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(Footnotes and references incomplete)

MALNUTRITION, ECONOMICS AND GOVERNMENT

by Leonard Joy

The way in which the problem of malnutrition has been conceptualized has changed considerably in the past five years but it has not yet changed enough. With few exceptions, the problem is still seen as one in which the growth of population is outstripping the growth in food supplies and the size of the malnutrition problem is measured by the 'supply gap'*. It is also seen as a problem of a failure

* Ref. to FAO, Club of Rome, etc.

of poor countries to develop rather than as a problem which is a consequence of their development, - or at least of their pattern of development.

If malnutrition is seen as a consequence of population growing faster than food supply it seems to follow that the solution is to bring the two growth rates into line. We are increasingly persuaded, however, that voluntary family planning to reduce population growth rates is unlikely in circumstances where malnutrition is characteristic. (Ref. Cassen etc) We are also clear that there are severe limits to increasing food supplies when there are no buyers for the extra food.

It seems, therefore, that there is a sense in which, paradoxically, malnutrition is the cause of the 'supply gap' rather than the supply gap being the cause of malnutrition.

We do need, nevertheless, to make every effort to promote food supplies. For if the malnourished are to eat more, their increased consumption of food will raise food prices unless there is an offsetting increased supply. This will aggravate overall inflation which will frustrate, or make more difficult, measures - especially employment and income generation measures - to reduce malnutrition. Thus it is of the utmost importance that food supplies should respond to demand increases and, in many countries, active government intervention could stimulate that response and may be necessary to secure it.

However, the method by which supply increases are achieved are of some consequence. Imagine that crop breeders had evolved a new rice variety and that the Bihar and Bengal Departments of Agriculture were offering this package programme:

- new seed, a variety sown broadcast, tolerant of a wide range of planting dates and water regimes, resistant to pests and diseases, needing no transplanting;
- fertilizer: a modest dose required to secure yields double those of standard varieties;
- herbicide: virtually eliminating hand weeding and greatly reducing cultivation operations;

- mechanical harvester: an optional extra - a bullock drawn machine suitable for small plot operation.

There is no question but that the immediate, and perhaps lasting impact of such a package would be a severe increase in malnutrition. This is to be expected because of its impact on the distribution of the product both directly, through the reduction in labour earnings, and indirectly, through the disruption of social ties that would result. (Ref. Biggs-Table). Analysis by Biggs of a similar proposition is quite convincing on this.

It may, of course, be argued that the depression of food prices that would result would provide a splendid opportunity for government to embark on labour-intensive public works, capital development projects and other employment-generating programmes to absorb the displaced. Well, it is a conceivable strategy and it is worth further study. But I would fear a major and permanent displacement not only of labourers but also of small farmers, especially tenants: tenants because of an increased attractiveness of owner-occupancy, and small owners because many would be slow to innovate and be hit by falling prices. It would seem likely, too, that the resultant restructuring of economic, social and political power would make measures to reduce further displacement, and to absorb the displaced into other productive employment, more difficult rather than easier.

The problem of malnutrition that we face in the future has, at its centre, the growth in the numbers of people who will not be able to afford adequately to subsist. These numbers will grow because increasing numbers will be born whose claims to land are nil, or inadequate to their subsistence, and whose opportunities for alternative or supplementary employment will not allow for adequate subsistence either. Unless these people can be made productive and secure they will mostly simply survive, malnourished and still breeding.

While population growth is a key driving force in this process so also is 'development'. Development enhances the value of land, and of large, managed, capital intensive holdings. It reduces the value of tied labourers where these exist and everywhere replaces a web of open-ended transactions based on personal rights and obligations by impersonal, finite, cash transactions and legal process. In effect, a man who is not of economic or social significance may be denied the right to belong or to survive. In the past, development for many - in England, USA, Kenya and India - has meant eviction, 'ejectment', or displacement. In the now developed countries the displaced have mostly been reabsorbed productively off the land. The foreseeable prospect of productive absorption for many millions in the now developing countries would seem to be quite without hope unless development strategies aim explicitly to absorb them. The core of the world's nutrition problem is among the growing millions of the displaced.

Let me illustrate this from a district in Kenya that I visited in 1972 and show, too, how a concern for malnutrition would lead to changes in the approach to planning. It was an ecologically varied district ranging from dry savannah in the low areas to coffee and bananas in the upper areas. A wide range of crops could be grown, and the district was favourable for both beef and dairy cattle. Farming was labour intensive on very small plots, with holdings mostly less than one acre. Population pressure had led to bush clearing and cropping in areas where rainfall was marginal and unreliable. People dependent on maize in these areas had gone hungry in at least two of the previous five years and some had taken to charcoal burning and were destroying the natural vegetation in the process. Land registration was in progress, preparing for the abolition of customary title and its replacement by legal title which in practice would be conferred to only relatively few.

