Poverty and Famines

An Essay on Entitlement and Deprivation

AMARTYA SEN

OXFORD
UNIVERSITY PRESS

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Great Clarendon Street, Oxford OX2 6DP

Oxford University Press is a department of the University of Oxford.

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Oxford New York
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in the UK and in certain other countries
Published in the United States
by Oxford University Press Inc., New York

First published 1981

First issued as a paperback 1982

British Library Cataloguing in Publication Data

Sen, Amartya

Poverty and famines.

1. Famines

I. Title

363.8 HC79.F3 80-42191

ISBN 0-19-828463-2

9 10

Printed and bound in
Great Britain by Biddles Ltd,
Guildford and King's Lynn

To Amiya Dasgupta
who introduced me to economics
and taught me what it is about

Preface

Much about poverty is obvious enough. One does not need elaborate criteria, cunning measurement, or probing analysis, to recognize raw poverty and to understand its antecedents. It would be natural to be impatient with long-winded academic studies on 'poor naked wretches' with 'houseless heads and unfed sides' and 'loop'd and windowed raggedness', to use King Lear's graphic description. And furthermore it may also be the case, as Lear told the blind Gloucester, that 'a man may see how this world goes with no eyes'. There is indeed much that is transparent about poverty and misery.

But not everything about poverty is quite so simple. Even the identification of the poor and the diagnosis of poverty may be far from obvious when we move away from extreme and raw poverty. Different approaches can be used (e.g. biological inadequacy, relative deprivation), and there are technical issues to be resolved within each approach. Furthermore, to construct an overall picture of poverty, it is necessary to go well beyond identifying the poor. To provide an aggregate profile based on the characteristics of those who are identified as poor, problems of aggregation have to be squarely faced. Finally -- and most importantly -- the *causation* of poverty raises questions that are not easily answered. While the 'immediate' antecedents of poverty may be too obvious to need much analysis, and the 'ultimate' causation too vague and open-ended a question to be settled fully, there are various intermediate levels of useful answers that are worth exploring. The problem is of particular relevance in the context of recent discussions on the causation of hunger and starvation.

This monograph is concerned with these questions. The main focus of this work is on the causation of starvation in general and of famines in particular. The basic approach, which involves analysing 'entitlement systems', is introduced in general terms in Chapter 1. This is done even before the concepts of poverty are examined in any detail, because that is where the thrust of this monograph lies. In Chapters 2 and 3 problems of conceptualization and measurement of poverty are examined. The specific

problem of starvation is taken up in very general terms in Chapter 4, and the 'entitlement approach' is analysed in Chapter 5. This is followed by case studies of famines from different parts of the world: the Great Bengal Famine of 1943 (Chapter 6), the Ethiopian famines of 1973-75 (Chapter 7), famines in the Sahel region of Africa during the early 1970s (Chapter 8), and the Bangladesh famine of 1974 (Chapter 9). In Chapter 10 the entitlement approach is consolidated, taking up general issues of deprivation related to entitlement systems.

There are four technical appendices. Appendix A presents a formal analysis of the notion of exchange entitlement -- an important aspect of entitlement systems. The relevance of failures of exchange entitlement for the development of famine situations is brought out in Appendix B in terms of some illustrative models. Appendix C provides an examination of the problem of poverty measurement, including a scrutiny of various measures that have been used or proposed. Finally, the pattern of famine mortality is discussed in Appendix D based on a case study of the Bengal famine of 1943.

This work has been prepared for the World Employment Programme of ILO. I am grateful for, among other things, their extraordinary patience; the work took a good deal longer than they -- and for that matter I -- imagined it would. I am also most grateful for helpful discussions with Felix Paukert and others involved in the Income Distribution and Employment

Programme. I have also benefited greatly from detailed comments of Judith Heyer and Jocelyn Kynch on an earlier draft of this manuscript. For useful suggestions and advice, I am also grateful to Mohiuddin Alamgir, Sudhir Anand, Asit Bhattacharya, Robert Cassen, Dipankar Chatterjee, Pramit Chaudhuri, Amiya Dasgupta, Meghnad Desai, John Flemming, Madangopal Ghosh, David Glass, Ruth Glass, Terence Gorman, Keith Griffin, Carl Hamilton, Roger Hay, Julius Holt, Leif Johansen, J. Krishnamurti, Mukul Majumdar, Ashok Mitra, John Muellbauer, Suzy Paine, Debidas Ray, Debraj Ray, Samir Ray, Tapan Raychaudhuri, Carl Riskin, Joan Robinson, Suman Sarkar, John Seaman, Rehman Sobhan, K. Sundaram, Jaroslav Vanek and Henry Wan, among others.

I have drawn on my earlier writings, including articles

published in *Economic and Political Weekly* (1973, 1976), *Econometrica* (1976, 1977), *Review of Economic Studies* (1976), *Cambridge Journal of Economics* (1977), *Scandinavian Journal of Economics* (1979), *Journal of Economic Literature* (1979), *World Development* (1980), and *Quarterly Journal of Economics* (1981).

Finally, a remark on presentation. While some mathematical concepts and notation have been used in Appendices A-C, the text of the monograph is almost entirely informal. Someone concerned with the detailed structures would have to consult the Appendices, but there should be no difficulty in following the main lines of the argument (including the case studies) without reference to them. I have tried to make the book accessible to as wide an audience as possible, since the subject matter of this work is important. I am also immodest enough to believe that the analysis presented in this monograph has a certain amount of relevance to matters of practical concern.

A. K. S.

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Chapter 1

Poverty and Entitlements

1.1
ENTITLEMENTS AND OWNERSHIP

Starvation is the characteristic of some people not *having* enough food to eat. It is not the of there *being* not enough food to eat. While the latter can be a cause of the former, it is but one of many *possible* causes. Whether and how starvation relates to food supply is a matter for factual investigation.

Food supply statements say things about a commodity (or a group of commodities) considered on its own. Starvation statements are about the *relationship* of persons to the commodity (or that commodity group). [1] Leaving out cases in which a person may deliberately starve, starvation statements translate readily into statements of ownership of food by persons. In order to understand starvation, it is, therefore, necessary to go into the structure of ownership.

Ownership relations are one kind of *entitlement* relations. It is necessary to understand the entitlement systems within which the problem of starvation is to be analysed. [2] This applies *more generally* to poverty as such, and *more specifically* to famines as well.

An entitlement relation applied to ownership connects one set of ownerships to another through certain rules of legitimacy. It is a recursive relation and the process of connecting can be repeated. Consider a private ownership market economy. I own this loaf of bread. Why is this ownership accepted? Because I got it by exchange through paying some money I owned. Why is my ownership of that money accepted? Because I got it by selling a bamboo umbrella owned by me. Why is my ownership of the bamboo umbrella accepted? Because I made it with my own

[1] The contrast between commodities on the one hand and the relationship of commodities to persons on the other is central also to many other economic exercises. The evaluation of real national income is an important example, and for a departure from the traditional approaches to national income to a relationship-based evaluation in the light of this distinction, see Sen (1976b, 1979a).

[2] The 'entitlement approach' to starvation analysis was presented in Sen (1976c, 1977b), and is developed and extended in Chapter 5 and Appendix A, and applied to case studies in Chapters 6-9 below.

labour using some bamboo from my land. Why is my ownership of the land accepted? Because I inherited it from my father. Why is his ownership of that land accepted? And so on. Each link in this chain of entitlement relations 'legitimizes' one set of ownership by reference to another, or to some basic entitlement in the form of enjoying the fruits of one's own labour. [3] Entitlement relations accepted in a private ownership market economy typically include the following, among others:

1. **trade-based entitlement:** one is entitled to own what one obtains by trading something one owns with a willing party (or, multilaterally, with a willing set of parties);
2. **production-based entitlement:** one is entitled to own what one gets by arranging production using one's owned resources, or resources hired from willing parties meeting the agreed conditions of trade;
3. **own-labour entitlement:** one is entitled to one's own labour power, and thus to the trade-based and production-based entitlements related to one's labour power;
4. **inheritance and transfer entitlement:** one is entitled to own what is willingly given to one by another who legitimately owns it, possibly to take affect after the latter's death (if so specified by him).

These are some entitlement relations of more or less straightforward kind, but there are others, frequently a good deal more complex. For example, one may be entitled to enjoy the fruits of some property without being able to trade it for anything else. Or one may be able to inherit the property of a deceased relation who did not bequeath it to anyone, through some rule of kinship-based inheritance accepted in the country in question. Or one may have some entitlements related to unclaimed objects on the basis of discovery. Market entitlements may even be supplemented by rationing or coupon systems, even in private ownership market economies, such as in Britain during the last war. [4]

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[3] The interpretation of entitlement relations here is descriptive rather than prescriptive. In contrast, Robert Nozick's (1974) well-known exploration of 'the entitlement theory' of justice is prescriptive, discussing private property rights and other native terms. The two exercises are thus differently motivated, and must not be confused with each other.

[4] This may or may not be combined with price 'control', and that in its turn, may or may not be combined with a flourishing 'black market'; see Dasgupta (1950) for an illuminating analysis of black market prices.

The scope of ownership relations can vary greatly with economic systems. A socialist economy may not permit private ownership of 'means of production', thereby rendering 'production-based entitlements' inoperative except when it involves just one's own labour and some elementary tools and raw materials. A capitalist economy will not only *permit* the private ownership of means of production; that is indeed one of its main *foundations.* On the other hand, a capitalist economy -- like a socialist one -- will not permit ownership of one human being by another, as a slave economy will. A socialist economy may

restrict the employment of one person by another for production purposes, i.e. constrain the possibility of private trading of labour power for productive use. A capitalist economy will not, of course, do this, but may impose restrictions on binding contracts involving labour-power obligations over long periods of time. This, however, is the standard system under some feudal practices involving bonded labour, and also in some cases of colonial plantations.

1.2
EXCHANGE ENTITLEMENT

In a market economy, a person can exchange what he owns for another collection of commodities. He can do this exchange either through trading, or through production, or through a combination of the two. The set of all the alternative bundles of commodities that he can acquire in exchange for what he owns may be called the 'exchange entitlement' of what he owns.

The 'exchange entitlement mapping' is the relation that specifies the set of exchange entitlements for each ownership bundle. This relation -- E-mapping for brevity -- defines the possibilities that would be open to him corresponding to each ownership situation. A person will be exposed to starvation if, for the ownership that he actually has, the exchange entitlement set does not contain any feasible bundle including enough food. Given the E-mapping, it is in this way possible to identify those ownership bundles -- call them collectively the starvation set -- that must, thus, lead to starvation in the absence of non-entitlement transfers (e.g. charity). E-mappings, starvation sets, and related concepts are discussed in Chapter 5 and are formally analysed in Appendix A, and here we are concerned only with the underlying ideas.

Among the influences that determine a person's exchange

entitlement, given his ownership bundle (including labour power), are the following:

1. whether he can find an employment, and if so for how long and at what wage rate;
2. what he can earn by selling his non-labour assets, and how much it costs him to buy whatever he may wish to buy;
3. what he can produce with his own labour power and resources (or resource services) he can buy and manage;
4. the cost of purchasing resources (or resource services) and the value of the products he can sell;
5. the social security benefits he is entitled to and the taxes, etc., he must pay.

A person's ability to avoid starvation will depend both on his ownership and on the exchange entitlement mapping that he faces. A general decline in food supply may indeed cause him to

be exposed to hunger through a rise in food prices with an unfavourable impact on his exchange entitlement. Even when his starvation is *caused* by food shortage in this way, his immediate reason for starvation will be the decline in his exchange entitlement.

More importantly, his exchange entitlement may worsen for reasons other than a general decline of food supply. For example, given the same total food supply, other groups' becoming richer and buying more food can lead to a rise in food prices, causing a worsening of exchange entitlement. Or some economic change may affect his employment possibilities, leading also to worse exchange entitlement. Similarly, his wages can fall behind prices. Or the price of necessary resources for the production he engages in can go up relatively. These diverse influences on exchange entitlements are as relevant as the overall volume of food supply vis-à-vis population.

1.3
MODES OF PRODUCTION

The exchange entitlements faced by a person depend, naturally, on his position in the economic class structure as well as the modes of production in the economy. What he owns will vary with his class, and even if exactly the same E-mapping were to hold for all, the actual exchange entitlements would differ with his ownership position.

But even with the same ownership position, the exchange

entitlements will be different depending on what economic prospects are open to him, and that will depend on the modes of production and his position in terms of production relations. [5] For example, while a peasant differs from a landless labourer in terms of ownership (since he owns land, which the labourer does not), the landless share-cropper differs from the landless labourer not in their respective ownerships, but in the way they can use the only resource they own, viz. labour power. The landless labourer will be employed in exchange for a wage, while the share-cropper will do the cultivation and own a part of the *product.*

This difference can lead not merely to contrasts of the levels of typical remuneration of the two, which may or may not be very divergent, but also to sharp differences in exchange entitlements in distress situations. For example, a cyclone reducing the labour requirement for cultivation by destroying a part of the crop in each farm may cause some casual agricultural labourers to be simply fired, leading to a collapse of their exchange entitlements, while others are retained. In contrast, in this case the share-croppers may all operate with a lower labour input and lower entitlement, but no one may become fully jobless and thus incomeless.

