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RESERVE (832)

THE IDENTIFICATION AND ANALYSIS OF NUTRITIONAL  
PROBLEMS IN RURAL AREAS :  
AN APPROACH FOR VOLUNTARY AGENCIES

by

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ABSTRACT

This paper proposes an approach to the analysis of rural development problems for voluntary development agencies based on four questions:

1. Is there really a problem?
2. What are the causes of the problem?
3. Why has the problem not been solved?
4. What can we do to assist in producing a solution?

The paper is primarily concerned with the first two questions.

Part I looks at the case for using nutritional status as an indicator of problems, and suggests that at present in East Africa the removal of malnutrition should be the paramount objective of voluntary agencies. The problem of obtaining and interpreting nutritional measurements are then discussed.

Part II is concerned with finding the causes of malnutrition. After some general considerations, a procedure is outlined by which the relevance of different agricultural, economic and social factors to the malnutrition problem can be determined.

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## Section I: Introduction

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In this paper I try to outline a more systematic approach to problem analysis for development agencies. I am primarily concerned with the small, usually voluntary agencies supporting development work in the rural areas. Projects assisted by such agencies are generally of local impact (although the approach proposed here is equally valid for national problems and projects) and too small to justify extensive pre-implementation surveys, complex cost-benefit analyses or detailed evaluations.

My emphasis is on problem analysis rather than project assessment<sup>1</sup>, although they are over-lapping fields. Most agencies have procedures to ensure that projects supported are technically and economically feasible, that there are satisfactory administrative arrangements, and that the project is of some benefit to the local community. But a most important question is:

Given the problems of the area, is the project relevant?

Before an agency becomes involved in an area I therefore suggest they ask:

1. Is there really a problem?
2. What is the cause/are the causes of the problem?
3. Why has the problem not been solved (what are the constraints)?
4. What can we do to assist in producing a solution?

This paper is mainly concerned with the first two questions, although at a later date I hope to extend the analysis to all four.

Part I is concerned with problem definition. In section II I argue that many of the problems encountered will cause malnutrition, and that in answering question 1 it may therefore be possible to focus attention on nutritional status. Section III looks at the problems in measuring nutritional status.

Part II deals with how to determine the causes of malnutrition. Section IV makes some general remarks about the nature of problems, and Section V a major part of the paper, outlines a procedure, a set of questions and checklists for analysing nutritional problems.

I have not yet considered the implications of such an approach on the way in which agencies operate. At present the arrival of a project proposal may be an agency's first contact with an area: the project is the starting point rather than the outcome of an agency's investigations. What errors might this lead to, and what biases might be introduced by the lines of communication between applicants for aid and potential donors?

Before tackling the main themes of the paper, some comments on problem definition are required. Problem definition will depend on development objectives; and when those of an agency conflict with those of a rural community, agencies, especially foreign agencies, are open to the criticism that they are trying to dictate the pattern of development - a form of neo-imperialism. While communities must have the right to guide their own development (within the constraints of national interest), agencies cannot avoid having independent objectives, whether they are formed by a policy decision or by default. Agencies therefore have a responsibility to fully understand the implications of their objectives and possible conflicts. In no way should the importance of community involvement in the analysis of problems and the planning of development be underestimated.

PART I

Section II: The Case for a Nutritional Objective

The original objectives of many agencies are shown in their names - Freedom from Hunger, the Oxford Committee for Famine Relief, Bread for the World, and so on. These agencies were formed as a humanitarian response to acute food shortages existing in many parts of the world. And through their involvement in critical famine situations agencies became aware of the more permanent state of under-development from which disasters arise. Lack of food came to be seen as only one component of the deprivation from which many communities suffer - poor living conditions, unemployment and unproductive employment, social disruption, disease, etc.. Many agencies therefore became orientated towards 'development', i.e. towards promoting changes in the economic and social structures of societies which might enable them to provide for themselves a higher standard of living.

In a disaster the primary objective is to save lives, but in a more usual situation of under-development how should an agency set its objectives and establish its priorities for action? Although an agency's concern must be extended to factors other than nutrition, I will examine the following propositions:

1. That the removal of malnutrition should be regarded as the paramount objective;
2. That for planning purposes, the prevalence of malnutrition can be regarded as a single indicator of problems.

The first proposition has probably been accepted by many agencies and can be justified in several ways:

- (i) The lack of sufficient food to maintain the body in a state of physical well-being must be one of the worst deprivations from which man can suffer. "It is well-being, not income, that determines whether a man, rich or poor, has the capacity to enjoy (the) most fundamental sources of human satisfaction. Well-being is the primary requisite, the sine qua non, that determines the utility men derive from all other forms of consumption, whether measurable or not."<sup>2</sup>

- (ii) Although malnutrition may not mean starvation, it is nevertheless a killer. Especially with young children, resistance to disease is lowered resulting in high mortality rates.
- (iii) Initially improved nutrition may reduce mortality and exacerbate population growth problems. But it can be argued that reduced mortality is a necessary precondition for a reduced birthrate.<sup>3</sup>
- (iv) Malnutrition reduces a man's capacity for work, and this is likely to be a constraint on a community's self-development. The circle of malnutrition - low output - malnutrition must be broken. There is also evidence that malnutrition may impair mental as well as physical abilities.
- (v) The cost of preventing malnutrition is much less than the cost of treating it.<sup>4</sup>

The second proposition stems from the fact that many of the problems with which agencies are concerned are likely to be causes of malnutrition, or at least are likely to be related to it. For example, consider the following types of agency concerns:

Poverty problems: low income, unemployment, land shortage, poor housing, etc. If a family has few resources there is a high risk that they will not be able to buy or produce sufficient quantity or quality of food, hence malnutrition.

