approach but it worked very well for me.

Appendix C: Scope of work

Summary

In a short-term contract with FVA/PPE, Dr. Anne Fleuret, Department of Anthropology, The American University, will undertake an analytic assessment of hypotheses and variables derived from scientific literature and designed to provide FFP with information on the household-level dynamics of nutrition. Particular emphasis will be placed on isolating those factors that might affect or interact with household utilization of Title II commodities. The principal hypothesis to be examined is that the greater the overall economic value of a commodity or commodities, the better the nutritional outcome for beneficiaries. Other hypotheses will also be examined and particular attention will be paid to the issue of controlling for other variables bearing nutritional consequences at the household level. Both published and unpublished data from individuals, institutions and agencies will be examined. The product will be a detailed report providing the information that FVA/PPE will need to assist in making decisions about longer-term research activities aimed at understanding and improving food distribution programs. Included will be a preliminary assessment of the feasibility of field research on the household-level impacts of food transfers, and the prospects for co-ordinating such research activities with existing projects and ongoing research.

Background

FVA/PPE has already expressed an interest in identifying the precise role of PL 480 Title II food transfers at the household level. The Bureau initially commissioned the National Academy of Sciences to provide them with recommendations on improvement of the nutritional cost-effectiveness of Title II foods. The Academy's findings have prompted further concern on the part of FFP to look more closely at the household-level dynamics of food transfers. They suggest that the impact of food transfers is not so much in the provision of food to index or target household members as it is an income-enhancing effect that may benefit the entire unit. FFP's ultimate goal is to determine the effects, both short and long-term, of food transfers in general and also of various means of delivery of the commodities, with the objectives of improving the programs and enhancing nutritional and perhaps also income-generating benefits to the clients.

Objectives

1. To assess the reliabiity, validity and completeness of documentation of household-level processes and dynamics affecting nutritional status of household members, principally in developing countries.

2. To isolate and describe three categories of household-level

variables implicated in determination of nutritional status:

a. those clearly linked to nutrition effects in a large number of social/cultural settings;

b. those clearly linked to nutrition effects in a limited number of social/cultural settings;

c. those possibly linked to nutrition effects.

Attention will also be paid to those variables clearly not linked with nutrition effects at the household level.

3. Based on (2) above, to determine whether there is already sufficient evidence to establish specific sequences of cause and effect in nutrition outcomes at the household level, with particular attention to the role of food transfers. Where relatively certain sequences of cause and effect can be established, these will be described and policy implications stated.

4. For those variables and causal sequences that seem fairly well established, to describe the research designs and methodologies required to measure the variables and investigate the causal sequences.

5. For those variables and causal sequences that may be important but which are not yet well-established, to propose resarch designs and methodologies required to establish the linkages at the necessary level of confidence.

6. To establish whether it will be possible to develop methods which will sort out the interacting effects of implicated variables; and particularly whether the specific role of food transfers can be determined.

Methods

The task will require a comprehensive analytic assessment of the available literature, drawing upon the following sources:

1. Published reports in books and journals, housed principally in the National Library of Medicine in Bethesda and the National Agricultural Library in Beltsville. References will be traced using computerized search procedures such as MEDLINE, MEDLARS, AGRICOLA.

2. Official documents, largely unpublished, from public agencies such as the World Bank, the Food and Agriculture Organization, and the Agency for International Development.

3. Unpublished materials from other sources, such as private voluntary organizations and scholarly conference papers.

4. Visits to fieldworkers and to private voluntary organizations, particularly those with experience in the delivery of Title II commodities to beneficiaries.

5. Correspondence and meetings with fieldworkers and organizations concerning their ongoing and/or unpublished work (I have compiled a list of approsimately fifty such individuals and organizations already known to me).

As these resources are examined, the explicity and implicit hypotheses that inform the work will be extracted and the reliability of the data and testing procedures will be scrutinized and validated, by statistical analysis if feasible and/or appropriate. The final result will not be a simple literature review, but will go beyond description to the analysis of relevant hypotheses and variables and the assessment of their utility, promise, and/or difficulties with respect to anticipated future research activities.

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