Similarly, if the output is food, e.g. rice or wheat, the share-cropper gets his return in a form such that he can directly eat it without going through the vagaries of the market. In contrast, the agricultural labourer paid in money terms will have to depend on the exchange entitlement of his money wage. When famines are accompanied by sharp changes in relative prices -- and in particular a sharp rise in food prices -- there is much comparative merit in being a share-cropper rather than an agricultural labourer, especially when the capital market is highly imperfect. The greater production risk of the share-cropper compared with the security of a fixed wage on the part of the agricultural labourer has been well analysed (see, for example, Stiglitz, 1974); but a fixed money wage may offer no security at all in a situation of sharply varying food prices (even when employment is guaranteed). In contrast, a share of the food output does have some security advantage in terms of exchange entitlement.

[5]See Marx (1857-8, 1867) for the classic treatment of modes of production and their relevance to production and distribution.

Similarly, those who sell services (e.g. barbers or rickshaw-pullers) or handicraft products (e.g. weavers or shoemakers) are -- like wage labourers -- more exposed, in this respect, to famines involving unexpected rises of food prices than are peasants or share-croppers producing food crops. This is the case even when the *typical* standard of living of the latter is no higher than that of the former.

In understanding general poverty, or regular starvation, or outbursts of famines, it is necessary to look at both ownership patterns and exchange entitlements, and at the forces that lie behind them. This requires careful consideration of the nature of modes of production and the structure of economic classes as well as their interrelations. Later in the monograph, when actual famines are analysed, these issues will emerge more concretely.

1.4
SOCIAL SECURITY AND EMPLOYMENT ENTITLEMENTS

The exchange entitlements depend not merely. on market exchanges but also on those exchanges, if any, that the state provides as a part of its social security programme. Given a social security system, an unemployed person may get 'relief', an old person a pension, and the poor some specified 'benefits'. These affect the commodity bundles over which a person can have command. They are parts of a person's exchange entitlements, and are conditional on the absence of other exchanges that a person might undertake. For example, a person is not entitled to unemployment benefit if he exchanges his labour power for a

wage, i.e. becomes employed. Similarly, exchanges that make a person go above the specified poverty norm will make him ineligible for receiving the appropriate relief. These social security provisions are essentially supplementations of the processes of market exchange and production, and the two types of opportunities together determine a person's exchange entitlements in a private ownership market economy with social security provisions.

The social security arrangements are particularly important in the context of starvation. The reason why there are no famines in the rich developed countries is not because people are generally rich on the average. Rich they certainly are when they have jobs and earn a proper wage; but for large numbers of people this condition fails to hold for long periods of time, and the exchange

entitlements of their endowments in the absence of social security arrangements could provide very meagre commodity bundles indeed. With the proportion of unemployment as high as it is, say, in Britain or America today, but for the social security arrangements there would be widespread starvation and possibly a famine. What prevents that is not the high average income or wealth of the British or the general opulence of the Americans, but the guaranteed minimum values of exchange entitlements owing to the social security system.

Similarly, the elimination of starvation in socialist economies -- for example in China -- seems to have taken place even without a dramatic rise in food availability per head, and indeed, typically the former has *preceded* the latter. The end of starvation reflects a shift in the entitlement system, both in the form of social security and -- more importantly -- through systems of guaranteed employment at wages that provide exchange entitlement adequate to avoid starvation.

1.5
FOOD SUPPLY AND STARVATION

There has been a good deal of discussion recently about the prospect of food supply falling significantly behind the world population. There is, however, little empirical support for such a diagnosis of recent trends. Indeed, for most areas in the world -- with the exception of parts of Africa -- the increase in food supply has been comparable to, or faster than, the expansion of population. [6] But this does not indicate that starvation is being systematically eliminated, since starvation -- as discussed -- is a function of entitlements and not of food availability as such. Indeed, some of the worst famines have taken place with no significant decline in food availability per head (see Chapters 6, 7, and 9).

To say that starvation depends 'not merely' on food supply but also on its 'distribution' would be correct enough, though not remarkably helpful. The important question then would be: what determines distribution of food between different sections of the community? The entitlement approach directs one to questions dealing with ownership patterns and -- less obviously

[6]See Aziz (1975), Sinha (1976a, 1976b, 1977), Sinha and Gordon Drabek (1978), Interfutures (1979), and also the FAO *Production Yearbooks* and FAO *Monthly Bulletins* (e.g., vol. 3, No. 4, 1980, pp. 15-16). See also chapters 5 and 10 below.

but no less importantly -- to the various influences that affect exchange entitlement mappings (see Appendices A and B, and Chapters 5-10). In so far as food supply itself has any influence on the prevalence of starvation, that influence is seen as working *through* the entitlement relations. If one person in eight starves regularly in the world, [7] this is seen as the result of his inability to establish entitlement to enough food; the question of the physical availability of the food is not directly involved.

The approach of entitlements used in this work is very general and -- I would argue -- quite inescapable in analysing starvation and poverty. If, nevertheless, it appears odd and unusual, this can be because of the hold of the tradition of thinking in terms of what *exists* rather than in terms of who can *command* what. The mesmerizing simplicity of focusing on the ratio of food to population has persistently played an obscuring role over centuries, and continues to plague policy discussions today much as it has deranged anti-famine policies in the past. [8]

[7]See Aziz (1975), pp.108 and 123.
[8]See Chapters 6, 7, 9 and 10.

Chapter 2

Concepts of Poverty

2.1 REQUIREMENTS OF A CONCEPT OF POVERTY

On his deathbed in Calcutta, J. B. S. Haldane wrote a poem called 'Cancer's a funny thing'. [1] Poverty is no less funny. Consider the following view of poverty:

People must not be allowed to become so poor that they offend or are hurtful to society. It is not so much the misery and plight of the poor but the discomfort and cost to the community which is crucial to this view of poverty. We have a problem of poverty to the extent that low income creates problems for those who are not poor. [2]

To live in poverty may be sad, but to 'offend or [be] hurtful to society', creating 'problems for those who are not poor' is, it would appear, the real tragedy. It isn't easy to push much further the reduction of human beings into 'means'.

The first requirement of the concept of poverty is of a criterion as to *who* should be the focus of our concern. The specification of certain 'consumption norms', or of a 'poverty line', may do part of the job: 'the poor' are those people whose consumption standards fall short of the norms, or whose incomes lie below that line. But this leads to a further question: is the concept of poverty to be related to the interests of. (1) only the poor, (2) only the non-poor, or (3) both the poor and the non-poor?

It seems a bit grotesque to hold that the concept of poverty should be concerned only with the non-poor, and I take the liberty of dropping (2) -- and the 'view' quoted in the first paragraph -- without further ado. Alternative (3) might, however, appear to be appealing, since it is broad-based and unrestrictive. There is little doubt that the penury of the poor does, in fact, affect the well-being of the rich. The real question is whether such effects should enter into the concept of poverty as

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[1] *Oxford Book of 20th Century English Verse*, ed. P. Larkin, Oxford, 1973, p. 271.

[2] Rein (1971), p. 46. I hasten to add that here Professor Rein is describing one of the *three* 'broad concepts' of poverty, viz. (1) 'subsistence', (2) 'inequality', and (3) 'externality'; the view quoted corresponds to 'externality'.

such, or whether they should figure under the possible *effects* of poverty. I believe a good case can be made for choosing the latter alternative, since in an obvious sense poverty must be a characteristic of the poor rather than of the non-poor. One can, for instance, argue that, if one considers a case of reduction of real income and increase in the suffering of all the poor, it *must* be described as an increase of poverty, no matter whether this change is accompanied by a reduction in the adverse effects on the rich (e.g. whether the rich are less 'offended' by the sight of penury).

This conception of poverty based on (1) does not, of course, imply any denial of the fact that the suffering of the poor themselves may depend on the condition of the non-poor. It merely asserts that the focus of the concept of poverty has to be on the well-being of the poor as such, no matter what influences affect their well-being. *Causation* of poverty and *effects* of poverty will be important issues to study on their own rights, and the conceptualization of poverty in terms of the conditions only of the poor does not affect the worthwhileness of studying these questions. Indeed, there will be much to say on these questions later on in the book.

It is perhaps worth mentioning in this context that in some discussions one is concerned not with the prevalence of poverty in a country in the form of the suffering of the *poor,* but with the

relative opulence of the nation *as a whole.* [3] In those discussions it will, of course, be entirely legitimate to be concerned with the well-being of all the people in the nation, and the description of a nation as 'poor' must obviously relate to such a broader concept. These are *different* exercises, and so long as this fact is clearly recognized there need not be any confusion.

Even after we have identified the poor and specified that the concept of poverty is concerned with the conditions of the poor, much remains to be done. There is the problem of aggregation - often important -- over the group of the poor, and this involves moving from the description of the poor to some over-all measure of 'poverty' as such. In some traditions, this is done very simply by just counting the number of the poor, and then expressing poverty as the ratio of the number of the poor to the total number of people in the community in question.

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[3]See, for example, Paul Streeten, "How Poor Are the Poor Countries and Why?" in

This 'head-count measure' -- *H* for short -- has at least two serious drawbacks. First, *H* takes no account of the *extent* of the short-fall of incomes of the poor from the 'poverty line': a reduction in the incomes of all the poor without affecting the incomes of the rich will leave this head count measure completely unchanged. Second, it is insensitive to the distribution of income among the poor; in particular, no transfer of income from a poor person to one who is richer can increase this head count measure. Both these defects make the measure *H,* which is by far the most widely used measure, quite unacceptable as an indicator of poverty, and the conception of poverty that lies implicit in it seems eminently questionable.

In this chapter I am not concerned with problems of measurement as such, which will be taken up in the next two chapters and in Appendix C. But behind each measure lies an analytical concept, and here I am concerned with the general ideas on the conception of poverty. If the preceding argument is right, then the requirements of a concept of poverty must include two distinct -- but not unrelated -- exercises, namely (1) a method of identifying a group of people as poor ('identification'); and (2) a method of aggregating the characteristics of the set of poor people into an over-all image of poverty ('aggregation'). Both these exercises will be performed in the next two chapters, but before that we need to study the kinds of considerations that may be used in choosing the operations (both identification and aggregation). The rest of the chapter will be concerned with these issues.

The underlying considerations come out most sharply in the alternative approaches to the concept of poverty that one can find in the literature. Some of these approaches have been subjected to severe attacks recently, while others have not been examined sufficiently critically. In attempting an evaluation of

these approaches in the following sections, I shall try to assess the approaches as well as their respective critiques.

2.2
THE BIOLOGICAL APPROACH

In his famous study of poverty in York, Seebohm Rowntree (1901) defined families as being in 'primary poverty' if their 'total earnings are insufficient to obtain the minimum necessities for the maintenance of merely physical efficiency'. It is not surprising that biological considerations related to the requirements of

survival or work efficiency have been often used in defining the poverty line. Starvation, clearly, is the most telling aspect of poverty.

The biological approach has come under rather intense fire recently. [4] There are indeed several problems with its use. First, there are significant variations related to physical features, climatic conditions and work habits. [5] In fact, even for a specific group in a specific region, nutritional requirements are difficult to define precisely. People have been known to survive with incredibly little nutrition, and there seems to be a cumulative improvement of life expectation as the dietary limits are raised. In fact, physical opulence seems to go on increasing with nutrition over a very wide range; Americans, Europeans and Japanese have been growing measurably in stature as their diets have continued to improve. There is difficulty in drawing a line somewhere, and the so-called 'minimum nutritional requirements' have an inherent arbitrariness that goes well beyond variations between groups and regions.

Second, the translation of minimum *nutritional* requirements into minimum *food* requirements depends on the choice of commodities. While it may be easy to solve the programming exercise of a 'diet problem', choosing a minimum cost diet for meeting specified nutritional requirements from food items sold at specified costs, the relevance of such a minimum cost diet is not clear. Typically, it turns out to be very low-cost indeed, [6] but monumentally boring, and people's food habits are not, in fact, determined by such a cost minimization exercise. The actual incomes at which specified nutritional requirements are met will depend greatly on the consumption habits of the people in question.

Third, for non-food items such minimum requirements are not easy to specify, and the problem is usually solved by assuming that a specified proportion of total income will be spent on food. With this assumption, the minimum food costs can be used to derive minimum income requirements. But the proportion spent on food varies not merely with habits and culture, but also with relative prices and availability of goods and services. It is not

[4]See, for example, Townsend (1971, 1974) and Rein (1971).
[5]See Rein (1971), Townsend (1974), Sukhatme (1977, 1978), and Srinivasan (1977a, 1979).
[6]See, for example, Stigler's (1945) astonishing estimates of 'the cost of subsistence'. See also Rajaraman (1974).

surprising that the assumptions made often turn out to be contradicted by actual experience; for example, Lord Beveridge's estimate of subsistence requirements of income during the Second World War proved to be far from correct, since the British were spending a much lower proportion of their income on food than was assumed (see Townsend, 1974, p. 17).