Social problems: split-up of the family through men searching for work, migration of families because of natural disaster or political upheaval, change in social customs through change in methods of production. Migrations are associated with problems of low income, and therefore malnutrition. Changes in social customs may mean changes in diet, often for the worse, and they may leave mothers with less time for child feeding.

Problems of handicapped groups: these constitute problems because of their inability to provide for themselves. Without the assistance of the local community or an agency, malnutrition will result.

Health problems: Poor health is both a cause and a consequence of malnutrition.

Is nutritional status sufficient as an indicator?

In other words, what problems might exist in well-nourished communities?

The most common situation may be when malnutrition is a seasonal or occasional problem, e.g. in drought-prone areas. Clearly an agency must consider the possibility of variations in nutritional status and not, for example, make an assessment on a single nutritional survey made a few months after a good harvest.

Yet it is still possible to think of permanently well-nourished communities requiring development assistance. For example:

- (a) A hard-working community of subsistence farmers living in poor conditions with few facilities for leisure.
- (b) Low-income employees worked hard by a landlord/employer who gives them sufficient food but little else.
- (c) A community with little productive employment, but with nutritional status maintained by aid inputs.
- (d) A community in which all of working age have migrated to the towns, but remittances to the community are sufficient to buy food.
- (e) A highly-productive community with socially or politically divisive factors leading to tensions and a high crime rate.

(Note that the reverse situation may also exist, i.e. malnutrition but no problem. E.g., children may be malnourished on a new settlement scheme, but there may be plenty of productive land and prospects of an ample harvest.)

We must conclude that by looking at nutritional status alone we will not detect all problems. This poses the question of what other indicators are necessary.

1. Instead of nutritional status we should consider 'nutritional viability', the ability of a community to maintain its nutritional standards at a satisfactory level without outside help.

This expanded nutritional criterion will cover seasonal problems and problems (c) and (d) above. However, nutritional status should not be discarded: it is a much simpler factor to assess and will in most cases reflect nutritional viability.

2. The distribution of opportunity and income should also be regarded as an indicator of problems.

Inequality is the main feature of example (b) above. In (d) there is inequality of opportunity between the community and nearby towns, and (e) is likely to be the result of perceived inequalities between different sectors of the population.

However, these are refinements to the nutritional approach. And for a long time to come we will be faced with many projects competing for scarce development resources. Decisions must be taken regarding the relative priorities of different problems, and the above arguments seem to make a case for putting problems with low nutritional status as a symptom near the top of the list. Although excessive inequality is objectionable, East Africa probably does not have the severe problems of Latin America or southern Asia. Thus while nutritional status may not be a perfect indicator of problems, it should, at least in theory, be a powerful tool.

### Section III: The Problems of Using a Nutritional Indicator

#### Availability of data

The biggest stumbling-block with this whole approach may be the availability of nutritional data. Suppose that an agency suspects problems (e.g. from newspaper reports, project requests or field staff reports), say, in an area of Kenya. What is the probability that nutritional information on the area exists? And if it exists where is it to be found? An agency already working in the area may be able to carry out a simple survey, but in general this will not be possible.

I will return to the problem of lack of data in section V, but for the remainder of this paper

nutritional status.

Attention can be confined to children

Without losing any generality, the assessment can be confined to young children under the age of 3, or sometimes 5 years.

If these children under three enjoy a good nutritional status it may be safely assumed that the whole community is well-nourished. On the other hand the number of malnourished (underweight) children indicates the degree of malnutrition in the community concerned. <sup>5</sup>

The reason is that malnutrition in any other sector of the community is likely to lead to child malnutrition, e.g. malnourished mothers will not be able to adequately breast feed infants, and malnourished workers through low-productivity will result in the whole community being malnourished. (Workers are probably the least vulnerable group because of traditional food-sharing habits: feeding workers first was a sensible strategy for a community's survival). A possible exception is malnutrition only in the elderly, but such problems are not confined to the developing countries.

Concentration on children may have two practical advantages:

- the symptoms of malnutrition can be most clearly seen in infants; and
- it may be easier to carry out a survey among infants than among working adults (although it has been pointed out to me that this is not always the case).

Types of nutritional measurement

Nutritional surveys may be of four general types:

(i) Clinical

These are the most accurate as they directly measure the body's absorption and utilization of different nutrients. But such surveys are expensive and agencies will rarely get information in this form.

(ii) Physical inspection

I.e., estimates of the prevalence of different observable symptoms. The difficulty here is that data may be a bit

subjective, especially with marginal cases (and hopefully problems can be identified before marginal cases become acute). Nevertheless, the value of such surveys has probably been under-rated, researchers preferring surveys which give more measureable data, irrespective of how meaningful such data might be.

(iii) Dietary surveys

Quantitative surveys give much useful information but are expensive to conduct, hence data will rarely be available. Qualitative surveys do not actually measure malnutrition, but once malnutrition has been found they may be a useful diagnostic tool.<sup>6</sup>

(iv) Anthropometric measurements

These are simple and cheap to collect, and therefore most common. Nutrition is a major, but not the only determinant of the rate of growth of a young child, and there is hence a high correlation between physical development and malnutrition. Children whose growth lags behind some standard are assumed malnourished. Common measurements are:

Weight-for-age: Many consider this to be the most reliable statistic and it is widely used in nutrition clinics (e.g. C.R.S.). Children can be given a card on which their monthly progress is charted. When a child's weight falls below a certain percentage of the standard for its age (80% for C.R.S.) then malnutrition is assumed and remedial action taken. Errors can arise through inaccuracies in weighing equipment (which can receive rough treatment in mobile clinics) and in estimating children's ages. The latter can be a major difficulty when a child has not entered a monitoring programme at an early age.