In this district the malnourished were those who did not cultivate enough land to live on. A prediction of the growth of malnutrition would be a prediction of those who in future would have neither land enough to live on nor wages enough to augment their output of their land, if any. In short, a prediction of the insufficiently productive.

Policy to reduce malnutrition would need to concentrate on absorbing marginal families into productive activity on their own account or in wage employment. In this area there seemed

to be possibilities of channelling streams to fertile areas of unreliable rainfall and for the development of land under supplementary irrigation. Such development would imply land clearing, roads, water channels, housing and other items of social capital. Many of these items could in principle be designed to have low capital and high labour inputs. Thus, in this situation a plan to reduce malnutrition would, to start with, identify who was malnourished; it would, for the most part, I believe, discover that these were people without productive resources or employment and it would seek ways to create resources and employment for these people.

It would identify whose productivity needed to be increased, what measures were relevant to increasing their productivity and how far measures proposed for the area would reduce their problem. Relief schemes and nutrition/health programmes would doubtless be desirable but they would not be likely to solve the problem. Nor would simply producing more food.

In practice it is instructive to examine the plan proposals that were produced for this area. These were not based on attempts to reduce malnutrition or even poverty. Instead, the objectives which were specified included: the raising of farmers incomes; improving food supplies; increasing employment and improving nutrition. The inadequacy or inappropriateness of these formulations in relation to poverty and malnutrition becomes evident from the measures that they led to. But what is immediately clear is they do

not sufficiently specify whose incomes, whose food supplies employment and nutrition are to be improved. In the event, the agricultural department conventionally asked "What can be grown?" and came out with a plan for increasing crop production and land yields rather than a programme for increasing the consumption and the labour productivity of the poor. Thus, there were schemes for vegetables, potatoes, passion fruit, hybrid-maize, coffee improvement, cattle ranching and the introduction of high yielding dairy cattle. All these could conceivably feature in a scheme to reduce poverty and malnutrition but in practice they were not designed to have this impact. Many of the schemes were explicitly designed in ways which biased the benefit towards larger farmers. The dairy scheme makes the point particularly well: it was for farmers of 4 acres or more, (less than half of registered holdings), and the milk was to be sold to well-fed urban consumers. Its implications for employment and displacement trends seemed adverse compared to previous or alternative land use. Thus a measure proposed to raise farmers incomes and food output, and to improve nutrition, could easily have aggravated malnutrition.

In India dairy schemes have made milk cattle available to the landless not to make it possible for them to drink milk but to make it possible for them to buy enough rice and dal.

I would argue generally that planning which was addressed to the reduction of malnutrition would produce very different plans from those which we are familiar. That they would also require the development of natural resources or crop production as now would be incidental. What would be different would be the nature of the benefits and who received them.

There will, of course, be other objectives of government in addition to the reduction of malnutrition and we shall discuss these shortly. But where objectives are formulated so that they relate to specific people they will need to be approached in a manner exactly analogous to that proposed for the approach to the reduction of malnutrition.

What then, precisely is special about the proposed approach? The difference is in the questions we address to ourselves in policy and programme formulation. We must start by recognizing the inadequacy of questions such as:

- "how can we raise agricultural production?"
- "how can we raise incomes, employment, grammes of protein or calories per caput?"

These may be appropriate questions reflecting a need to improve aggregate indices as a precondition of meeting true objectives. But they are inadequate if they fail to specify who it is that is intended to receive the increments: for we may discover that we answer the questions that were put, that we achieve our objectives as stated, but are unhappy with the result. We can certainly achieve increased average incomes together with increased poverty, increased food supplies with

increased malnutrition and even increased employment and increased average wages with increased numbers unable to subsist. Politics and government is about "who gets what and when?" And, if we fail to state this in formulating policy objectives, planning can hardly be guided by analysis.

It is important to note that this simple change in the approach to and specification of policy objectives has quite fundamental implications for both government and economics. Administratively, it is likely to require changes in the process and structure of decision-making. The disaggregation of objectives, and of the measures needed to pursue them, requires a major degree of administrative devolution. It requires that national planning and policy formulation should receive more impetus from below than it now does since national objectives will be seen as the reconciled sum of disaggregated, particular objectives with national programmes and policies - relating say, to prices, taxes, internal migration and trade policy - designed to promote, harmonize, reconcile and mediate local and group aspirations. This is the converse of seeking to express, adapt and interpret national objectives by national programmes modified and adapted to local situations.

Not surprisingly, historical experience of nation building has emphasised the strengthening of national, central, government and its control. It has also repeatedly concentrated scarce planning skills at the centre: not only to maintain control but also, supposedly, to maximize their pay-off.