In view of these problems, one may well agree with Martin Rein's (1971) assertion that 'almost every procedure in the subsistence-level definition of poverty can be reasonably challenged' (p. 61). But the question that does remain is this: after we have challenged every one of the procedures used under the biological approach, what do we do *then?* Do we simply ignore that approach, [7] or do we examine whether something remains in it to be salvaged? I would argue that there does remain something.

First, while the concept of nutritional requirements is a rather loose one, there is no particular reason to suppose that the concept of poverty must itself be clear-cut and sharp. In fact, a certain amount of vagueness is implicit in both the concepts, and the really interesting question is the extent to which the areas of vagueness of the two notions, as commonly interpreted, tend to coincide. The issue, thus, is not whether nutritional standards are vague, but whether the vagueness is of the required kind.

Second, to check whether someone is getting a specified bundle of nutrition, one need not necessarily go through the procedure of examining whether that person has the income level that would generate that bundle. One can simply examine whether the person is, in fact, meeting that nutritional requirement or not. Even in poor countries, direct nutritional information of this type can be collected through sample surveys of consumption bundles and can be extensively analysed (see, for example, Srinivasan and Bardhan, 1974, especially the paper by Chatterjee, Sarkar and Paul, and Panikar*et al.,* 1975); and the 'identification' exercise under the nutritional approach need not go through the intermediary of income at all.

[7]Much depends on what the alternatives are. Rein (1971) himself recommends that 'other' conceptions 'deserve more attention and developments' (p. 62). Since 'subsistence' is one of his three 'broad concepts' of poverty, we are left with 'externality' and 'inequality'. Inequality -- though related to poverty in terms of both causation and evaluation -- is, however, a *distinct* issue from poverty, as will be presently argued (see Section 2.3). 'Externality', in terms of the effects of poverty on the *non-poor,* is an approach
that we have already discussed (in Section 2.1), critically.

Third, even when we do go through the intermediary of income, the translation of a set of nutritional norms (or of alternative sets of such norms) into a 'poverty line' income (or poverty-line *incomes*) may be substantially simplified by the wide prevalence of particular patterns of consumption behaviour in the community in question. Proximity of *actual* habits and behaviour makes it possible to derive income levels at which the nutritional norms will be 'typically' met. (This question is discussed further in Chapter 3.)

Finally, while it can hardly be denied that malnutrition captures only one aspect of our idea of poverty, it is an important aspect, and one that is particularly important for many developing countries. It seems clear that malnutrition must have a central place in the conception of poverty. How exactly this place is to be specified remains to be explored, but the recent tendency to dismiss the whole approach seems to be a robust example of misplaced sophistication.

2.3
THE INEQUALITY APPROACH

The idea that the concept of poverty is essentially one of inequality has some immediate plausibility. After all, transfers from the rich to the poor can make a substantial dent on poverty in most societies. Even the poverty line to be used for identifying the poor has to be drawn with respect to contemporary standards in the community in question, so that poverty may look very like inequality between the poorest group and the rest of the community.

Arguments in favour of viewing poverty as inequality are presented powerfully by Miller and Roby, who conclude:

Casting the issues of poverty in terms of stratification leads to regarding poverty as an issue of inequality. In this approach, we move away from efforts to measure poverty lines with pseudo-scientific accuracy. Instead, we look at the nature and size of the differences between the bottom 20 or 10 per cent and the rest of the society. Our concern becomes one of narrowing the differences between those at the bottom and the better-off in each stratification dimension. [8]

There is clearly quite a bit to be said in favour of this approach. But one can argue that inequality is fundamentally a different

[8] Miller and Roby (1971, p. 143). Also Miller, Rein, Roby and Cross (1967). See Wedderburn (1974) for discussions of alternative approaches.

issue from poverty. To try to analyse poverty 'as an issue of inequality', or the other way round, would do little justice to either. Inequality and poverty are not, of course, unrelated. But neither concept subsumes the other. A transfer of income from a person in the top income group to one in the middle income range must *ceteris paribus* reduce inequality; but it may leave the perception of poverty quite unaffected. Similarly, a general decline in income that keeps the chosen measure of inequality unchanged may, in fact, lead to a sharp increase in starvation, malnutrition and obvious hardship; it will then be fantastic to claim that poverty is unchanged. To ignore such information as starvation and hunger is not, in fact, an abstinence from 'pseudo-scientific accuracy', but blindness to important parameters of the common understanding of poverty. Neither poverty nor inequality can really be included in the empire of the other. [9]

It is, of course, quite a different matter to recognize that inequality and poverty are *associated* with each other, and to note that a different distribution system may cure poverty even without an expansion of the country's productive capabilities. Recognizing the distinct nature of poverty as a concept permits one to treat it as a matter of interest and involvement in itself. The role of inequality in the prevalence of poverty can then figure in the analysis of poverty without making the two conceptually equivalent.

2.4
RELATIVE DEPRIVATION

The concept of 'relative deprivation' has been fruitfully used in the analysis of poverty, [10] especially in the sociological literature. Being poor has clearly much to do with being deprived, and it is natural that, for a social animal, the concept of deprivation will be a relative one. But within the uniformity of the term 'relative deprivation', there seem to exist some distinct and different notions.

One distinction concerns the contrast between '*feelings* of

[10] See Runciman (1966) and Townsend (1971), presenting two rather different approaches to the concept.

[9] It is also worth noting that there are many measures of inequality, of which the gap 'between the bottom 20 or 10 per cent and the rest' is only one. See Atkinson (1970), Sen (1973a), Kolm (1976a, 1976b), and Blackorby and Donaldson (1978, 1980b). Also, inequality is not just a matter of the *size distribution* of income but one of investigating contrasts between different sections of the community from many different perspectives, e.g. in terms of relations of production, as done by Marx (1859, 1867).

deprivation' and '*conditions* of deprivation'. Peter Townsend has argued that 'the latter would be a better usage'. [11] There is indeed much to be said for a set of criteria that can be based on concrete

conditions, so that one could use 'relative deprivation' 'in an objective sense to describe situations where people possess less of some desired attribute, be it income, favourable employment conditions or power, than do others'. [12]

On the other hand, the choice of '*conditions* of deprivation' can not be independent of '*feelings* of deprivation'. Material objects cannot be evaluated in this context without reference to how people view them, and even if 'feelings' are not brought in explicitly, they must have an implicit role in the selection of 'attributes'. Townsend has rightly emphasized the importance of the 'endeavour to define the style of living which is generally shared or approved in each society and find whether there is . . . a point in the scale of the distribution of resources below which families find it increasingly difficult . . . to share in the customs, activities and diets comprising that style of living'. [13] One must, however, look also at the feelings of deprivation in deciding on the style and level of living the failure to share which is regarded as important. The dissociation of 'conditions' from 'feelings' is, therefore, not easy, and an objective diagnosis of 'conditions' requires an objective understanding of 'feelings'.

A second contrast concerns the choice of 'reference groups' for comparison. Again, one has to look at the groups with which the people in question actually compare themselves, and this can be one of the most difficult aspects of the study of poverty based on relative deprivation. The horizon of comparison is not, of course, independent of political activity in the community in question, [14] since one's sense of deprivation is closely related to one's expectations as well as one's view of what is fair and who has the right to enjoy what.

These different issues related to the general notion of relative deprivation have considerable bearing on the social analysis of

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[11]Townsend (1974), pp. 25-6.
[12]Wedderburn (1974), p. 4.
[13]Townsend (1974), p. 36.
[14]For example, Richard Scase (1974) notes that Swedish workers tend to choose rather wider reference groups than British workers, and relates this contrast to the differences in the nature of the two trade union movements and of political organization generally.

poverty. It is, however, worth noting that the approach of relative deprivation -- even including all its variants -- cannot really be the *only* basis for the concept of poverty. A famine, for example, will be readily accepted as a case of acute poverty no matter what the relative pattern within the society happens to be. Indeed, there is an irreducible core of *absolute* deprivation in our idea of poverty, which translates reports of starvation, malnutrition and visible hardship into a diagnosis of poverty without having to-ascertain first the relative picture. Thus the approach of relative deprivation supplements rather than supplants the analysis of poverty in terms of absolute dispossession.

2.5
VALUE JUDGEMENT?

The view that 'poverty is a value judgement' has recently been presented forcefully by many authors. It seems natural to think of poverty as something that is disapproved of, the elimination of which is regarded as morally good. Going further, it has been argued by Mollie Orshansky, an outstanding authority in the field, that 'poverty, like beauty, lies in the eye of the beholder'. [15] The exercise would, then, seem to be primarily a subjective one: unleashing one's personal morals on the statistics of deprivation.

I would like to argue against this approach. It is important to distinguish between different ways in which the role of morals can be accommodated into the exercise of poverty measurement. There is a difference between saying that the exercise *is itself* a prescriptive one and saying that the exercise must *take note* of the prescriptions made by members of the community. To describe a prevailing prescription is an act of description, not prescription. It may indeed be the case that poverty, as Eric Hobsbawm (1968) puts it, 'is always defined according to the conventions of the society in which it occurs' (p. 398). But this does not make the exercise of poverty assessment in a given society a value judgement. Nor a subjective exercise of some kind or other. For the person studying and measuring poverty, the conventions of society are matters of fact (what *are* the contemporary standards?), and not issues of morality or of subjective search (what *should be* the contemporary standards? what *should be* my values? how do I *feel* about all this?). [16]

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[15]Orshansky (1969), p. 37. For a critique of this position, see Townsend (1974).

[16]This does not, of course, in any way deny that one's values may implicitly affect one's

The point was brought out very clearly by Adam Smith more than two hundred years ago:

By necessaries I understand not only the commodities which are indispensably necessary for the support of life, but what ever the custom of the country renders it indecent for creditable people, even the lowest order, to be without. A linen shirt, for example, is, strictly speaking, not a necessary of life. The Greeks and Romans lived, I suppose, very comfortably though they had no linen. But in the present times, through the greater part of Europe, a creditable day-labourer would be ashamed to appear in public without a linen shirt, the want of which would be supposed to denote that disgraceful degree of poverty which, it is presumed, nobody can well fall into without extreme bad conduct. Custom, in the same manner, has rendered leather shoes a necessary of life in England. The poorest creditable person of either sex would be ashamed to appear in public without them. [17]

In a similar vein Karl Marx (1867) argued that, while 'a historical and moral element' enters the concept of subsistence, 'nevertheless, in a given country, at a given period, the average quantity of the means of subsistence necessary for the labourer is practically known' (p. 150).

It is possible that Smith or Marx may have overestimated the extent of uniformity of views that tends to exist in a community on the content of 'subsistence' or 'poverty'. Description of 'necessities' may be very far from ambiguous. But the presence of ambiguity in a description does not make it a prescriptive act- only one of ambiguous description. One may be forced to be arbitrary in eliminating the ambiguity, and if so that arbitrari- ness would be worth recording. Similarly, one may be forced to use more than one criteria because of non-uniformity of accepted standards, and to look at the *partial* ordering generated by the criteria taken together (reflecting 'dominance' in terms of all the criteria). [18] But the partial ordering would still reflect a descript-

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assessment of facts, as indeed they very often do. The statement is about the *nature* of the exercise, viz. that it is concerned with assessment of facts, and not about the way it is typically performed and the psychology that lies behind that performance. (The doctor attached to the students' hostel in which I stayed in Calcutta would refuse to diagnose influenza on the powerful ground that 'flu shouldn't be a reason for staying in bed'.) The issue is, in some respects, comparable to that of one's interests influencing one's values; for
an important historical analysis of various different aspects of that relationship, see Hirschman (1977).

[17] Smith (1776), pp. 351-2.

[18] Sen (1973a), Chapters 2 and 3.

ive statement rather than a prescriptive one. Indeed, the statement would be rather like saying, ' Nureyev may or may not be a better dancer than Nijinsky, but he dances better than this author, according to contemporary standards', a descriptive statement (and sadly non-controversial).

2.6
A POLICY DEFINITION?

A related issue is worth exploring in this context. The measure- ment of poverty may be based on certain given standards, but what kind of statements do these standards themselves make? Are they standards of public policy, reflecting either the objectives of actual policy or views on what the policy should be? There is little doubt that the standards must have a good deal to do with some broad notions of acceptability, but that is not the same thing as reflecting precise policy objectives-actual or recommended. On this subject too a certain amount of confusion seems to exist. For example, the United States President's Commission on Income

Maintenance (1969) argued thus for such a 'policy definition' in its well-known report, *Poverty amid Plenty:*

If society believes that people should not be permitted to die of starvation or exposure, then it will define poverty as the lack of minimum food and shelter necessary to maintain life. If society feels some responsibility for providing to all persons an established measure of well-being beyond mere existence, for example, good physical health, then it will add to its list of necessities the resources required to prevent or cure sickness. At any given time a policy definition reflects a balancing of community capabilities and desires. In low income societies the community finds it impossible to worry much beyond physical survival. Other societies, more able to support their dependent citizens, begin to consider the effects that pauperism will have on the poor and non-poor alike. [19]

There are at least two difficulties with this 'policy definition'. First, practical policy-making depends on a number of influences, going beyond the prevalent notions of what should be done. Policy is a function of political organization, and depends on a variety of factors including the nature of the government, the sources of its power, and the forces exerted by other organizations. In the public policies pursued in many countries, it is, in fact, hard to detect a concern with the elimination of deprivation in any obvious sense. If interpreted in terms of actual

[19]US President's Commission on income Maintenance (1969), p. 8.

policy, the 'policy definition' may fail to catch the political issues in policy-making.