Weight-for-height: This is often used when the age of a child is in doubt, but with an infant height measurement with accuracy may be difficult. Some object to weight-for-height

Others argue that this is not serious as people of small stature are better adapted to areas where food shortages are likely.

Arm circumference: The beauty of this method is its simplicity. The mid-upper arm circumference of a well-nourished child only increases by 1 cm between the ages of 1 and 5, while that of a malnourished child may be up to 4 cm below the standard. Age determination is no longer a serious problem, and the only equipment required is a marked piece of tape. However, there have been reports of this method giving highly inconsistent results. Measurements should be taken with the arm relaxed, but the problem seems to be that children become tense when the measurement is taken.<sup>7</sup>

Problems in the interpretation of anthropometric measurements

For each child an observed measurement is compared with the distribution of measurements which can be expected in a population of well-nourished children of the same age.

1. On the basis of anthropometric measurements alone we cannot say for certain that a child is malnourished. We can only say whether the measurements could 'reasonably be expected' from a well-nourished child (the probability of a well-nourished child having lower measurements). We must expect errors of classifying some well-nourished but small children as malnourished, and of failing to detect some malnourished children.

This is not such a drawback if our interest is only in the general nutritional state of a community. Errors are still possible, but when a whole sample of measurements is used their probability is greatly reduced.

2. A more important objection is that the standard distribution may not be appropriate: It is likely to have been derived from studies of American or European children ignoring possible differences in the African physique. And even if there were no differences in physique the standard may be unrealistically high for problem definition in a developing country.<sup>8</sup>

3. There is some doubt about the sensitivity of anthropometric indicators. If a community is faced with a relatively sudden and acute food shortage will anthropometric measurements be responsive enough to indicate a problem?
4. Some regard the usefulness of any nutritional indicator in project evaluation as questionable. Nutritional status is a function of many variables, and the dominant ones may be outside a community's or an agency's control, e.g. the weather. It may therefore be a long time, if ever, before a project can be shown to have produced a statistically significant improvement. If nutritional indicators cannot measure progress, it is debatable whether or not they can measure problems, because, for example, a community would be just as likely to 'have problems' (i.e. malnutrition) after the implementation of a project as before.
5. How much malnutrition can be tolerated before a situation is considered a problem? The criterion may take the form, 'X% of children with weight below Y% of standard weight for age', but how do we judge the seriousness of a problem knowing that some malnutrition will exist in all communities, even highly-developed ones?<sup>9</sup>
6. Low anthropometric measurements are a symptom of low calorie intake, but they need not be a symptom of mineral or vitamin deficiencies.

Assessment of the community by the community

Dr. Morley<sup>10</sup> has suggested that by using arm-circumference measurements it should be possible for communities to measure their own nutritional status, and in this way the process of assessment is itself developmental as it makes the community nutrition conscious. A strip of old X-ray plate can be marked with a base line and coloured bands at the appropriate intervals. The proportion of young children (1-5 years) whose arm circumferences come within the red (lowest) band gives a measure of the community's nutritional status.

An alternative is to use plastic pipe whose circumference is the borderline measurement between well-and malnourishment. The pipe can be

sliced to produce bangles, decorative if possible, which can be given to children. Whether or not a child can slide the bangle up its arm is an indication of nutritional status.

Dr. Morley seems to have used these methods with some success in other parts of the world, but, as mentioned above, arm-circumference surveys in East Africa have not always given good results. However, because of the simplicity, cheapness, and educational value of the method it cannot be disregarded.

PART II

Section IV: A General Approach to Problem Analysis

Single problems may not exist: we must look at the whole problem situation

Because of the complexity of the development process it may not be possible to pick out a single problem causing malnutrition. The concept of a single problem may not even be definable. Consider a village with, say, a water shortage. 'The problem' could simultaneously be regarded as not enough rain, an inadequate water supply system, lack of money to invest in water development, etc., and no one formulation of 'the problem' need be more valid than another. Instead we have a 'problem situation'.

Nevertheless, some features of a situation may contribute more to malnutrition than others. To take another example, consider a village entirely dependent on cotton production for its income. Cotton yields may be above the national average, but prices to growers may be much below average, and the resultant low incomes lead to malnutrition. Both yields and prices are relevant factors in any analysis as an increase in either is likely to reduce malnutrition, but it seems sensible to say that prices contribute more to malnutrition than yields. (I leave aside, of course, the problem of dependence on cotton!). However, the idea of regarding some factors as more relevant than others must be used with care as it may result in development opportunities being overlooked. In our example there may be a very easy way of making further improvements in cotton yields. Some factors may be relevant in the stricter sense that malnutrition cannot be removed without a change in the factor, but I do not expect such factors to be common.