I am arguing, however, that central government must be backed by, and effectively related to, strong local government. This poses enormous problems with respect to the role and power of local government in relation to the role and power of central ministries. These problems relate both to the devising of effective structures and processes and to negotiating the transition from existing to new structures - a transition which many will find reason to resist.

For planning and policy-making to become people-specific rather than sector-specific, officials from different ministries must together formulate overall programmes, directed at people-specific objectives, which define the executive roles of the ministries and departments as subordinate to overall objectives. This requires a shift of power from central ministries to local administrations and to field officers of the ministries. These, at least, are some hypotheses with respect to the process and structure of government decision-making that I should like to see more widely examined together with their implications for the role of the economist. But there are other overriding implications for economics which are, perhaps, more fitting for me to dwell on.

A major concern that the economist might properly have is the implication of measures to reduce malnutrition now for the prospects for consumption and malnutrition in the future.

He will wish to identify strategy choices in the patterns of nutrition and consumption through time. Let us consider the diagram. Here we are using the very aggregative concepts of whose inadequacy I warned above. However, inadequate they may be: useful they still are. This graph plots numbers malnourished against national income per head. H is intended broadly to depict what we know of historical experience with the path of this relationship (refs: Adelman and Morris, IBRD); O is the area in which the path originates and includes postulated situations in which malnutrition was absent; A is a notional current state in some particular area; F is a feared projection; P is a notional preferred path. Wisely, I have omitted to scale the axes or mark the paths with time scales. (Although for H time scales could be given corresponding to a fairly consistent historical experience.) Policymakers might properly be conscious of and concerned for the options depicted by these paths. It would seem to me to be part of the economist's function to define and to spell out in some greater detail the options faced. It is clearly important that the reduction of present malnutrition be undertaken in a way which does not aggravate future malnutrition. The cost of eating one's seed grain now is to have no grain in the future unless there is hope of a gift. But less extreme compromises may be presented between aggravating the numbers malnourished now and increasing the capacity to reduce malnutrition in the future, and the historical path may be preferred among those available. It is possible that no paths such as P exist or that when time scales are put on them they appear less attractive than H. For many areas,

however, the problem is to avoid F and we do not yet know if even H will be possible, in all situations. The consequences of development having occurred in many countries could conceivably be that it is impossibly difficult for all countries to 'get over the hump' by their own actions. However, I cannot dwell on this important speculation here.

There may be situations where productive occupation cannot be identified, or readily organized, for all in need, or where it necessarily requires capital - or even food for wages - in amounts which are not available, or where it necessarily involves injury to existing interests and is therefore opposed. In circumstances where internal solutions are available but unacceptable the economist-planner, and indeed the nutritionist also, has an essentially political role of sharpening commitment by clarifying alternatives, and the values implicit in alternative choices, by generating dialogue about these issues. Hirschman and Lindblom argue that it is by advocacy in relation to specific problems and objectives - in this case the reduction of malnutrition - that overall policy formulation can best be pursued for they doubt the feasibility of a comprehensive calculus, or of an adequate total systems view. They also argue for a sequential approach to policy decisions which adapts measures to changing perceptions of problems. This seems apposite with regard to food policy on which some comment is called for.

If we supposed that, within a country, there was a programme of action or development plan for each area, we might suppose also that these programmes would have implications for our expectations of national trends in food production, quantities sold on the market and retained by producers, quantities demanded for cash by consumers, and for the prices paid by consumers and paid to producers. In practice, our expectations might be subject to a good deal of error even when based on reasonable data and intensive analysis. But if expected trends seemed undesirable we should wish to amend area level programmes to bring them more into line with what we believed desirable. But this raises the question of what we mean by desirable. Clearly, the nature of the equilibrium of food supply and demand affects the attainment of nutrition and other objectives. We have argued that it is the productivity of the poorest which is most critical to malnutrition but we should qualify the statement by saying that it is their productivity in food terms that matters (i.e. how much food they can earn). This is governed, for wage earners, by food prices and hence by food supplies. Now it might seem that we should always wish to increase food supplies - but we have noted that some strategies for this might aggravate displacement so that, in principle, we may face the sort of choices depicted in the diagram: choices about which we are in practice seriously ignorant. Clearly we must search for output-raising technologies, and for programmes to promote these in ways which would channel their benefits to those deemed most in need.

This may involve separate but complementary programmes for production and distribution, though it cannot be assumed that there are complements and it seems unwise to gamble on their discovery. Thus in some degree strategies must be planned. But strategy might best evolve from continuous reappraisal by an ongoing food-policy-administration which, within a strategy framework, would engage in aspects of the day-to-day administration of food policy.