Second, even if 'policy' is taken to stand not for actual public policy, but for policy recommendations widely held in the society in question, there are problems. There is clearly a difference between the notion of 'deprivation' and the idea of what should be eliminated by 'policy'. For one thing, policy recommendations must depend on an assessment of feasibilities ('ought implies can' [20]), but to concede that some deprivations cannot be immediately eliminated is not the same thing as conceding that they must not currently be seen as deprivations. (Contrast: 'Look here, old man, you aren't really poor even though you are starving, since it is impossible in the present economic circumstances to maintain the income of everyone above the level needed to eliminate starvation.') Adam Smith's notion of subsistence based on 'the commodities which are indispensably necessary for the support of life' and 'what ever the custom of the country renders it indecent' for someone 'to be without' is by no means identical with what is generally accepted as could and should be provided to all as a matter of policy. If in a country suddenly impoverished, say, by war it is agreed generally that the income maintenance programme must be cut down to a lower level of income, would it be right to say that the country does not have any greater poverty since a reduction of incomes has been *matched* by a reduction of the poverty line?

I would submit that the 'policy definiton' is based on a fundamental confusion. It is certainly true that with economic development there are changes in the notion of what counts as deprivation and poverty, and there are changes also in the ideas as to what should be done. But while these two types of changes are interdependent and also intertemporally correlated with each other, neither can be *defined* entirely in terms of the other. Oil-rich Kuwait may be 'more able to support their dependent citizens' with its new prosperity, but the notion of what is poverty may not go up immediately to the corresponding level. Similarly, the war-devastated Netherlands may keep up its standard of what counts as poverty and not scale it down to the level commensurate with its predicament. [21]

[20]Cf. Hare (1963), Chapter 4.
[21]For an account of that predicament, see Stein, Susser, Saenger, and Marolla (1975).

If this approach is accepted, then the measurement of poverty must be seen as an exercise of description assessing the predicament of people in terms of the prevailing standards of necessities. It is primarily a factual rather than an ethical exercise, and the facts relate to what is regarded as deprivation, and not directly to what policies are recommended. The deprivation in question has both absolute and relative aspects (as argued in Sections 2.2 and 2.4 above).

2.7
STANDARDS AND AGGREGATION

This still leaves two issues quite untouched. First, in comparing the poverty of two societies, how can a common standard of necessities be found, since such standards would vary from society to society? There are actually two quite distinct types of exercises in such inter-community comparisons. One is aimed at comparing the extent of deprivation in each community in relation to their respective standards of minimum necessities, and the other is concerned with comparing the predicament of the two communities in terms of some given minimum standard, e.g. that prevalent in one community. There is, indeed, nothing contradictory in asserting both of the following pair of statements:

1. There is *less* deprivation in community A than in community B in terms of some *common* standard, e.g. the notions of minimum needs prevailing in community A.
2. There is *more* deprivation in community A than in community B in terms of their *respective* standards of minimum needs, which are a good deal higher in A than in B. [22]

It is rather pointless to dispute which of these two senses is the 'correct' one, since it is quite clear that both types of questions are of interest. The important thing to note is that the two questions are quite distinct from each other.

Second, while the exercise of 'identification' of the poor can be based on a standard of minimum needs, that of 'aggregation'

requires some method of combining deprivations of different people into some overall indicator. In the latter exercise some relative scaling of deprivations is necessary. The scope for

[22]There is also no necessary contradiction in asserting that community A has less deprivation in terms of one community's standards (e.g. A's itself), while community B is less deprived in terms of another community's standards (e.g. B's).

arbitrariness in this is much greater, since conventions on this are less firmly established and the constraints of acceptability would tend to leave one with a good deal of freedom. The problem is somewhat comparable with the criteria for making *aggregative descriptive statements* in such fields as, say, comparisons of sporting achievements of different groups. While it is clear that certain circumstances would permit one to make an aggregative statement like 'Africans are better at sprint than Indians' (e.g. the circumstance in which the former group keeps winning virtually all sprint events over the Indians), and other circumstances would force one to deny this, there are intermediate cases in which either of the two aggregative descriptive statements would be clearly disputable.

In this context of arbitrariness of 'aggregate description', it becomes particularly tempting to redefine the problem as an 'ethical' exercise, as has indeed been done in the measurement of economic inequality. [23] But the ethical exercises involve exactly similar ambiguities, and furthermore end up answering a different question from the descriptive one that was originally asked. [24] There is very little alternative to accepting the element of arbitrariness in the description of poverty, and making that element as clear as possible. Since the notion of the poverty of a nation has some inherent ambiguities, one should not have expected anything else.

2.8
CONCLUDING REMARKS

Poverty is, of course, a matter of deprivation. The recent shift in focus -- especially in the sociological literature -- from *absolute* to *relative* deprivation has provided a useful framework of analysis (Section 2.4). But relative deprivation is essentially incomplete as an approach to poverty, and supplements (but cannot supplant) the earlier approach of absolute dispossession. The much maligned biological approach, which deserves substantial reformulation but not rejection, relates to this irreducible core of absolute deprivation, keeping issues of starvation and hunger at the centre of the concept of poverty (Sections 2.2 and 2.4).

To view poverty as an issue in inequality, as is often recommended, seems to do little justice to either concept.

[23]See Dalton (1920), Kolm (1969), and Atkinson (1970).
[24]See Bentzel (1970), Hansson (1977), and Sen (1978b).

Poverty and inequality relate closely to each other, but they are distinct concepts and neither subsumes the other (Section 2.3).

There is a good case for viewing the measurement of poverty not, as is often asserted, as an ethical exercise, but primarily as a descriptive one (Section 2.5). Furthermore, it can be argued that the frequently used 'policy definition' of poverty is fundamentally flawed (Section 2.6). The exercise of describing the predicament of the poor in terms of the prevailing standards of ‚necessities' does, of course, involve ambiguities, which are inherent in the concept of poverty; but ambiguous description isn't the same thing as prescription. [25] Instead, the arbitrariness that is inescapable in choosing between permissible procedures and possible interpretations of prevailing standards requires recognition and appropriate treatment.

[25]The underlying methodological issues have been discussed in Sen (1980a).

Chapter 3

Poverty: Identification and Aggregation

3.1 COMMODITIES AND CHARACTERISTICS

It was argued in the last chapter that the measurement of poverty can be split into two distinct operations, viz. the *identification* of the poor, and the *aggregation* of their poverty characteristics into an over-all measure. The identification exercise is clearly prior to aggregation. The most common route to identification is through specifying a set of 'basic' -- or 'minimum' -- needs, [1] and regarding the inability to fulfil these needs as the test of poverty. It was claimed in the last chapter that considerations of relative deprivation are relevant in specifying the 'basic' needs, but attempts to make relative deprivation the *sole* basis of such specification is doomed to failure since there is an irreducible core of absolute deprivation in the concept of poverty. Within the general perspective that was presented in the last chapter, some detailed -- and more technical -- issues are taken up in this chapter before moving from identification to aggregation.

Are the basic needs involved in identifying poverty better specified in terms of commodities, or in terms of 'characteristics'? Wheat, rice, potatoes, etc., are commodities, while calories,

protein, vitamins, etc., are characteristics of these commodities that the consumers seek. [2] If each characteristic could be obtained from only one commodity and no others, then it would be easy to translate the characteristics needs into commodity needs. But this is very often not the case, so that characteristics requirements do not specify commodity requirements. While calories are necessary for survival, neither wheat nor rice is.

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[1]The literature on basic needs is vast. For some of the main issues involved, see ILO (1976a, 1976b), Haq (1976), Jolly (1976), Stewart and Streeten (1976), Beckerman (1977), Bhalla (1977), Ghai, Khan, Lee and Alfthan (1977), Streeten (1977), Balogh (1978), Griffin and Khan (1978), Perkins (1978), Singh (1978), and Streeten and Burki (1978). On related issues, see also Adelman and Morris (1973), Chenery, Ahluwalia, Bell, Duloy and Jolly (1974), Morawetz (1977), Reutlinger and Selowsky (1976), Drewnowski (1977), Grant (1978), Chichilnisky (1979), Morris (1979), and Fields (1980).

[2]For analyses of consumer theory in terms of characteristics, see Gorman (1956, 1976), and Lancaster (1966).

The characteristics needs are, in an obvious sense, prior to the needs for commodities, and translation of the former to the latter is possible only under special circumstances. Multiplicity of sources is, however, not uniform. Many commodities provide calories or proteins; rather few commodities provide shelter. Literacy comes almost entirely from elementary schooling, even though there are, in principle, other sources. In many cases, therefore, it is possible to move from characteristics requirements to commodity requirements -- broadly defined -- with rather little ambiguity. It is for this reason that 'basic' or 'minimum' needs are often specified in terms of a hybrid *vector* -- e.g. amounts of calories, proteins, housing, schools, hospital beds -- some of the components being pure characteristics while others are unabashed commodities. While there is some evidence that such mongrelism disconcerts the purist, it is quite economic, and typically does little harm.

An interesting intermediate case arises when a certain characteristic can be obtained from several different commodities, but the tastes of the community in question guarantee that the characteristic is obtained from one commodity only. A community may, for example, be wedded to rice, and may not treat the alternative sources of calories (or carbohydrates) as acceptable. A formal way of resolving the issue is to define the characteristic 'calories from rice' as the thing sought by the consumer in question, so that rice and rice alone can satisfy this. This is analytically adequate if a little underhand. But there are also other ways of handling the problem, e.g. the assumption that the group seeks calories as such but treats rice as its only *feasible* source. While these conceptual distinctions may not have much immediate practical importance, they tend to suggest rather different approaches to policy issues involving taste variations.

The role of knowledge accumulation in reforming ideas of feasible diets may in fact be an important part of nutritional planning. The knowledge in question includes both information

about nutrition as such and experience of how things taste (once one breaks out of the barrier spotted by the old Guinness ad: 'I have never tasted it because I don't like it').

Dietary habits of a population are not, of course, immutable, but they have remarkable staying power. In making inter-community comparisons of poverty, the contrast between for-

mulating needs in terms of characteristics and formulating needs in terms of commodities may turn out to be significant. For example, the ranking of rural living standards in different states in India changes significantly when the basis of comparison is shifted from command over commodities to command over characteristics such as calories and protein. [3] There is little doubt that ultimately characteristics provide the more relevant basis for specification of basic needs, but the relative inflexibility of taste factors makes the conversion of these basic needs into minimum cost diets a function not merely of prices but also of consumption habits. [4] Explicit account would have to be taken of this issue in completing the identification exercise. This last question is further discussed in the next section.

3.2
THE DIRECT METHOD VERSUS THE INCOME METHOD

In identifying the poor for a given set of 'basic needs', it is possible to use at least two alternative methods. [5] One is simply to check the set of people whose actual consumption baskets happen to leave some basic need unsatisfied. This we may call the 'direct method', and it does not involve the use of any income notion, in particular not that of a poverty-line income. In contrast, in what may be called the 'income method', the first step is to calculate the minimum incomeΠ at which all the specified minimum needs are satisfied. The next step is to identify those whose actual incomes fall below that poverty line.

In an obvious sense the direct method is superior to the income method, since the former is not based on particular assumptions of consumption behaviour which may or may not be accurate. Indeed, it could be argued that *only* in the absence of direct information regarding the satisfaction of the specified needs can there be a case for bringing in the intermediary of income, so that the income method is at most a second best.

There is much to be said for such a view, and the income method can indeed be seen as a way of approximating the results

[3] See Sen (1976d) on this general issue, and Rath (1973), Bhattacharya and Chatterjee (1974, 1977), and Sen (1976b), on the underlying empirical studies.

[4]While dietary habits are not easy to change, they do, of course, undergo radical transformation in a situation of extreme hunger, for example in famine conditions. In fact, one of the more common causes of death during a famine is diarrhoea caused by eating unfamiliar food -- and non-food (see Appendix D below).

[5]The distinction relates closely to Seebohm Rowntree's (1901) contrast between primary' and 'secondary' poverty.

of the direct method. However, this is not all there is to the contrast of the two methods. The income method can also be seen as a way of taking note of individual idiosyncrasies without upsetting the notion of poverty based on deprivation. The ascetic who fasts on his expensive bed of nails will be registered as poor under the direct method, but the income method will offer a different judgement in recognition of his level of income, at which typical people in that community would have no difficulty in satisfying the basic nutritional requirements. The income of a person can be seen not merely to be a rough aid to predicting a person's actual consumption, but also as capturing a person's *ability* to meet his minimum needs (whether or not he, in fact, chooses to use that ability). [6]

There is a difficult line to draw here. If one were to look merely for the ability to meet minimum needs without being bothered by tastes, then one would, of course, set up a cost-minimizing programming problem and simply check whether someone's income falls short of that minimum cost solution. Such minimum cost diets are typically very inexpensive but exceedingly dull, and are very often regarded as unacceptable. (In Indira Rajaraman's (1974) pioneering work on poverty in Punjab, in an initial round of optimization, unsuspecting Punjabis were subjected to a deluge of Bengal grams.) Taste factors can be introduced through constraints (as Rajaraman did, and others do), but it is difficult to decide how pervasive and severe these constraints should be. In the extreme case the constraints determine the consumption pattern entirely.