The Main steps in the analysis

The proposed procedure is outlined in diagram I below:

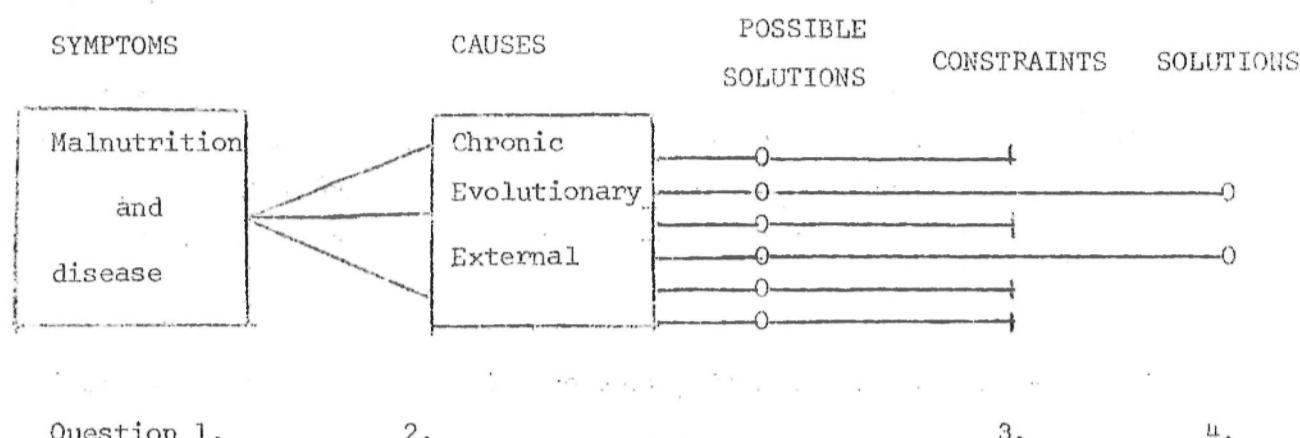


DIAGRAM 1.

The questions refer to the four questions listed in section I.

1. Is there really a problem?
2. What are the causes of the problem?
3. Why has the problem not been solved?
4. What can we do to assist in producing a solution?

I have found it helpful to divide problems into two groups, causes and constraints, although it may not always be possible to draw a line between them. 'Causes' are problems which directly lead to malnutrition, while factors which prevent a community (or agency) from overcoming problems I have termed 'constraints'. Thus a water shortage may be a cause if it reduces food production, while illiteracy would be regarded as a constraint (it is only relevant when programmes using written materials are being considered). In other situations water shortage may also be a constraint, e.g. in the introduction of coffee as a cash crop.

#### Causes

The procedure which I have sketched in section V is primarily concerned with identifying causes. A secondary approach which I have found useful is to ask how the causes of malnutrition or disease may have risen, and to divide them into three classes:

- (i) Chronic: Problems from which communities have always suffered. With such problems it is likely that communities will have learnt to use their resources and technology to cope in the best possible manner.

Many nutritional problems will, however, be of more recent origin: Professor Joy has pointed out that, "Generally poor nutrition is associated with poverty and also with change, for poor nutrition is not necessarily a characteristic of rural subsistence communities."<sup>11</sup>

The changes I see as being of two types:

(ii) Evolutionary: resulting from on-going changes within a community, e.g. a growing population causing land shortage, leading to over-use of land, soil exhaustion and soil erosion.

(iii) External: resulting from changes taking place outside the community, or imposed on the community from the outside. E.g. the mix of crops grown may be changed by market forces and extension advice, and better development opportunities outside the community may lead to migration and social problems within it.

Unfortunately I have not yet integrated this approach with the procedure of section V.

#### Constraints

In referring to constraints I mean two things. Firstly there is the check on the feasibility of a project which any agency will make. If the project involves the introduction of a new crop, will the crop grow in the area, will there be a sufficient supply of fertiliser, will the growers get an economic price, will the growers be able to afford the initial inputs, etc. Any of these questions may detect constraints on a project's viability.

Secondly, and perhaps more importantly, a constraint is something which prevents a community from solving a problem on its own. As an appendix to this section I have examined how constraints relate to the idea of self-help.

#### Constraints and self-help

Many agencies state that one of their aims is to "help people to help themselves" (perhaps partly to answer criticisms from their donors), and some may go even further.

self-help ingredient before they will grant assistance. But in looking at problem situations in terms of causes and constraints, agencies' concern for self-help appears to be over-emphasised, if not misplaced. I see no reason to believe that an individual would willingly suffer from a problem if he were able to recognise the problem and if he had the know-how and means to solve it. An agency can assist by removing the constraints and allowing self-help to take place, but it should not assume that it is trying to promote a virtue which is not already there. Self-help is not a new phenomenon: it is the strategy by which communities have survived since civilization began. Only agency help is new, and agencies must remember that their contribution is only a very small part of the total development effort taking place within communities.<sup>12</sup>

#### Section V: A Procedure for Problem Analysis

##### Introduction

I have divided the procedure into four parts:

- Step 1: Examine the evidence of malnutrition or disease, and decide whether or not there are grounds for continuing the analysis.
- Step 2: Identify the relevant problem areas.
- Step 3: For each relevant problem area, identify the types of problem which may be relevant.
- Step 4: Make a detailed analysis of the relevant problem types. (I have only sketched this step for one problem type).

Step 1 should answer the first of the four questions of section I. Step 2, 3 and 4 all tackle the second question, although once step 4 has been completed the constraints may also be known. It should be possible to add further steps to answer the fourth question.

Step 1, 2 and 3 are summarized in diagram II.