While we should rightly be concerned for trends in supplies we should also be particularly concerned for the day-to-day administration of food policy. Food supplies, and marketed surpluses especially, can fluctuate very considerably and at high cost to many sections of the community: producers and consumers, agriculture and industry. Fluctuations have implications for farm investments, for farm and non-farm employment, for trade and foreign exchange and for political stability. Price shifts may change the extent of malnutrition and its incidence and severity as between, say, urban and rural labourers. Not everyone benefits or suffers in the same way. Thus a food administration which concerns itself with containing fluctuations and, within the limits of what is feasible, with shifting the incidence of benefits and burdens to meet government's needs and short and long-term objectives, has high potential payoffs. It can be a liability, however, when inept in analysis and response, or a pawn in a political battle where short-term payoffs count regardless of the longer run.

It may sound unhelpful to advocate pragmatism, successive approximation by adaptive control, and the refinement of objectives as the implications of alternatives are analysed, but I consider it a constructive advocacy which needs to be contrasted with what now is commonly done. Where food planning is attempted the following approach is conventional.

1. Predict demand at some target date. Demand is not here conceived of as a schedule but as a quantity at some assumed price - often the current price. This is first calculated separately for each food item using some assumptions about population growth, income distribution and income elasticity of demand.
2. The resulting pattern is then analysed with the help of a nutritionist and adjusted to what is considered nutritionally desirable and dietetically feasible.
3. These figures then become food policy targets. Agricultural policy formulation then consists of identifying measures for accelerating projected food supply trends, where necessary, to meet these targets.

There are many variations on this basic theme especially with regard to the treatment of what we might call the 'demand gap'. Thus, in stage 2, predicted demand may be augmented by 'needs' not satisfied by market demand in arriving at production targets.

This approach sees both nutritional and other policy objectives in terms of creating supply rather than creating demand. I would argue that supply and demand must be seen together and that a better problem formulation is "how to create the 'right' pattern of demand while making supply consistent with it?"

This raises the whole question of how we determine the desired pattern of demand. What guidelines do we have for designing optimum amendments to the pattern of consumption? Unless he is sufficiently unconventional to believe that government has no role to play in intervening in the market directly or indirectly, the conventional western economists' answer is "we respond to consumers' signals by planning to achieve that increment to the supply of goods and services which maximizes consumers' net benefits". The idea of contemplating some socially desirable pattern of demand is abhorant. Thus, economists use market prices and cost benefit analysis but they will thereby appear to avoid making judgements about consumption and deal instead with production. Most economists nowadays accept the value of cost-benefit analysis. True, they will admit that its perfection as a policy tool depends on the satisfaction of some key assumptions which are in practice not satisfied but these imperfections are supposed to demote its status from oracle to guide rather than to invalidate in completely.

Let us now consider its application to the pursuit of nutritional objectives and with regard, explicitly, to nutrition intervention programmes - a scheme for the manufacture and distribution of weaning foods, for example, or, ideal for our purposes, a scheme to supplement intakes of vitamin A.

Planners seek criteria by which they can choose between alternative courses of action, and thus select that package of measures best calculated to advance national objectives. Ideally, planners might hope to have a consistent set of cost-benefit conventions which they could apply equally to nutrition intervention or other welfare programmes, and to capital investment projects, as reflecting a true test of the extent to which different measures would achieve national objectives. In practice, the conventions used in cost-benefit analysis do not allow of this. When applied to the appraisal of nutrition interventions the shortcomings of some cost-benefit analysis conventions are revealed most markedly.

Let us first examine what would constitute a satisfactory set of criteria and then note the extent to which cost-benefit approaches are less than satisfactory.

All cost-benefit analysis starts from an identification of the items of costs and benefits likely to be relevant in appraising a measure. The quantitative prediction of the magnitudes of each of these items is then necessary.

Further, in order that a balance sheet of costs and benefits may be prepared, and a value placed on the net benefit, the quantities predicted for each item have then to be valued in terms of a single numeraire - money. The ratio of benefits to costs is then used to rank measures which, in principle, should be adopted in descending order of this ratio to the limit of the availability of resources.

For procedures to be satisfactory they must (a) correctly identify all the consequences of a measure which, in the light of planning objectives, might be regarded as costs and benefits; (b) predict with acceptable accuracy the quantities of these costs and benefits; (c) properly reflect the social valuation to be accorded to them.

The quantitative prediction of costs and benefits poses problems where the margins of predictive accuracy do not allow the definitive ranking of projects. This may be a practical issue with regard to the differences in the consequential effects of different projects. Some projects may provide a major stimulus to economic activity quite apart from that generated directly in the initial plan. Road, railway or irrigation projects are particular classes of schemes which are likely to generate activities - and costs and benefits - beyond those directly implied by the initial construction activity or, in the case of irrigation, beyond the change in production activities resulting directly from the scheme. These higher order effects may be both significant in determining the net benefit of a project and subject to considerable errors in prediction.