But there is, I believe, a difference in principle between taste constraints that apply broadly to the entire community and those that essentially reflect individual idiosyncrasies. If the poverty-level income can be derived from typical behaviour norms of society, a person with a higher income who is choosing to fast on a bed of nails can, with some legitimacy, be declared to be non-poor. The income method does, therefore, have some merit of its own, aside from its role as a way of approximating what would have been yielded by the direct method had all the detailed consumption data been available.

The 'direct method' and the 'income method' are not, in fact,

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[6]The income method has close ties with the welfare economics of real income comparisons; see Hicks (1958).

two alternative ways of measuring the same thing, but represent two alternative *conceptions* of poverty. The direct method identifies those whose actual consumption fails to meet the accepted conventions of minimum needs, while the income method is after spotting those who do not have the ability to meet these needs within the behavioural constraints typical in that community. Both concepts are of some interest on their own in diagnosing poverty in a community, and while the latter is a bit more remote in being dependent on the existence of some typical behaviour pattern in the community, it is also a bit more refined in going beyond the observed choices into the notion of ability. A poor person, on this approach, is one whose income is not adequate to meet the specified minimum needs in conformity with the conventional behaviour pattern. [7]

The income method has the advantage of providing a metric of numerical distances from the 'poverty line', in terms of income short-falls. This the 'direct method' does not provide, since it has to be content with pointing out the short-fall of each type of need. On the other hand, the income method is more restrictive in terms of preconditions necessary for the 'identification' exercise. First, if the pattern of consumption behaviour has no uniformity, there will be no specific level of income at which the 'typical' consumer meets his or her minimum needs. Second, if prices facing different groups of people differ, e.g. between social classes or income groups or localities, then the poverty line will be group-specific, even when uniform norms and uniform consumption habits are considered. [8] These are real difficulties and cannot be wished away. That the assumption of a uniform poverty line for a given society distorts reality seems reasonably certain. What is much less clear, however, is the *extent* to which reality is thus distorted, and the seriousness of the distortion for the purposes for which the poverty measures may be used.

3.3

FAMILY SIZE AND EQUIVALENT ADULTS

Another difficulty arises from the fact that the family rather than the individual is the natural unit as far as consumption behaviour

[7] The income method is based on *two* distinct sets of conventions, viz. (1) those used to identify the minimum needs, and (2) those used to specify behaviour and taste constraints.

[8] For evidence of sharp differences in income-group-specific price deflators in India, see Bardhan (1973), Vaidyanathan (1974) and Radhakrishna and Sarma (1975), among others. See also Osmani (1978).

is concerned. In calculating the income necessary for meeting the minimum needs of families of different size, some method of correspondence of family income with individual income is needed. While the simplest method of doing this is to divide the

family income by the number of family members, this overlooks the economies of large scale that operate for many items of consumption, and also the fact that the children's needs may be quite different from those of adults. To cope with these issues, the common practice for both poverty estimation and social security operations is to convert each family into a certain number of 'equivalent adults' by the use of some 'equivalence scale', or, alternatively, to convert the families into 'equivalent households'. [9]

There tends to be a lot of arbitrariness in any such conversion. Much depends on the exact consumption pattern of the people involved, which varies from family to family and with age composition. Indeed, both the minimum needs of children as well as variations of consumption behaviour of families with variations of the number and age composition of children are complex fields for empirical investigation. The question of maldistribution *within* the family is also an important issue requiring a good deal more attention than it has received so far.

There are also different bases for deriving appropriate equivalence of needs. [10] One approach is to take the nutritional requirements for each age group separately and then to take the ratios of their costs, given established patterns of consumer behaviour. The acceptability of this approach depends not merely on the validity of the nutritional standards used, but also on the assumption that family behaviour displays the same concern for fulfilling the respective nutritional requirements of members of different age groups in the family. [11] It also ignores economies of scale in consumption which seem to exist even for such items as food.

A second approach is to examine how the people involved regard the equivalence question themselves, viz. how much extra

[10]For an illuminating account of these methods and their underlying logic, see Deaton and Muellbauer (1980).

[11]Another important variable is the work load, including that of the children, which too can be high in many poor economies; see Hansen (1969) and Hamilton (1975).

[9]See Orshansky (1965), Abel-Smith and Townsend (1965), and Atkinson (1969), among others. See also Fields (1980).

income they think is needed to make a larger family have the same standard of well-being as a smaller one. Empirical studies of these 'views' (e.g., Goedhart, Halberstadt, Kapteyn, and van Praag, 1977) have shown considerable regularities and consistency.

A third way is to examine the actual consumption behaviour of families of different size and to treat some aspect of this behaviour as an indicator of welfare. For example, the fraction spent on food has been treated as an indicator of poverty: two families of different size are regarded as having 'equivalent' incomes when they spend the same proportion of their incomes on food. [12]

No matter how these equivalent scales are drawn up, there remains the further issue of the weighting of families of different size. Three alternative approaches may be considered: (1) put the same weight on each *household,* irrespective of size; (2) put the same weight on each person, irrespective of the size of the family to whom they belong; and (3) put a weight on each *family* equal to the number of equivalent adults in it.

The first method is clearly unsatisfactory since the poverty and suffering of a large family is, in an obvious sense, greater than that of a small family at a poverty level judged to be equivalent to that of the former. The third alternative might look like a nice compromise, but is, I believe, based on a confusion. The scale of 'equivalent adults' indicates conversion factors to be used to find out how well off members of that family are, but ultimately we are concerned with the sufferings of *everyone* in the family and not of a hypothetical equivalent number. If two can live as cheaply as one and a half and three as cheaply as two, these facts must be taken into account in comparing the relative well-beings of two-member and three-member families; but there is no reason why the suffering of two three-member families should receive any less weight than that of three two-member families at the same level of illfare. There is, thus, a good case for using procedure (2), after the level of well-being or poverty of each person has been ascertained by the use of equivalent scales taking note of the size and composition of the families to which they belong.

[12] See Muellbauer (1977b) and Deaton and Muellbauer (1980), Chapter 8. The method goes back to Engel (1895). On this approach and others addressed to the problem of comparing well-beings of households, see Friedman (1952), Brown (1954), Prais and Houthakker (1955), Barten (1964), Theil (1967), Nicholson (1976), Muellbauer (1977a), Deaton and Muellbauer (1980), Fields (1980), Kakwani (1980a), and Marris and Theil (1980).

3.4
POVERTY GAPS AND RELATIVE DEPRIVATION

The income short-fall of a person whose income is less than the poverty-line income can be called his 'income gap'. In the aggregate assessment of poverty, these income gaps must be taken into account. But does it make a difference whether or not a person's short-fall is unusually large compared with those of others? It seems reasonable to argue that any person's poverty cannot really be independent of how poor the others are. [13] Even with exactly the same absolute short-fall, a person may be thought to be 'poorer' if the other poor have short-falls smaller than his, in contrast with the case in which his short-fall is less than that of others. Quantification of poverty would, thus, seem to need the marrying of considerations of absolute and relative deprivation even *after* a set of minimum needs and a poverty line have been fixed.

The question of relative deprivation can be viewed also in the context of a possible transfer of a unit of income from a poor person -- call him 1 -- to another -- christened 2 -- who is richer but still below the poverty line and remains so even after the transfer. Such a transfer will increase the absolute short-fall of the first person by exactly the same amount by which the absolute short-fall of person 2 will be reduced. Can one then argue that the over-all poverty is unaffected by the transfer? One can dispute this, of course, by bringing in some notion of diminishing marginal utility of income, so that the utility loss of the first may be argued to be greater than the utility gain of the second. But such cardinal utility comparisons for different persons involves the use of a rather demanding informational structure with well-known difficulties. In the absence of cardinal comparisons of marginal utility gains and losses, is it then impossible to hold that the overall poverty of the community has increased? I would argue that this is not the case.

Person I is relatively deprived compared with 2 (and there may be others in between the two who are more deprived than 2 but less so than 1). When a unit of income is transferred from I to 2, it increases the absolute short-fall of a more deprived person and reduces that of someone less deprived, so that in a straightforward

[13]Cf. Scitovsky (1976) and Hirsch (1976). See also Hirschman and Rothschild (1973).

sense the over-all relative deprivation is increased. [14] And this is the case quite irrespective of whether absolute deprivation is measured by income short-falls, or -- taking utility to be an increasing function of income -- by utility short-falls, from the break-even poverty line. One does not, therefore, have to introduce an interpersonally comparable *cardinal* welfare scale to be able to say that the transfer specified will increase the extent of relative deprivation.

In the 'aggregation' exercise the magnitudes of absolute deprivation may have to be supplemented by considerations of relative deprivation. Before this exercise is studied, it will be useful to review the standard measures of poverty used in the literature and to examine their shortcomings.

3.5
CRITIQUE OF STANDARD MEASURES

The commonest measure of over-all poverty, already discussed in Chapter 2, is the head-count measure *H,* given by the proportion of the total population that happens to be identified as poor, e.g. as falling below the specified poverty-line income. If *q* is the number of people who are identified as being poor and *n* the total

number of people in the community, then the head-count measure H is simply q/n.

This index has been widely used -- explicitly or by implication ever since quantitative study and measurement of poverty began (see Booth, 1889; Rowntree, 1901). It seems to be still the mainstay of poverty statistics on which poverty programmes are based (see Orshansky, 1965, 1966; Abel-Smith and Townsend, 1965). It has been extensively utilized recently both for intertemporal comparisons as well as for international contrasts. [15]

Another measure that has had a fair amount of currency is the

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[14] A complex problem arises when the transfer makes person 2 cross the poverty line - a possibility that has been deliberately excluded in the postulated case. This case involves a reduction in one of the main parameters of poverty, viz. the identification of the poor, and while there is an arbitrariness in attaching a lot of importance to whether a person actually crosses the poverty line, this is an arbitrariness that is implicit in the concept of poverty itself based on the use of a break-even line. The question is investigated further in Section C. 3, pp. 192-4.

[15] See, for example, the lively debate on the time trend of Indian poverty: Ojha (1970), Dandekar and Rath (1971), Minhas (1970, 1971), Bardhan (1970, 1971, 1973), Mukherjee, Bhattacharya and Chatterjee (1972), Bhatty (1974), Kumar (1974), Vaidyanathan (1974), Lal (1976), Ahluwalia (1978), and Dutta (1978). For international comparisons, see Chenery, Ahluwalia, Bell, Duloy and Jolly (1974).

so-called 'poverty gap', which is the aggregate short-fall of income of all the poor from the specified poverty line. [16] The index can be normalized by being expressed as the percentage short-fall of the average income of the poor from the poverty line. This measure -- denoted I -- will be called the 'income-gap ratio'.

The income-gap ratio I is completely insensitive to transfers of income among the poor so long as nobody crosses the poverty line by such transfers. It also pays no attention whatever to the number or proportion of poor people below the poverty line, concentrating only on the aggregate short-fall, no matter how it is distributed and among how many. These are damaging limitations. [17]

The head-count measure H is, of course, not insensitive to the number below the poverty line; indeed, for a given society it is the only thing to which H is sensitive. But H pays no attention whatever to the extent of income short-fall of those who lie below the poverty line. It matters not at all whether someone is just below the line or very far from it, in acute misery and hunger.

Furthermore, a transfer of income from a poor person to one who is richer can never increase the poverty measure H -- surely a perverse feature. The poor person from whom the transfer takes place is, in any case, counted in the value of H, and no reduction of his income will make him count any more than he does already. On the other hand, the person who *receives* the income

transfer cannot, of course, move below the poverty line as a consequence of this. *Either* he was rich and stays so or was poor and stays so, in both of which cases the *H* measure remains unaffected; or he was below the line but is pulled above it by the transfer, and this makes the measure *H* fall rather than rise. So a transfer from a poor person to one who is richer can never increase poverty as represented by *H.*

There are, thus, good grounds for rejecting the standard poverty measures in terms of which most of the analyses and debates on poverty have traditionally taken place. The head-count measure in particular has commanded implicit support of a kind that is quite astonishing. Consider A. L. Bowley's (1923) famous assertion: 'There is, perhaps, no better test of the progress

[16]The poverty gap has been used by the US Social Security Administration; see Batchelder (1971). See also Kakwani (1978) and Beckerman (1979a, 1979b).
[17]The underlying issues have been discussed in Sen (1973b, 1976a). See also Fields (1980).

of the nation than that which shows what proportion are in poverty' (p. 214). The spirit of the remark is acceptable enough, but surely not the gratuitous identification of poverty with the head-count measure *H.*

What about a combination of these poverty measures? The head-count measure *H* ignores the extent of income short-falls, while the income-gap ratio *I* ignores the numbers involved: why not a combination of the two? This is, alas, still inadequate. If a unit of income is transferred from a person below the poverty line to someone who is richer but who still is (and remains) below the poverty line, then both the measures *H* and *I* will remain completely unaffected. Hence any 'combined' measure based only on these two must also show no response whatsoever to such a change, despite the obvious increase in aggregate poverty as a consequence of this transfer in terms of relative deprivation.