##### Step 1:

###### WHAT EVIDENCE IS THERE OF PROBLEMS?

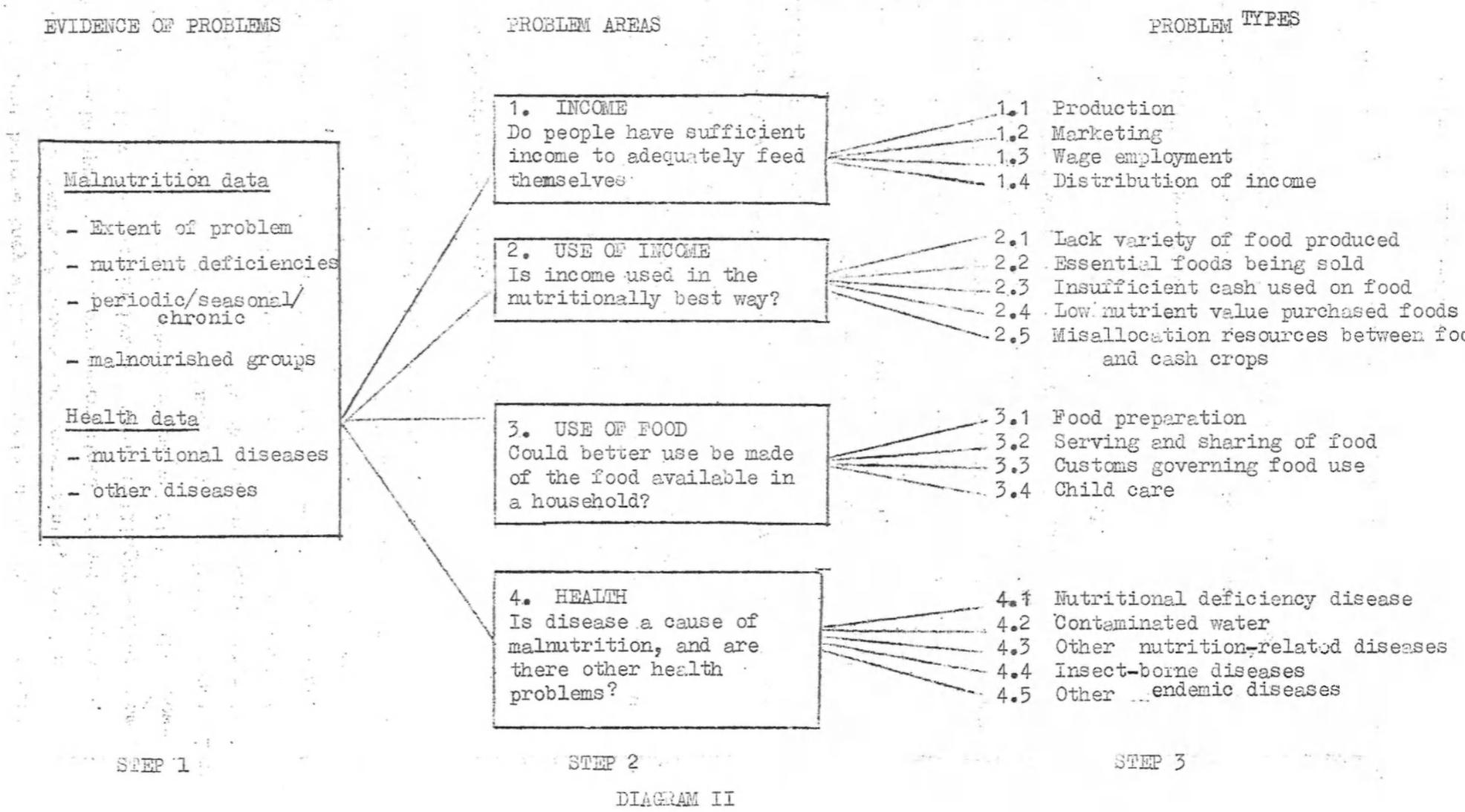
Is there evidence which shows that there is a serious nutritional problem? (Government, hospital and voluntary agency records should be checked).

###### If yes

It will be helpful if any of the following questions can be answered from the statistics:

- (i) What is the extent of the problem?

SUMMARY OF STEPS 1 - 3 OF THE ANALYSIS



- geographical area (the defining characteristics of the area may give a clue to the problem)
  - number of people affected
- (ii) What form does the nutritional deficiency take?  
(protein-calorie, vitamin, mineral)
- (iii) Is the problem periodic, seasonal, or chronic?  
(periodic or seasonal may point to weather-related problems)
- (iv) Is there a particular sector of the population which is malnourished?
  - socio-economic groups (suspect distributional problems (1.4))
  - women, children, the elderly (suspect social problems (3))

In many cases the answers to these questions will not be apparent from the statistics.

If the evidence does not suggest a serious problem

Only if there is some other clear indication of problems should the analysis proceed.

If there is no evidence

Subjective assessments must be obtained from people who know the area. Are there enough indications of problems to justify proceeding? If so, carry on to step 2 and see if any of the main problem areas are relevant.

Is there a serious disease problem?

Check hospital and health centre records.

STEP 2

IDENTIFYING THE PROBLEM AREAS

Here we try to identify the general problem area. I have considered four:

- Income
- Use of income
- Use of food
- Health

The ordering of this list corresponds to the process by which food is obtained and used, from the resources used to produce food to the effect of food on the body. These problem areas are not exclusive, but they are inter-related, and, for example, improving the use of income will never completely solve a nutritional problem if the level of income is too low.

(1) Income

\* Do people have sufficient income to adequately feed themselves and to meet their essential expenses?

It is unnecessary to have a very precise definition of sufficient income - a general indication is all that is required, say 2000 calories per day and 200/- p.a. for each person (averaged over all ages and sexes). Assuming that about two-thirds of a poor household's income will be spent on food it should be possible to make rough assessments of cash-only or food-crop-only incomes.

A difficulty may be the level of detail at which incomes can be examined. Ideally we want to look at the incomes of households with malnourished members, but it may only be possible to obtain aggregate data for a whole area. If the area income is inadequate then there will be malnourished households in the area, but if the area has sufficient income it cannot be assumed that the income of every household is sufficient. If the sufficiency of income can only be established at an aggregate level then income problems cannot be dismissed from the analysis until distributional problems are examined in step 3 (1.4).