But the major problems are those of valuation - the determination of the values to be assigned per unit to the components of cost and benefit - and these require special consideration.

The most simple assumption in use in cost-benefit analysis is that the maximization of aggregate production valued at market prices can be taken to be the objective of national policy.

Thus each proposed measure is evaluated by the net increment of value it adds to national output regardless of to whom the increment accrues. Implicitly, it is argued that, if the national cake is made bigger it can always be divided so that the distribution of benefits is acceptable. Not only is this true, however, but it means that C-B cannot be used to evaluate redistributive measures and, in practice, the approach leads to undesirable and critically inappropriate conclusions especially, as we shall see, when applied to nutrition projects. But let us first consider more general aspects of the problem of assigning values to costs and benefits.

The weakness implicit in the use of market prices, is the assumption that the distribution of income is satisfactory or, which comes to the same thing, that the value of a loaf of bread is the price paid by the purchaser. To accept this valuation is of course a denial of the proposition that it might be of even greater value if the loaf were consumed by somebody who could not afford to buy it and had less than enough to eat rather than by somebody who had sufficient.

The market does not distribute vitamin A to children who go blind for the lack of it. By the 'net value added' criteria a nation would not engage in such distribution, either, if it held to the 'net value added criteria' largely because the children concerned could not possibly become productive for another ten years and they would then mostly join the ranks of the unemployed. The value of vitamin A distribution when measured in terms of its impact on the present value of future net production might be small indeed. If such a conclusion does not accord with what we wish to see done we must question the assumptions of the argument. Thus, if we accept that our concern is with the pattern and level of consumption over time and between people, rather than with simply the aggregate of production regardless of by whom it is consumed, and if we wish therefore to assign different values to different items of consumption according to who consumes them, we cannot accept either actual market prices or even 'shadow prices' which seek to reflect what these might truly be if markets operated efficiently*.

* Hurwicz

One crude approach to a solution to this problem is to look at the incremental changes in income caused by a project.

This is more satisfactory than measuring changes in aggregate production but still does not fully measure changes in consumption and other benefits. However, it is possible to

weight increments of income according to whom they accrue, as Dasgupta, Sen and Marglin have proposed**(refs). Thus,

** Refs. Dasgupta, Sen, Marglin. Also Chenery et al. Comment.

giving extra weight to the increments of income accruing to the poorest in a way that expresses social objectives. Even so however, this approach would not be likely to result in the adoption of a scheme for vitamin A distribution. In this case, the present value of the likely increment of income accruing to poor families might still be small. The inclusion of the money value of the vitamin A would add very little to this so that an inordinately heavy weighting of increments to poor peoples' incomes would be necessary to make the net benefit of such a programme significant. In fact it would be precisely because the vitamin A was so cheap that, by this criteria, its use would be rejected.

This approach also leaves us with the problem of how to determine relevant weights for the positive and negative changes of income which ensue at different income levels. Economic science cannot provide a 'correct' or objective answer to this question though it might reveal the implications of alternative assumptions. Lacking such an answer, we might simply explore whether government is prepared to accept the implied cost of a particular proposal: the cost of the reduction of someone's consumption, now or in the future. But the relevant definition of 'consumption' will be wider than that used in economics. It will certainly need to include status and power.

The answer to the question "Are we willing to accept that some peoples' consumption should be reduced as a result of a measure in order that others' should be enhanced?" might depend on whether or not there were other measures to compensate those who lose. Acceptable plans are likely to comprise many measures. Some of these might pursue one objective at the expense of others, but together they may best advance the totality of objectives in the way desired. How much each measure can afford to neglect or even reduce the attainment of some objectives will depend on how well others advance them. Thus there are dangers in appraising measures separately and on the basis of fixed weights ascribed to particular objectives. In particular, we should note that, in a balanced programme of measures, the weights which reflect the marginal valuation of each of the objectives attained by the optimum package will be different from the marginal valuations implicit in the choice of each separate measure since the balance of the contribution of each measure to particular objectives will be different.

This observation in effect denies that cost-benefit analysis can ever be used to achieve consistency by applying constant weighting to different objectives in the evaluation of separate measures. What it can do, however, is to explore the implications of a set of assumption about the relative valuation of different benefits and clarify the cost implications of alternative choices which are broadly comparable in terms of who is affected.