There is, however, a special case in which a combination of *H* and *I* might just about be adequate. Note that, while individually *H* is insensitive to the extent of income short-falls and I to the numbers involved, we could criticize the *combination* of the two only for their insensitivity to variations of distribution of income among the poor. If we were, then, to confine ourselves to cases in which all the poor have precisely the same income, it may be reasonable to expect that *H* and *I* together may do the job. Transfers of the kind that have been considered above to show the insensitivity of the combination of *H* and *I* will not then be in the domain of our discourse.

The interest of the special case in which all the poor have the same income does not arise from its being a very likely occurrence. Its value lies in clarifying the way absolute deprivation *vis-á-vis* the poverty line may be handled when there isn't the additional feature of relative deprivation *among* the poor. [18] It

helps us to formulate a condition that the required poverty measure *P* should satisfy when the problem of distribution among the poor is assumed away by postulating equality. It provides *one* regularity condition to be satisfied among others.

[18]As was discussed in Section 2.1, the question of *relative deprivationvis-á-vis* the rest the community is involved also in the fixing of minimum needs on which the choice of the poverty line is based, so that the estimation of 'absolute' deprivation *vis-á-vis* the poverty line involves implicitly some considerations of *relative* deprivation as well. The reference in the text here is to issues of relative deprivation that remain even after the poverty line has been drawn, since there is the further question of one's deprivation compared with others who are also deprived.

3.6 AXIOMATIC DERIVATION OF A POVERTY MEASURE AND VARIANTS

We may require the poverty measure *P* to be a weighted sum of the short-falls of all people who are judged to be poor. This is done in a very general way with weights that can be functions of other variables. If we wished to base the poverty measure on some quantification of the sum-total loss of utility arising from the penury of the poor, then the weights should be derived from the familiar utilitarian considerations. If, additionally, it is assumed that the utility of each person depends only on his own income, then the weight on each person's income gap will depend only on the income of that person, and not also on the incomes of others. This will provide a 'separable' structure, each person's component of the overall poverty being derived without reference to the conditions of the others. But this use of the traditional utilitarian model will miss the idea of relative deprivation, which -- as we have already argued -- is rather central to the notion of poverty. Furthermore, there are difficulties with such cardinal comparisons of utility gains and losses, and even if these were ignored, it is no easy matter to secure agreement on using one particular utility function among so many that can be postulated, all satisfying the usual regularity conditions (such as diminishing marginal utility).

Instead, the concentration can be precisely on aspects of relative deprivation. Let $r(i)$ be the rank of person i in the ordering of all the poor in the decreasing order of income; e.g. $r(i) = 12$ if i is the twelfth worst off among the poor. If more than one person has the same income, they can be ranked in any arbitrary order: the poverty measure must be such that it should not matter which particular arbitrary order is chosen among those with the same income. Clearly, the poorest poor has the largest rank value q, when there are q people altogether on this side of the poverty line, while the least poor has the rank value of 1. The greater the rank value, the more the person is deprived in terms of relative deprivation with respect to others in the same category. [19] It is, thus, reasonable to argue that a poverty measure capturing this aspect of relative deprivation must make the

weight on a person's income short-fall increase with his rank value $r(i)$.

[19]Cf. Runciman (1966) and Townsend (1971).

A rather distinguished and simple case of such a relationship is to make the weight on any person i's income gap equal the rank value $r(i)$. This makes the weights equidistanced, and the procedure is in the same spirit as Borda's (1781) famous argument for the rank-order method of voting, choosing equal distances in the absence of a convincing case for any alternative assumption. While this too is arbitrary, it captures the notion of relative deprivation in a simple way, and leads to a transparent procedure, making it quite clear what precisely is being assumed. [20]

This axiom of 'Ranked Relative Deprivation' (axiom R) focuses on the distribution of income among the poor, and may be combined with the kind of information that is presented by the head-count measure H and the income-gap ratio I in the special case in which everyone below the poverty line has the same income (so that there is no distribution problem among the poor). H presents the proportion of people who are deprived in relation to the poverty line, and I reflects the proportionate amount of absolute income deprivation *vis-a-vis* that line. It can be argued that H catches one aspect of overall deprivation, viz. how many (never mind how much), while I catches another aspect of it, viz. how much on the average (never mind suffered by how many). In the special case when all the poor have the same income, H and I together may give us a fairly good idea of the extent of poverty in terms of over-all deprivation. Since the problem of relative distribution among the poor does not arise in this special case, we may settle for a measure that boils down to some function of only H and I under these circumstances. A simple representation of this, leading to a convenient normalization, is the product HI. This may be called the axiom of 'Normalized Absolute Deprivation' (axiom A). [21]

If these two axioms are imposed on a quite general format of

[20]It is, in fact, possible to derive the characteristic of equidistance from other -- more primitive -- axioms (see Sen, 1973b, 1974).

[21]It should be remembered that in fixing the poverty line considerations of relative deprivation have already played a part, so that absolute deprivation *vis-a-vis* the poverty line is non-relative only in the limited context of the 'aggregation' exercise. As was discussed earlier, the concepts of absolute and relative deprivation are both relevant to *each* of the two exercises in the measurement of poverty, viz. identification and aggregation. Axioms A and R are each concerned exclusively with the aggregation exercise.

the poverty measure being a weighted sum of income gaps, then a precise measure of poverty emerges (as shown in Sen, 1973b, 1976a). When *G* is the Gini coefficient of the distribution of income among the poor, this measure is given by $P=H\{I + (1-I)G\}$. The precise axiomatic derivation is discussed in Appendix C. When all the poor have the same income, then the Gini coefficient *G* of income distribution among the poor equals zero, and P equals *HI.* Given the same average poverty gap and the same proportion of poor population in total population, the poverty measure *P* increases with greater inequality of incomes below the poverty line, as measured by the Gini coefficient. Thus, the measure *P* is a function of *H* (reflecting the number of poor), *I* (reflecting the aggregate poverty gap), and *G* (reflecting the inequality of income distribution below the poverty line). The last captures the aspect of 'relative deprivation', and its inclusion is indeed a direct consequence of the axiom of Ranked Relative Deprivation.

Many interesting empirical applications of this approach to the measurement of poverty have been made, [22] and several variants of it have also been considered in the literature, [23] which will be discussed in Appendix C. While the measure P has certain unique advantages which its axiomatic derivation brings out, several of the variants are certainly permissible interpretations of the common conception of poverty. There is nothing defeatist or astonishing in the acceptance of this 'pluralism'. Indeed, as argued in Chapter 2, such pluralism is inherent in the nature of the exercise. But the important point to recognize is that the assessment of overall poverty has to take note of a variety of considerations capturing different features of absolute and relative deprivation. Such simplistic measures as the commonly used head-count ratio *H,* or the poverty-gap ratio *I,* fail to do justice to some of these features. It is necessary to use complex measures such as the index *P* to make the measurement of

[22] See, for example, Ahluwalia (1978), Alamgir (1976, 1978a), Anand (1977), Bhatty (1974), Clark, Hemming and Ulph (1979), Dutta (1978), Fields (1979), Ginneken (1980), Kakwani (1978, 1980), Osmani (1978), Pantulu (1980), Sastry (1977, 1980), Seastrand and Diwan (1975), Szal (1977), among others.

[23] See Anand (1977), Blackorby and Donaldson (1980a), Clark, Hemming and Ulph (1979), Hamada and Takayama (1978), Kakwani (1978, 1980), Osmani (1978), Pyatt (1980), Szal (1977), Takayama (1979), Thon (1979, 1980), Fields (1980), and Chakravarty (1980a, 1980b), among others.

poverty sensitive to the different features that are implicit in our ideas on poverty. In particular, the question of distribution remains relevant even when incomes *below* the poverty line are considered. It will be necessary to go into this question further in the context of analysing starvation and famines, as is done in the chapters that follow. [24]

[24] The relevance of this aspect of the distributional question is brought out in the empirical studies of starvation and famine (Chapters 6-9), and the general argument is

assessed in that light (Chapter 10).

Chapter 4

Starvation and Famines

4.1 FAMINES

Famines imply starvation, but not vice versa. And starvation implies poverty, but not vice versa. The time has come for us to move from the general terrain of poverty to the disastrous phenomenon of famines.

Poverty, as was discussed in Chapter 2, can reflect relative deprivation as opposed to absolute dispossession. It is possible for poverty to exist, and be regarded as acute, even when no serious starvation occurs. Starvation, on the other hand, does imply poverty, since the absolute dispossession that characterizes starvation is more than sufficient to be diagnosed as poverty, no matter what story emerges from the view of *relative* deprivation.

Starvation is a normal feature in many parts of the world, but this phenomenon of 'regular' starvation has to be distinguished from violent outbursts of famines. It isn't just regular starvation that one sees in 436 BC, when thousands of starving Romans 'threw themselves into the Tiber'; or in Kashmir in AD 918, when 'one could scarcely see the water of Vitasta [Jhelum] entirely covered as the river was with corpses'; or in 1333-7 in China, when -- we are told -- four million people died in one region only; or in 1770 in India, when the best estimates point to ten million deaths; or in 1845-51 in Ireland, when the potato famine killed about one-fifth of the total Irish population and led to the emigration of a comparable number. [1] While there is quite a literature on how to 'define' famines, [2] one can very often

[1] For some absorbing accounts of the phenomenon of famines in different parts of the world and some comparative analysis, see Mallory (1926), Ghosh (1944), Woodham-Smith (1962), Masefield (1963), Stephens (1966), Bhatia (1967), Blix, Hofvander and Vahlquist (1971), Johnson (1973), Aykroyd (1974), Hussein (1976), Tudge (1977), and Alamgir (1978b, 1980), among a good many other studies. Early accounts of famines in the Indian subcontinent can be found in Kautilya (circa 320 BC) and Abul Fazl (1592), among other documents.

[2] A few of the many definitions: 'On balance it seems clear that any satisfactory definition of famine must provide that the food shortage is either widespread or extreme if not both, and that the degree of extremity is best measured by human mortality from starvation' (Masefield, 1963, pp. 3-4). 'An extreme and protracted shortage of food

diagnose it -- like a flood or a fire -- even without being armed with a precise definition. [3]

In distinguishing between starvation and famine, it is not my intention here to attribute a sense of deliberate harming to the first absent in the second, as intended by the Irish American Malone in Bernard Shaw *Man and Superman*:

> Malone: Me father died of starvation in the black $_{47}$. Maybe you've heard of it?
>
> Violet: The Famine?
>
> Malone: No, the starvation. When a country is full o food and exporting it, there can be no famine. Me father was starved dead; and I was starved out to America in me mother's arms. [4]

The history of famines as well as of regular hunger is full of blood-boiling tales of callousness and malevolence -- and I shall have something to say on this -- but the distinction between starvation and famine used in this work does not relate to this. Starvation is used here in the wider sense of people going without adequate food, while famine is a particularly virulent manifestation of its causing widespread death; that is, I intend to use the two words in their most common English sense. [5]

4.2 THE TIME CONTRAST

In analysing starvation in general, it is important to make clear distinctions between three different issues. (1) *lowness of the typical level* of food consumption; (2) *declining trend* of food consumption;

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resulting in widespread and persistent hunger, evidenced by loss of body weight and emaciation and increase in the death rate caused either by starvation or disease resulting from the weakened condition of the population' (Johnson, 1973, p. 58). 'In statistical term, it can be defined as a severe shortage of food accompanied by a significant increase in the local or regional death rate' (Mayer, 1975). 'Famine is an economic and social phenomenon characterised by the widespread lack of food resources which, in the absence of outside aid, leads to death of those affected' (UNRISD, 1975). I hope the reader has got the point.

[3]The definitional exercise is more interesting in providing a pithy description of what happens in situations clearly diagnosed as one of famine than in helping us to do the diagnosis -- the traditional function of a definition. For example, Gale Johnson's (1973) pointer to disease in addition to starvation directs our attention to an exceptionally important aspect of famines (see Chapter 8 and Appendix D below). See also Morris (1974).

[4]G. Bernard Shaw, *Man and Superman*, Penguin, Harmondsworth, 1946, p. 196.

[5]The meaning of 'starve' as 'to cause to die, to kill, destroy' is described by *The Shorter Oxford English Dictionary* as 'obsolete' (with its latest recorded use being placed in 1707), but -- of course -- the meaning 'to cause to perish of hunger' or 'to keep scantily supplied with food' survives, and -- alas -- has much descriptive usage in the modern world.

and (3) *sudden collapse* of the level of food consumption. Famine is chiefly a problem of the third kind, and while it can -- obviously -- be helped by the first two features, it often does not work that way.