It may be necessary to calculate incomes from more basic data. Tables exist showing the calorific values of different crops, likely wastage, seed requirements, etc.<sup>13</sup> Data on areas under crops, yields, market prices, etc. will not always be very reliable and one must therefore be careful not to dismiss income problems without strong evidence.<sup>14</sup>

The calorific value of income alone is not of course a complete measure as a balanced diet is likely to cost more than, say, an all-maize diet. However, the calorie total may be a useful starting point, even if the shortage of particular nutrients forces us to return to

(2) Use of income

Is income being used in the best way to provide a satisfactory amount and variety of food?

This question will be difficult to answer, and it may be necessary to wait and go through the checklist of problem types in step 3. However, it may be possible to spot some indirect indications of income misuse, e.g. malnutrition and high income, more ownership of luxury goods than might be expected, high sales of processed foods, alcoholism, a recent change from a subsistence to a cash economy or from one food crop to another. Where income is very low it may be best to give this problem area low priority as the situation may be quite different after incomes have been raised.

(3) Use of food

Could better use be made of the food available in a household?

Poor use of food may be suspected if the nutritional data show only certain age or sex groups malnourished, or from knowledge of social customs in the area. As with (2) above, it may be difficult to assess the relevance of this problem area without using the checklist of step 3. In some cases, however, it may be possible to deduce poor use of food by elimination of problem areas (1), (2) and (4).

(4) Health

Most health problems should be identified in step 1. If problems are the results of nutritional deficiencies alone then this problem area should be left out of the analysis. But if there is evidence of malnutrition a careful check should be made to ensure that poor health is not contributing to the problem.

STEP 3

FURTHER ANALYSIS

In this step we take the general problem areas which were shown to be relevant in step 2 and try to identify more specific problem types within them.

(1) Income

This I have divided into four partly overlapping problem types:

(1.1) Production

Are households producing enough?

Where production is mainly subsistence with few cash needs or obligations (e.g. to landlords) then low income will imply low production. More often households will have some contact with a cash (or at least an exchange) economy, and production will no longer be the sole determinant of income. It will then be necessary to see how production compares with the norms in other areas: if it is low the production problems and possibilities for improvement can be investigated in step 4.

Comments made in step 2, area (1) on aggregate data, accuracy of data, etc. are also relevant when considering production.

(1.2) Marketing

Are buying and selling prices fair?

If households have little contact with the cash economy this problem type can be ignored (unless it is later found that prices are a constraint to households entering the cash economy).

The prices of agricultural inputs (where appropriate), of household produce and of food must be examined. Care is necessary when only one set of prices is available as weather and market factors may cause large price fluctuations (seasonal malnutrition may be an indication). The fairness of prices can only be judged by comparison with prices in other parts of the country. In some cases it must be asked whether buyers or sellers exist, irrespective of price (or where prices are government controlled). Delays in payment for produce sold, or in delivery of goods bought may also be a problem when marketing organisations are involved.

(1.3) Wage employment

Are wage levels sufficient to enable workers to feed their families throughout the year?

Where estate agriculture is the main source of employment in an area this problem type may be

which estates may provide must also be taken into account. The problem of the low-paid hired worker on a small farm is more complicated, and should also be regarded as a distribution problem ((1.4) below).

(1.4) Distribution of income

Are there excessive inequalities in the incomes of workers in the area?

In every society some degree of inequality will exist. In section 2 I suggested that excessive inequality should be regarded as a basic problem in the same way as malnutrition and poor health. Here we must ask to what extent inequality is a cause of low incomes, and hence malnutrition or disease.

It must be remembered that inequality does not imply exploitation: relative wealth may be an outcome of hard work and progressiveness, qualities not to be discouraged. Inequalities in income will often, however, lead to inequalities in economic opportunities and access to government services and advice. This may be a constraint on the poorer farmers' development.

Distributional problems will not exist in isolation but will occur within production, marketing or wage employment problem types. For example, production may be low where the distribution of land has caused a shortage for some, marketing problems may be caused by powerful and monopolistic traders, and wage problems may be due to the distribution of power between employer and employees. If this problem type is considered relevant it may be necessary to redefine the target group so that any assistance programmes will narrow the income distribution.

(2) Use of income

Income will generally be part subsistence and part cash. Both forms of income must be considered, as well as the allocation of productive resources between them.

(2.1) Lack of variety of food produced

Could the food produced by households provide a balanced diet?

If it could not do so in a purely subsistence economy then nutritional diseases would result (is there evidence of such diseases?).

More generally, many nutrients will be purchased with cash income and the lack of variety of produced foods may not be a problem. However, the question may be helpful in assessing the prospects for self-sufficient food production, and for determining the food supplements which cash income must buy. This problem type should be suspected in areas where a single crop (e.g. maize or bananas) provides a large part of the diet, and particular nutritional deficiencies which have been identified should be kept in mind.

(2.2) Essential foods being sold

Often food is produced for sale as well as household consumption. We must check that farmers are not selling the important nutrients which they require. For example, it is reported from some parts of East Africa that households suffering from protein malnutrition continue to sell their eggs and poultry as that is their only source of cash income.

(2.3) Insufficient cash used for food

Even if a household has adequate cash income it is not certain that enough of the income will be used for food purchases, or for the particular foods required to supplement subsistence produce. If malnutrition is accompanied by relatively high spending on luxury goods this problem needs to be examined. For example, I am told that some of the more wealthy parts of Machakos District have more malnutrition than neighbouring areas which depend more on subsistence produce. In some places it may be possible to check that foods being sold in the area, together with subsistence foods, provide all nutrients required.