It is possible that there might be no net cost to others in increasing the consumption of some. This idea offends the conventional wisdom the "there is no such thing as a free meal!" This dictum, however, assumes that all resource use involves a net cost or that more of one good, or consumption benefit, can only be attained at the cost of a reduction in another. In poor countries, especially, there are typically unused or underused resources. Increasing the demand for consumer goods does not necessarily imply a cost in the reduction of investment and thus of consumption in the future. Increasing demand may, indeed, induce additional investment especially where the demand is for goods which can be produced by many small producers, perhaps mobilizing small savings not otherwise available to government or to large-scale investors. Cost-benefit analysis tends to be weak in taking account of such effects as flow from the stimulation of economic activity. For programmes which aim to reduce poverty - and thus a major cause of malnutrition - it may be critically important to be able to measure not simply the direct effects but the overall pattern of income generation. But this may not be very usefully achieved in relation to specific programmes and our methods for exploring the effects of total plans, are, as yet, both too crude and too expensive.

The problems faced in the application of cost-benefit analysis to nutrition projects, and the reasons why pricing conventions, especially, might give wrong answers, are faced equally in application to other projects. Nutrition planners need not be dismayed that they cannot produce cost-benefit ratios

comparable with those for other projects. It may be that the ratios calculated for the other projects are wrong and do not correctly reflect national objectives. The relevant course of action therefore is to question the pricing assumptions which are being used for all evaluations.

What matters is that evaluation procedures should explore the implications of choice, including the implications for underlying values. If evaluations imply conclusions that policy makers are unhappy to accept, then procedures and values should be questioned. If nutrition improvement programmes are consistently rejected by cost-benefit criteria then there is a need to examine whether it is the demand for these programmes or the evaluation criteria which fail to reflect true objectives. What matters is that we should aim to be explicit about the values we are adopting and that we should make choices with adequate understanding of their true costs, and there is a range of problems in assessing 'true costs' which directly concern nutritionists.

While the attack on malnutrition must focus on making it possible for people to support themselves, there will be a need for a variety of applied nutrition programmes and nutrition/health programmes to respond to a range of circumstances. (These are discussed at some length in Joy and Payne; Food and Nutrition Planning, which also further discusses the role of the nutritionist).

There is need for a balance between applied nutrition programmes and more fundamental income-generating programmes and a need, too, to balance and integrate nutrition programmes and public health measures. In the design of such programmes, and in establishing criteria for determining priorities, the nutritionist has a key role to play.

First, and this is true overall, the nutritionist has a critical contribution in identifying nutritional need and in specifying the characteristics of groups in need. (A simple definition in terms of income level may be quite inadequate in spite of my earlier simplification of the problem. What it might mean, especially by way of descriptive studies, is discussed in detail in Joy and Payne). The nutritionist should also contribute to the establishment of priorities and to the ranking of needs - to the appraisal of the relative deprivation and disability of different types and degrees of malnutrition - on which this depends.

We need to know the relation between food intake and human functioning and we then need to appraise the individual and social costs of dysfunction. It would be impertinent of me to enlarge on these various points, not least because of the presence of my nutritionist colleague and chairwoman who has written on this subject (ref. 3 papers on Nutrition Planning). This line of thinking is significant for economists, however, for it suggests that we have turned welfare economics on its head for we are explicitly expressing increases in welfare

as reductions in deprivation. We are also comparing and making value judgements about different deprivations. We might reasonably ask whether there can be any increase in welfare which is not a reduction in deprivation. We might also ask whether policy should not be concerned to make the greatest net reduction in deprivation and whether practically this would mean reducing the most severe deprivations according to some explicit ranking of priorities. It clearly would not in all circumstances, but it would mean a very considerable restatement of policy objectives which are now couched in terms of increasing material welfare and total welfare at that. I believe that my line of thinking is convergent with that of Mishan as expressed for example, in his 'Costs of Economic Growth'.

Most of the severe deprivations are experienced by individuals and groups who are deprived not simply materially but also socially and politically. Thus, we are asking that government should not only counter market forces but that it should also counter the very social and political forces on which it depends for its support, unless, that is, it is a government depending on the support of the mass of the deprived. Governments sometimes are so dependent, at least in some degree, and they are then prepared to make, or perhaps they may be pressed into making, statements of policy objectives in terms of reducing deprivation to which, in some degree, they may become committed. Generally, however, such statements are, at best, appended to some expression of total growth objectives.

Other implications of thinking in terms of deprivation - as it were, of defining 'welfare' as '1 minus deprivation', - are that first, we need to find a basis for comparing and ranking different categories of deprivations, for example, for comparing physical dysfunction with illiteracy, or with status deprivation or political deprivation. Though here, again, the maxim 'concentrate on conspicuous problems' might serve us well, and a completely specified 'objective function' is likely to be as unnecessary as it is elusive. Second, we shall need to recognize that deprivations are interdependent in both cause and effect. (See Rodgers G.B.). Third, we shall need to recognize that, in some degree, the significance, or pain, of deprivation is socially determined. Even though we may interpret some situations as revealing adaptation to deprivation which is functional in its social context, we may judge it in ultimate human terms, to be undesirable.