For example, in dealing with the trend of foodgrains availability in India in this century, S. R. Sen (1971) notes the following dichotomy between the trend of the moving average and the level of the minimal values (pp. 2-3):

A study of these data shows that during the first 24 years of the century foodgrains production increased at an average annual rate of 0.81 per cent per annum on the average, the trough points showed a declining trend of 0.14 per cent per annum on the average and there was a growing divergence. Thus, while the foodgrains production showed a rising trend, the instability was also on the increase. . . . The next 24 years, however, presented a completely different picture. During this period, foodgrains production showed a declining trend of 0.02 percent per annum on the average, in spite of the fact that droughts turned out to be relatively moderate and less frequent. In contrast with the previous period, while the peak points reached showed a declining trend of 0.04 per cent, the trough points recorded a rising trend of 0.10 per cent per annum on the average and the two were converging.

A similar contrast has been suggested for Japan in comparing food consumption in the Meiji period with that in the Tokugawa period by Nakamura (1966). [6] He argues:

In fact food consumption picture of the Tokugawa period (and earlier)7 is that of periodic food shortages and famine owing to the high incidence of natural calamities. In view of this, it is even possible that the Japanese *ate more regularly but consumed less food on the average* in the later Meiji era than they did in late Tokugawa before food imports became available to relieve shortages. [7]

There is, of course, nothing in the least bit surprising about a rising trend being accompanied by bigger fluctuations, or a falling trend going with greater stability. [8] Even more obvious is

[6]The underlying empirical generalisation about trends of food availability has been, however, the subject of some controversy. See also Ohkawa (1957) and Ohkawa and Rosovsky (1973).

[7]Nakamura (1966), p. 100; italics added. See also a similar contrast in Eric Hobsbawm's analysis of the British standard of living during 1790-1850 (Hobsbawm, 1957, especially p. 46).

[8]The empirical issue as to whether the quoted views of the Indian or Japanese economic history are correct is, of course, a different question.

the fact that a rising trend need not *eliminate* big fluctuations. Indeed, there are good reasons to think that the trend of food availability per head in recent years has been a rising one in most parts of the world, [9] but nevertheless acute starvation has occurred quite often, and there is some evidence of intensification of famine threats. [10] While this is partly a problem of distribution of food between different groups in a nation -- an issue to which I shall turn presently -- there is also the time contrast (in particular, the problem of sharp falls against a generally rising trend). Famines can strike even when regular starvation is on firm decline.

The food crisis of 1972 is a global example of this time contrast. Colin Tudge (1977) describes the development in dramatic terms:

The 1960s brought good harvests, augmented by the Third World's 'green revolution', based on American-developed dwarf strains of wheat and rice. The world's food problem was not shortage, apparently, but over-production, leading to low prices and agricultural depression. The US took land out of production, and in the early 1970s both the US and Canada ran down their grain stores. Then the bad weather of 1972 brought dismal harvests to the USSR, China, India, Australia and the Sahel countries south of Sahara. Russia bought massively in the world grain markets before others, including the US, realized what was happening. By mid-1974 there was only enough grain left in store to feed the world's population for three-and-a-half weeks; terrifying brinkmanship. [11]

In all this the focus has been on the *total* availability of food -- for the nation as a whole, or even for the world as a whole. But exactly similar contrasts hold for food availability to a particular section of a given community. A sudden collapse of the command of a group over food can go against a rising trend (or against a typically high level of food consumption). Problems of (i) existence of much regular starvation, (ii) worsening trend of regular starvation, and (iii) sudden outbreak of acute starvation, are quite distinct. While they can accompany each other, they need not, and often do not, do so.

[10] See Blix, Hofvander and Vahlquist (1971); UNRISD (1975, 1978); Aziz (1975); and Tudge (1977)

[11] Tudge (1977), p. 2.

[9] See FAO (1979). See also Aziz (1975), p. 116, Table 2; and Sinha (1976a), p. 6, Table 1.

4.3 THE GROUP CONTRAST

While famines involve fairly widespread acute starvation, there is no reason to think that it will affect all groups in the famine-

affected nation. Indeed, it is by no means clear that there has ever occurred a famine in which all groups in a country have suffered from starvation, since different groups typically do have very different commanding powers over food, and an over-all shortage brings out the contrasting powers in stark clarity.

There has been some speculation as to whether such a comprehensive famine was not observed in India in 1344-5 (see Walford 1878, and Alamgir 1980, p. 14). There is indeed some evidence for this famine being a very widespread one. In fact, the authoritative *Encyclopaedia Britannica* saw the famine as one in which even 'the Mogul emperor was unable to obtain the necessaries for his household' (Eleventh Edition, 1910-1, vol. X, p. 167). This is most unlikely since the Mogul empire was not established in India until 1526! But it is also doubtful that the Tughlak king then in power -- Mohammad Bin Tughlak-was really unable to obtain his household necessities, since he had the resources to organize one of the most illustrous famine relief programmes, including remitting taxes, distributing cash, and opening relief centres for the distribution of cooked food (see Loveday, 1916). One has to be careful about anecdotal history, just as a companion volume of the same Encyclopaedia points out: 'the idea that Alfred, during his retreat at Athenley, was a helpless fugitive rests upon the foolish legend of the cakes'. This is, however, not to deny that some famines are much more widespread than others, and Alamgir is certainly right that the Dutch famine during 1944 was very widely shared by the Dutch population. [12]

The importance of inter-group distributional issues rests not merely in the fact that an over-all shortage may be very unequally shared by different groups, [13] but also in the recog-nition that some groups can suffer acute absolute deprivation

[12] See Aykroyd (1974), Chapter 10, and Stein, Susser, Saenger and Marolla (1973).

[13] One contrast that has received much professional attention recently is that between urban and rural population (see particularly Lipton, 1977). This contrast is indeed relevant to conflicts implicit in some famines (see for example Chapter 6 below), but there are other, more specialized, group conflicts which deserve more attention (some of these contrasts are taken up in Chapters 6, 7, 8, and 9).

even when there is no over-all shortage. There is no reason whatsoever to think that the food consumption of different groups must vary in the same *direction* (even if by different proportions and amounts), and in later chapters cases will be encountered in which different groups' fortunes moved sharply in opposite directions.

Chapter 5

The Entitlement Approach

5.1 ENDOWMENT AND EXCHANGE

The entitlement approach to starvation and famines concentrates on the ability of people to command food through the legal means available in the society, including the use of production possibilities, trade opportunities, entitlements *vis-à-vis* the state, and other methods of acquiring food. A person starves *either* because he does not have the ability to command enough food, *or* because he does not use this ability to avoid starvation. The entitlement approach concentrates on the former, ignoring the latter possibility. Furthermore, it concentrates on those means of commanding food that are legitimized by the legal system in operation in that society. While it is an approach of some generality, it makes no attempt to include all possible influences that can in principle cause starvation, for example illegal tranfers (e.g. looting), and choice failures (e.g. owing to inflexible food habits).

Ownership of food is one of the most primitive property rights, and in each society there are rules governing this right. The entitlement approach concentrates on each person's entitlements to commodity bundles including food, and views starvation as resulting from a failure to be entitled to a bundle with enough food.

In a fully directed economy, each person i may simply get a particular commodity bundle which is assigned to him. To a limited extent this happens in most economies, e.g. to residents of old people's homes or of mental hospitals. Typically, however, there is a menu -- possibly wide -- to choose from. E_i is the entitlement set of person i in a given society, in a given situation, and it consists of a set of alternative commodity bundles, any one of which the person can decide to have. In an economy with private ownership and exchange in the form of trade (exchange with others) and production (exchange with nature), E_i can be characterized as depending on two parameters, viz. the *endowment* of the person (the ownership bundle) and the *exchange*

entitlement mapping (the function that specifies the set of alternative commodity bundles that the person can command respectively for each endowment bundle). [1] For example, a peasant has his land, labour power, and a few other resources, which together make up his endowment. Starting from that endowment he can produce a bundle of food that will be his. Or, by selling his labour power, he can get a wage and with that buy commodities, including food. Or he can grow some cash crops and sell them to buy food and other commodities. There are many other possibilities. The set of all such available commodity bundles in a given economic situation is the exchange entitlement of his

endowment. The exchange entitlement *mapping* specifies the exchange entitlement set of alternative commodity bundles respectively for each endowment bundle. The formal relations are analysed in Appendix A.

The exchange entitlement mapping, or E-mapping for short, will depend on the legal, political, economic and social characteristics of the society in question and the person's position in it. Perhaps the simplest case in terms of traditional economic theory is one in which the endowment bundle can be exchanged in the market at fixed relative prices for any bundle costing no more, and here the exchange entitlement will be a traditional 'budget set'.

Bringing in production will make the E-mapping depend on production opportunities as well as trade possibilities of resources and products. It will also involve legal rights to apportioning the product, e.g. the capitalist rule of the 'entrepreneur' owning the produce. Sometimes the social conventions governing these rights can be very complex indeed -- for example those governing the rights of migrant members of peasant families to a share of the peasant output (see Sen, 1975).

Social security provisions are also reflected in the E-mapping, such as the right to unemployment benefit if one fails to find a job, or the right to income supplementation if one's income would fall otherwise below a certain specified level. And so are employment guarantees when they exist -- as they do in some socialist economies -- giving one the option to sell one's labour power to the government at a minimum price. E-mappings will depend also on provisions of taxation.

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[1]Formally, an exchange entitlement mapping $E_i(.)$ transforms an endowment vector of commodities x into a set of alternative availability vectors of commodities $E_i(x)$.

Let the set of commodity bundles, each of which satisfies person i's minimum food requirement, be F_i. Person i will be forced to starve because of unfavourable entitlement relations if and only if he is not entitled to any member of F_i given his endowment and his exchange entitlement mapping. The 'starvation set' S_i of endowments consists of those endowment bundles such that the exchange entitlement sets corresponding to them contain no bundles satisfying his minimum food requirements. [2]

5.2 STARVATION AND ENTITLEMENT FAILURES

Person *i* can be plunged into starvation if his endowment collapses into the starvation set S_i either through a fall in the

endowment bundle, or through an unfavourable shift in the exchange entitlement mapping. The distinction is illustrated in Figure 5.1 in terms of the simple case of pure trade involving only two commodities, food and non-food. The exchange entitlement mapping is taken to assume the simple form of constant price exchange. With a price ratio p and a minimum food requirement O*A,* the starvation set S_i is given by the region O*AB.* If the endowment vector is x, the person is in a position to avoid starvation. This ability can fail either (I) through a lower endowment vector, e.g. x^*, or (2) through a less favourable exchange entitlement mapping, e.g. that given by p^*, which would make the starvation set O*AC.*

It is easy to see that starvation can develop for a certain group of people as its endowment vector collapses, and there are indeed many accounts of such endowment declines on the part of sections of the poor rural population in developing countries through alienation of land, sale of livestock, etc. (see, for example, Griffin, 1976, 1978; Feder, 1977; and Griffin and Khan, 1977). [3] Shifts in exchange entitlement mappings are rather less palpable, and more difficult to trace, but starvation can also develop with *unchanged* asset ownership through move-

[2]For formalities, see Appendix A. For applications see Chapters 6-10 and Appendix B. See also Sen (1976c, 1977b, 1979c); Griffin (1978); Hay (1978b); Ghosh (1979); Penny (1979); Shukla (1979); Seaman and Holt (1980); and Heyer (1980).

[3]Asset loss affects not merely the ability to exchange the asset directly with food, but also the ability to borrow against one's future earning power. Given the nature of the capital markets, substantial borrowing is typically impossible without tangible securities. The limitations of the capital markets often constitute an important aspect of famine conditions.

FIG. 5.1 Illustration of Endowment and Entitlement

ments of exchange entitlement mapping. [4] This would be impossible only if the endowment vector itself contained enough food, for example, in figure 5.1, if it belonged to the region *DAE.* The characteristics of commodities in most people's endowment bundles rule out this possibility.

5.3 LIMITATIONS OF THE ENTITLEMENT APPROACH

Before proceeding to the use of the entitlement approach, a few of the limitations may be briefly noted. First, there can be

[4]Shifts in E-mapping may arise from different sources, e.g. growth of unemployment, changes in relative prices and terms of trade, variations in social security (see Chapter 1 and Appendix A). For an insightful analysis of the role of terms of trade in economic development, see Mitra (1977).

ambiguities in the specification of entitlements. Even in capitalist market economies, entitlements may not be well defined in the absence of a market-clearing equilibrium, [5] and in pre-capitalist formations there can be a good deal of vagueness on property rights and related matters. [6] In many cases the appropriate characterization of entitlements may pose problems, [7] and in some cases it may well be best characterized in the form of 'fuzzy' sets and related structures -- taking precise note of the vagueness involved. [8] In empirical studies of actual famines the question of precision is compromised by data problems as well, and the focus here will be not on characterizing entitlements with pretended exactitude, but on studying shifts in some of the main ingredients of entitlements. Big shifts in such ingredients can be decisive in causing entitlement failures, even when there is some 'fuzziness' in the entitlement relations.

Second, while entitlement relations concentrate on rights within the given legal structure in that society, some transfers involve violation of these rights, such as looting or brigandage. When such extra-entitlement transfers are important, the entitlement approach to famines will be defective. On the other hand, most recent famines seem to have taken place in societies with 'law and order', without anything 'illegal' about the processes leading to starvation. In fact, in guarding ownership rights against the demands of the hungry, the legal forces uphold entitlements; for example, in the Bengal famine of 1943 the people who died in front of well-stocked food shops protected by the state [9] were denied food because of *lack* of legal entitlement, and not because their entitlements were violated. [10]

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[10]Cf. 'A concept of law which allows the invalidity of law to be distinguished from its immorality, enables us to see the complexity and variety of these separate issues' (Hart, 1961, p. 207).