(2.4) Low nutrient value of purchased foods

As with (2.3), this should be investigated when cash is a substantial part of the household income. Tinned or packaged foods may be used for convenience, for prestige, because of taste, or because of the non-availability of other foods, but they may not have the nutrient value of fresh foods, and because of their higher cost a smaller quantity will be bought. The quantity of processed foods being stocked in local dukas may be an indicator of this problem type.

(2.5) Misallocation of resources between cash and food crops

Resources allocated to cash crop production may give a better cash return than those allocated to food production, but the latter may give a better return in nutritional value. Furthermore, food production may avoid the problem of non-availability of certain food types. However, the prospect of cash income and its more visible attractions, often coupled with a bias in government services, may lead farmers into giving their food crops insufficient attention. This may take the form of concentration on, say, cotton at the critical planting time for maize, using fertilizers only on cash crops, or planting cash crops on all the best land. The opposite problem may exist, i.e. the neglecting opportunities for cash crop production which would give a better food supply, but I expect it to be rare.

(3) Use of food

It is not possible to give a full list of all the conceivable problems which may arise in this area, and below I have only dealt with four common problem types. In any analysis information on further problems should be sought from community development workers, local nutrition workers and anthropological studies.

(3.1) Food preparation

It has been estimated that the traditional crushing of maize after soaking in water causes the loss of 40% of the nutritive value, 60% of the proteins and 80% of the fats and vitamin A.<sup>15</sup> The loss in cooking (ugali crust) has been estimated at 10-15%.<sup>16</sup> There may therefore be a big difference between the maize harvested and the maize available for consumption. No doubt losses are also incurred with other crops and methods of preparation. Hence if the methods of preparation are not known to be reasonably efficient an agency should seek expert advice.

(3.2) The serving and sharing of food

It may be the social custom for the men to eat first, and for women and children to eat what remains. This will create a danger of malnourishment among women and children, especially when meat is scarce and all taken by the men. Further problems may arise when food is served

in a communal bowl and it is difficult for the smaller and younger members of a household to claim their fair share. The serving of only one main meal each day may also contribute to malnutrition.

(3.3) Customs governing the use of particular foods

Some traditional taboos may still be observed, e.g. the eating of eggs by women, but they are probably now uncommon. More serious may be the diets given to invalids, e.g. the stopping of breast-feeding while infants have diarrhoea.

(3.4) Child care

The vulnerability of young children to malnutrition has already been mentioned, and they may well suffer if suitable foods and feeding methods are not used. Problems of this type should be suspected when children are separated from their mothers at an early age, or where particularly heavy demands are made on the mother through family split-up (e.g. because of migration of father), agricultural work, water carrying or a large family size. Motherless children of course present a special problem.

A well-publicized problem of this type is the use of powdered milk in place of breast-feeding. The sudden change from breast-feeding to foods of low nutrient value may also cause malnutrition.

(4) Health

Agencies may be required to assist curative programmes as a short-term measure, but ideally they should attempt to remove the causes of diseases. This will not always be possible, and vaccination or food fortification programmes may be required as an alternative. Below I have tried to put diseases into groups which suggest where the problem may lie.

(4.1) Nutritional deficiency diseases

I have already suggested that where there exist a cause of malnutrition in problem areas (1), (2) or (3) should be sought. If

(4.2) Diseases associated with contaminated water

Such diseases may be a major cause of malnutrition. It will be necessary to investigate the source of the problem in more detail: it may, for example, be contaminated drinking water, casual water lying near houses, or even a lack of water for personal hygiene. Water supplies, methods of drawing water, drainage and waste disposal should all be investigated.

(4.3) Other diseases associated with malnutrition

E.g. measles and tuberculosis. Vaccination and curative help may be required, but agencies must also look for a cause of the malnutrition.

(4.4) Insect-borne diseases

Basic problems should be tackled where possible, e.g. draining surface water and clearing bushes from near homesteads. If the insects cannot be removed, mesh windows, mosquito nets and protective drugs must be considered.

(4.5) Other endemic diseases

Action will depend on medical advice.