So far, I have touched, no doubt too lightly, on a wide range of issues:

- I have argued for attacking malnutrition initially from demand rather than from supply;
- I have argued the need for disaggregating nutritional (and other) objectives and the identification of measures for pursuing them;
- I have argued for explicit value judgements involving interpersonal comparisons and explicit concern about who gets what, for consumption between people and over time rather than for the aggregate of production valued at market prices;

- I have argued that the output of a planning system is a function of its structure and process and that planning systems are commonly unable to take the approach to problem definition and to the identification of action relevant to an effective attack on malnutrition;
- I have argued that an attack on malnutrition may also be an attack on society as it is. This may be either against powerful elements in it or in terms of an undermining of those characteristics which give a unique identity to a society and to the individuals who belong to it.
- I have argued for a non-optimizing approach to policy-making, an approach which directs itself, sequentially, to particular conspicuous and worrying problems albeit seeing them within an overall systems, or general equilibrium, framework; and
- I have argued for identifying these problems in terms of deprivations and I have contrasted the policy objectives which emerge when we define the problems in this way, with more conventional statements of aggregate growth objectives which are inadequate, in any case, as a basis for planning.

I started, however, by castigating naive views of the causation and control of malnutrition and, given time, I would further castigate naive models for predicting its evolution. I should like now to turn to the subject of modelling and prediction and to consider the problems it poses in relation to, perhaps, one of the most complex of situations - an Indian village - incidentally touching on some of the similarities and some of the contrasts between particular African and Indian situations.

In the diagram I have tried to depict an Indian village as a system generating sub-subsistent households (to the right of the diagram). The village is set in an environment (distinguished by being more lightly drawn). If you were to make a census of an Indian village and to relate households to land holdings you would normally find a wide range of amounts of land per caput available to different households. Land would also be cultivated under different tenure arrangements and some families - maybe many - would command little or no land. The pattern and level of farm output and the pattern and intensity of use of inputs might also vary between farmers: some using purchased seed and fertilizers, pumped water and hired labour and others using little or nothing of these items. A transactions matrix of the village could be arranged into a pattern distinguishing groups of landlords and employers and others who were tenants and labourers. The pattern might not be simple, however, for there would be some who would own some land and rent other plots and still maybe work as labourers for others. Moreover, transactions would be varied and would relate to status:- status in caste and land particularly. Mostly, transactions would not be direct cash transactions but complex exchanges in fulfilment of rights or obligations to receive or give services, albeit for some direct element of payment. The terms of these transactions, the 'price', the degree of freedom to contract-in or contract-out and so on might vary considerably depending upon the relationship between the participants. Thus the pattern of farming and the pattern and level of output and its distribution between people would be governed by the interdependent relationships between people largely expressed through land.

This pattern would be under pressure for change. First, the relationship between households and land cultivation would be changing. Population growth, inheritance patterns, opportunities or pressures for sale and purchase, the need and opportunity to evict tenants and resume direct cultivation - these pressures would lead over time to changes in the distribution of household size against holding size and tenure status. Clearly, too, land legislation and the way it was implemented would also have its effect.

The changing pattern of size and tenure of holdings in relation to the command over other resources - by direct ownership or by service obligations from others - would affect the pattern of cultivation and yields. So also would changes in water control and irrigation investments, the availability of inputs especially fertilizers, seed and credit, (and different cultivators' access to them), the advent of new technologies, and changes in prices and markets.

Between them, these forces would largely determine what was produced and who received what. In addition we should, among other things, need to take account of weather as it affected decisions and their outcomes; the availability of non-farm employment, perhaps in rural works programmes (although, in the area of rural Bihar that I have in mind, 93% of the population is dependent on farming); health as it affected productivity and employment; and remittances to or from outside the village.

Together these forces would largely determine the net income distribution between households and thus the number of households whose incomes did not allow of an adequate subsistence. The point that needs to be made is that, while poverty of resources available to the community overall may constrain the potential numbers who could be supported adequately, first, this constraint is not usually effective; and, second, that malnutrition may be extensive even where there is a considerable 'marketed surplus' sold out of the village. In determining both the extent to which natural resources are developed, and the way in which the product is distributed, the pattern of social organization, especially the organization of productive resources, is critical.

Global simulation models do not attempt to model social organization and this is hardly surprising (Ref. Forrester, Meadows, Mescarovic, DES, Clark, Clark & Cole, Aluwahlia). But, because they do not, they fail to grasp the heart of the problem. Sadly, so also do many economic analyses, for example, Raj Krishna's analysis of the impact of new technologies which calculates implied changes in total labour requirements given alternative assumptions about the level of output. This sort of calculation seems conspicuously to miss the point when applied to India when what matters is the effect on the pattern of transactions modes and who gets the work. As we have seen, technological innovations are likely, to have a wide indirect effect on the pattern of transactions

overall, not simply in the sense of repercussions analysable in conventional input-output models but in the sense of repercussions on the network of rights and obligations and on the overall pattern of transactions modes. Together with population pressure and inflation, technical change is likely to accelerate the monetization of wage employment and the erosion of social security for the poor, and erstwhile tied, landless labourer.

It would seem not unreasonable to expect to be able to develop and quantify such a model as I have depicted. Its value would be less in the numerical predictions that it produced than in improving understanding about the factors that critically govern the number of sub-subsistent households. It would seem practical to model demographic structure in relation to holdings and farming systems also. More complex would be the modelling of transactions modes. Here we see how critically economic and social factors are interlinked and mutually determinant. When we are studying the dynamics of change, the interaction of these factors must be explicitly modelled; economists and social anthropologists cannot afford each to keep to themselves. (See Joy (Kasi/Dhanbad & ASA) & Biggs & Burns).

There is a further element of displacement that deserves attention. Epstein, particularly, has drawn attention to the way in which families share their misfortunes. Such behaviour would keep many families afloat while there are some earnings to be spread among them. Repudiation of family ties could be a disaster and any general breakdown of this pattern

could be critical to the manifestation of large scale chronic malnutrition. If there were time it would be interesting to appraise Indian policy measures in the light of this analysis. But there is not. I should like therefore to return to my initial proposition that the core of the problem of malnutrition is to be seen as the problem of displacement and the failure of the growth of alternative productive earning opportunities. If we are to predict changes in the extent of malnutrition we must predict the extent of this displacement. Neither simple extrapolations and regressions nor complex simulations offer a clear prospect of good predictions though the latter might help us get a feel of the processes at work and an understanding of the extent and nature of the measures required to have an impact on the problem. More understanding might be gained from micro modelling of the sort that I have depicted than from global aggregative models though there is everything to be gained by complementary modelling at several levels of aggregation.

Let me try to tie some ends together.

First, many, perhaps most, government policy objectives are best formulated in people-specific terms. Certainly, with nutrition policy it is important to define policy in terms of target groups (that is groups relatively homogenous with respect to the effects of particular policies and the problem that the policies are intended to relieve).

N.B. Vulnerable groups are not well specified by these criteria.

Second, such an approach requires appraisal of the specific situations of the people concerned and of specific measures addressed to them. (The nutritionist has an important contribution to qualitative studies here which I have not had time to discuss).

Third, this appraisal needs to be not simply of the present situation but also of the way that it is evolving. Such a dynamic appraisal should be aimed at understanding the forces for change and thence at identifying measures to control these forces or their impact.

Fourth, strategies should be evolved from consideration of alternative mixtures of measures which compromise conflicting objectives and, especially, aggregative, distributive and inter-temporal aspects of objectives.

Fifth, model building can give useful insights into particular situations. (Though I would add that there might be rapidly diminishing return to quantification to sophistication and to replication. Also, models have to be of the right sort).

Sixth, even when we are fairly confident in our strategies and plans we shall need to take an 'adaptive control' view of policy-making. This is particularly so with food policy. Generally, policy to relieve malnutrition should concentrate on making the poor productive: i.e. reducing net displacement. This will mean seeking ways of increasing food production which make the rural poor productive but being prepared to compromise where rising food prices inhibit both asset creation for the poor, income transfers to the poor and investments generally in social infrastructures and private capital.

Seventh, do not waste too much time on cost-benefit analysis but do use it to advance the dialogue on objectives if this seems necessary. Spend time instead on identifying and designing relevant measures, on securing feedback on their operation and impact and an adaptive control.

Eighth, nutritionists have a major role to play in all this;

- in identifying the nature and existence of nutrition problems and the groups that they afflict;
- in defining the significance of different forms and degrees of nutritional deprivation;
- in the identification and design of programmes intended to affect nutrition and health status directly.

Ninth, the role defined for economists implies some change in professional stance;

- towards a more behavioural and systems oriented view, which is interdisciplinary, concrete and specific (as well as abstract and general), non-optimizing, value-explicit, deprivation-oriented, people-specific, concerned for social and organizational dimensions of economic and technological change, concerned for the economist's role in articulating objectives and improving decision making and in modifying government structures and processes for this purpose.

Disciplines develop by meeting the challenge of unanswered questions. These questions come both from within disciplines and from outside them. The outside challenge of the existence of malnutrition, concern for its growth, and concern to eliminate it, poses a whole series of challenges to nutritionists, economists and governments. Let us hope that these challenges will be faced and that not only will we improve our response to malnutrition - or, I would prefer to say, the malnourished - but that we will also thereby improve our capacity for defining and tackling other problems, and, indeed, for getting our values right about the problems that need to be tackled.