STEP 4

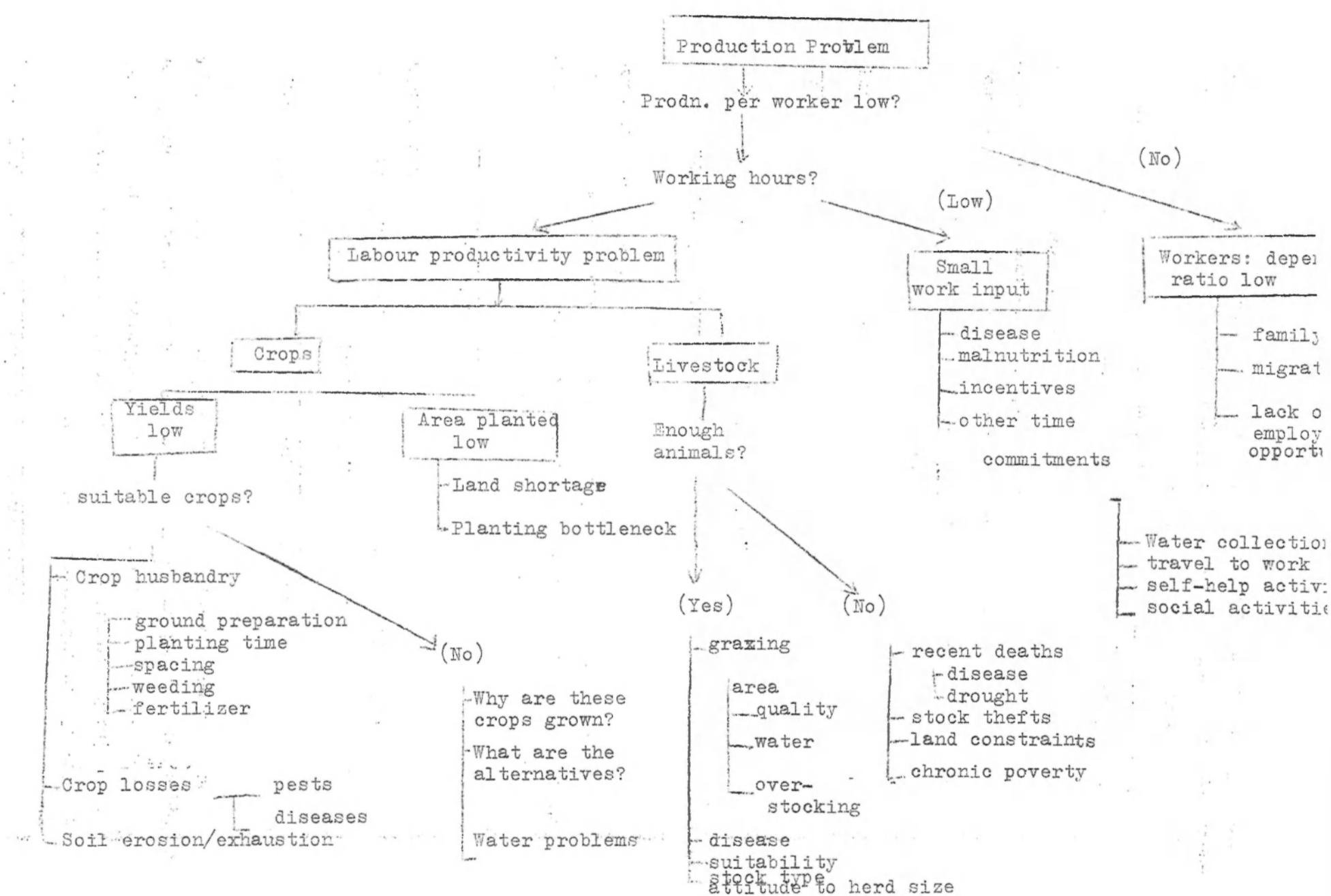
DETAILED ANALYSES OF PROBLEM TYPES

After step 3 one or more problem types will have been singled out as relevant to the malnutrition or disease problem. We now examine each of these relevant types in detail to get as full an understanding as possible of the causes of the problem (and in doing so we may also discover the constraints).

To give a full account of this step would be a long job, and for the purposes of this paper perhaps an unnecessary one. Instead I have taken production problems as an example and have illustrated a scheme for the analysis in diagram III. Although the questions and checklists of the diagram may not be comprehensive, they demonstrate the very

DIAGRAM III

#### STEP 4 : THE ANALYSIS OF PRODUCTION PROBLEMS



wide range of circumstances from which a production problem may arise. It also must be remembered that a problem may not have a single cause: poor crop production, for example, may be a result of both low yields and too small an area planted.

Eventually I hope to produce similar schemes for the analysis of other problem types. Hopefully, however, many of the other schemes should be much less complex than diagram III as in other problem areas, e.g. health, step 3 takes us much nearer to the underlying causes.

Footnotes and References

1. An approach suggested by War on Want staff.
2. Berg, 'The Nutrition Factor', The Brookings Institute 1973, p. 28.
3. Ibid., pp. 31-40.
4. Ibid., p. 24, "The annual cost to prevent malnutrition is approximately the same as the daily cost to treat it in a number of countries."
5. Blankhart, 'Two surveys on the nutritional status and feeding of children under three', Medical Research Centre, Nairobi, 1974.
6. A simple survey technique developed by Blankhart is described in Jelliffe, 'The Assessment of the Nutritional Status of the Community', WHO, 1966.
7. I am grateful to Sr. J.Lynch, Medical Missionaries of Mary, P.O. Box 3124, Arusha for pointing out this and other difficulties.
8. Joy, 'Food and Nutrition Planning', I.D.S., Sussex, 1973:-  
One suspects that the recommendations of the various international agencies are higher than can be afforded by many countries... poor countries will have difficulty enough, however, in eliminating frank clinical deficiency symptoms. They are generally likely to be well advised to set targets only marginally above the levels that would achieve this until such levels have been reached by the mass of the population.
9. For Y, 80% of standard is often used. Blankhart, in 'Health and Disease in Kenya', ed. Vogel et al, E.A. Lit. Bureau, p. 413, writes, "Areas with 40% or more of children showing underweight (PCM) have to be considered as high risk areas ..." But some field workers report cases with much higher percentages underweight and little serious malnutrition.
10. Various papers by Dr. D. Morley, Tropical Child Health Unit, University of London.
11. Joy, 'Food and Nutrition Planning', I.D.S. Sussex, 1973.
12. What, then, of the Harambee movement in Kenya, and the self-reliance of Tanzanian villages? It might be argued that these movements are the result of political and economic constraints being removed by independence and general economic development, and of the removal of lack of awareness of development opportunities through political education etc.
13. For example, Burgess and Burgess, 'Nutrient Content and Value of Local Foodstuffs', in Nutrition and Food in an African Economy, Makerere, 1972.

14. I attempted a food balance sheet for Kitui District using reported areas under crops and the most pessimistic estimates of average yields that I could find. The calculations suggested that food crop production alone should supply 150% of the district's calorie and protein requirements, and yet the district has a food shortage.
15. Estimates by Kreysler reported in Dumont, 'Tanzania Agriculture after the Arusha Declaration', Ministry of Economic Affairs and Development Planning, Dar es Salaam, 1969.
16. Maletnlema, 'Nutrition and Government Policy', Tanzania Food and Nutrition Centre, 1975.