[5]See Hicks (1939), Debreu (1959), and Arrow and Hahn (1971).

[6]There are also legal and economic ambiguities in an *open* 'black market' (see Dasgupta, 1950).

[7]There is also the critique by Ronald Dworkin (1977) of legal positivism', disputing the view of law as a set of 'rules', and emphasizing the role of 'principles, policies, and other sorts of standards' (p. 22), which are, of course, inherently more ambiguous.

[8]A similar problem arises from the ambiguity of values in economic planning, requiring 'range' -- rather than 'point' -- specification of shadow prices leading to partial orders (see Sen, 1975). Correspondingly here, the possible set of endowment vectors may be partitioned into three subsets, viz. definitely starvation set, definitely non-starvation set, and neither.

[9]See Ghosh (1944) and also Famine Inquiry Commission (1945a).

Third, people's actual food consumption may fall below their entitlements for a variety of other reasons, such as ignorance, fixed food habits, or apathy. [11] In concentrating on entitlements, something of the total reality is obviously neglected in our approach, and the question is: how important are these ignored elements and how much of a difference is made by this neglect?

Finally, the entitlement approach focuses on starvation, which has to be distinguished from famine mortality, since many of the famine deaths -- in some cases *most* of them -- are caused by epidemics, which have patterns of their own. [12] The epidemics are, of course, induced partly by starvation but also by other famine characteristics, e.g. population movement, breakdown of sanitary facilities.

5.4 DIRECT AND TRADE ENTITLEMENT FAILURES

Consider occupation group *j,* characterized as having only commodity *j* to sell or directly consume. Let q_j be the amount of commodity *j* each member of group *j* can sell or consume, and let the price of commodity *j* be p_j. The price of food per unit is p_f. The maximum food entitlement of group *j* is F_j, given by $q_j p_j / p_f$, or $q_j a_j$, where a_j is occupation *j*'s food exchange rate (p_j / p_f).

Commodity $_j$ may or may not be a produced commodity. The commodity that a labourer has to sell is labour power. It is his means of survival, just as commodities in the shape of baskets and jute are the means of survival of the basket-maker and the jute-grower, respectively. [13]

A special case arises when the occupation consists of being a producer of food, say rice, which is also what members of that

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[11] Also, people sometimes choose to starve rather than sell their productive assets (see Jodha, 1975, for some evidence of this in Indian famines), and this issue can be accommodated in the entitlement approach using a relatively long-run formulation (taking note of future entitlements). There is also some tendency for asset markets to collapse in famine situations, making the reward from asset sales rather puny.

[12] See Appendix D for a study of the pattern of mortality in the Great Bengal Famine. See also McAlpin (1976).

[13] In general, it may be necessary to associate several different commodities, rather than one, with the same occupation, but there is not much difficulty in redefining q_j and p_j appropriately.

[14] Given the selective nature of calamities such as floods and droughts, affecting one group but not another, it will be sometimes convenient to partition the occupation f into a number of subgroups (*f, i*) for famine analysis. With $q_{f,i}$ the food grown by subgroup (*f, i*), we have: $F_{f,i} = q_{f,i}$.

occupation live on. In this case $p_j = p_f$, and $a_f = 1$. Thus $F_f = q_f$.[14]

It is worth emphasizing that this drastically simple modelling of reality makes sense only in helping us to focus on some important parameters of famine analysis; it does not compete with the more general structure outlined earlier (and more formally in Appendix A). Furthermore, these simplifications will be grossly misleading in some contexts, for example in analysing entitlements in an industrialized economy, because of the importance of raw materials, intermediate products, asset holdings, etc. Even in applying this type of structure to analyse rural famines in developing countries, care is needed that the distortions are not too great.

For any group j to start starving *because of* an entitlement failure, F_j must decline, since it represents the maximum food entitlement. F_j can fall either because one has produced less food for own consumption, or because one can obtain less food through trade by exchanging one's commodity for food. The former will be called a 'direct entitlement failure', and the latter a 'trade entitlement failure'. The former can arise for food-producing groups, while the latter can occur for others (i.e. for those who sell their commodities to buy food), because of a fall in a_j, or a fall in q_j. Such a fall in q_j can occur either owing to an autonomous production decline (e.g. a cash crop being destroyed by a drought), or owing to insufficiency of demand (e.g. a labourer being involuntarily unemployed, or a basket-maker cutting down the output as the demand for baskets slackens).

It is, in fact, possible for a group to suffer both direct entitlement failure and trade entitlement failure, since the group may produce a commodity that is both directly consumed and exchanged for some other food. For example, the Ethiopian pastoral nomad both eats the animal products directly and also sells animals to buy foodgrains (thereby making a net gain in calories), on which he is habitually dependent. [15] Similarly, a Bengali fisherman does consume some fish, though for his survival he is dependent on grain-calories which he obtains at a favourable calorie exchange rate by selling fish -- a luxury food for most Bengalis. [16]

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[15] See Chapter 7.
[16] See Chapter 6.

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Chapter 10

Entitlements and Deprivation

10.1
FOOD AND ENTITLEMENTS

The view that famines are caused by food availability decline -- the FAD view -- was questioned on grounds of cogency in the first chapter of this monograph. Empirical studies of some of the larger recent famines confirmed that famines could thrive even without a general decline in food availability (see Chapter 6, 7, and 9). Even in those cases in which a famine is accompanied by a reduction in the amount of food available per head, the causal mechanism precipitating starvation has to bring in many variables other than the general availability of food (see Chapter 8). The FAD approach gives little clue to the causal mechanism of starvation, since it does not go into the *relationship* of people to food. Whatever may be the oracular power of the FAD view, it is certainly Delphic in its reticence.

A food-centred view tells us rather little about starvation. It does not tell us how starvation can develop even without a decline in food availability. Nor does it tell us -- even when starvation is accompanied by a fall in food supply -- why some groups had to starve while others could feed themselves. The over-all food picture is too remote an economic variable to tell us much about starvation. On the other hand, if we look at the food going to *particular* groups, then of course we can say a good deal about starvation. But, then, one is not far from just describing the starvation itself, rather than explaining what happened. If some people had to starve, then clearly, they didn't have enough food, but the question is: *why* didn't they have food? What allows one group rather than another to get hold of the food that is there? These questions lead to the entitlement approach, which has been explored in this monograph, going from economic phenomena into social, political, and legal issues.

A person's ability to command food -- indeed, to command any commodity he wishes to acquire or retain -- depends on the entitlement relations that govern possession and use in that society. It depends on what he owns, what exchange possibilities

are offered to him, what is given to him free, and what is taken away from him. For example, a barber owns his labour power and some specialized skill, neither of which he can eat, and he has to sell his hairdressing service to earn an income to buy food. His entitlement to food may collapse even without any change in food availability if for any reason the demand for hairdressing collapses and if he fails to find another job or any social security benefit. Similarly, a craftsman producing, say, sandals may have his food entitlement squashed if the demand for sandals falls sharply, or if the supply of leather becomes scarce, and starvation can occur with food availability in the economy unchanged. A general labourer has to earn his income by selling his labour power (or through social security benefit) before he can establish his command over food in a free-market economy; unemployment *without* public support will make him starve. A

sharp change in the relative prices of sandals, or haircuts, or labour power (i.e. wages) *vis-à-vis* food can make the food entitlements of the respective group fall below the starvation level. It is the totality of entitlement relations that governs whether a person will have the ability to acquire enough food to avoid starvation, and food supply is only one influence among many affecting his entitlement relations.

It is sometimes said that starvation may be caused not by food shortage but by the shortage of income and purchasing power. This can be seen as a rudimentary way of trying to catch the essence of the entitlement approach, since income does give one entitlement to food in a market economy. While income may not always provide command in a fully planned economy, or in a 'shortage economy', in which a different system of entitlement might hold, [1] the income-centred view will be relevant in most circumstances in which famines have occurred. [2] But the inadequacy of the income-centred view arises from the fact that, even in those circumstances in which income does provide command, it offers only a partial picture of the entitlement pattern, and starting the story with the shortage of income is to

[1] See Kornai (1979a) for a far-reaching probe into economics of the 'shortage economy'. See also Kornai (1979b).

[2] A possible exception might conceivably be the Russian famines of 1932-4, but they have not been fully studied yet. See, however, Dalrymple (1964, 1965) and Brown and Anderson (1976, Chapter 6).

leave the tale half-told. People died because they didn't have the income to buy food, but how come they didn't have the income? What they can earn depends on what they can sell and at what price, and starting off with incomes leaves out that part of the entitlement picture. Futhermore, sometimes the income may be just 'notional', e.g. a peasant's possession of the foodgrains he has grown, and then the income-and-purchasing-power story is a bit oblique. To talk about his entitlement to the food he has grown is, of course, more direct. But the main advantage of the entitlement approach rests not in simplicity as such, but -- as explained above -- in providing a more comprehensive account of a person's ability to command commodities in general and food in particular.

10.2 THE POOR: A LEGITIMATE CATEGORY?

The entitlement approach requires the use of categories based on certain types of discrimination. A small peasant and a landless labourer may both be poor, but their fortunes are not tied together. In understanding the proneness to starvation of either we have to view them not as members of the huge army of 'the poor', but as members of particular classes, belonging to

particular occupational groups, having different ownership endowments, and being governed by rather different entitlement relations. Classifying the population into the rich and the poor may serve some purpose in some context, but it is far too undiscriminating to be helpful in analysing starvation, famines, or even poverty.

The grossest category is, of course, the category of the entire population. It is on this that FAD concentrates, in checking food availability per head, and comes to grief (Chapters 6-9). The entitlement approach not merely rejects such grossness; it demands much greater refinement of categories to be able to characterize entitlements of different groups, with each group putting together different people who have similar endowments and entitlements. As a category for causal analysis, 'the poor' isn't a very helpful one, since different groups sharing the same predicament of poverty get there in widely different ways. The contrast between the performances of different occupation groups in famine situations, even between groups that are all

typically poor, indicates the need for avoiding gross categories such as the poor and the rich.

So much for causal analysis. But it might be thought that, while the category of the poor isn't very helpful in such causal analysis, it is useful in the *evaluation* of the extent of poverty in the nation. Indeed, the poor are usually huddled together for a head count in quantifying poverty. There is clearly some legitimacy in the category of the poor in this evaluative context in so far as there is a clear break in our concern about people at the 'poverty line'. In Chapter 2 it was argued that the problem of poverty assessment is quite distinct from the issue of assessment of inequality and requires paying particular attention to the category of the poor. On the other hand, even for evaluative purposes there is need for discrimination *among* the poor according to the severity of deprivation. In the head-count measure, the starving wreck counts no more than the barely poor, and it is easy to construct examples in which in an obvious sense there is an intensification of poverty while the head-count measures is unchanged or records a diminution (see Chapter 3 and Appendix C). Thus, while the category of the poor has some legitimacy in the evaluative context, it is still far too gross a category and requires to be broken down.

The category of the poor is not merely inadequate for evaluative exercises and a nuisance for causal analysis, it can also have distorting effects on policy matters. On the causal side, the lack of discrimination between different circumstances leading to poverty gives rise to a lack of focus in policy choice. Evaluative grossness can also distort. With the use of the head-count measure of poverty, the best rewards to poverty-removal policies are almost always obtained by concentrating on the people who are *just* below the poverty line rather than on those suffering from deep poverty. There is indeed a certain amount of

empirical evidence that gross characterizations of poverty do lead to distortions of public policy. [3]

10.3 WORLD FOOD AVAILABILITY AND STARVATION

The FAD approach applied to the food availability for the population of an entire country is a gross approach, lacking in

[3]See Sen (1975, Appendix A; 1976d).

relevant discrimination. What is a good deal more gross is the FAD approach applied to the population of the world as a whole. The balancing of world supply and world population has nevertheless received a lot of attention recently. While a fall in food availability per head for the world as a whole is neither a necessary nor a sufficient condition for intensification of hunger in the world, it has typically been assumed that the two are rather well correlated with each other. The evidence in favour of that assumption is not abundant, but it may be reasonable to suppose that, if the food availability per head were to go on persistently declining, starvation would be sooner or later accentuated. Different institutions and authors have provided estimates of 'short-falls' the 1980s and beyond, some more alarming than others. [4]

I have little to add to this exacting exercise, except to point out the sensitivity of the results to the assumptions chosen and the remarkable lack of uniformity in the methodologies that have been thought to be appropriate. As far as the present is concerned -- rather than the future -- there is no real evidence of food supply falling behind population growth for the world as a whole, even though this has been observed for a number of countries. There is no outstripping of food growth by population expansion even when we look at the global picturing leaving out the United States, which has been such a large supplier of food to other countries. The 'balance' in the future will depend on a variety of economic and political conditions, [5] but there is as yet no indication that world population expansion has started gaining on the growth of world food supply.

But if the analysis presented in the earlier chapters of this monograph is correct, it is quite possible that severe famine conditions can develop for reasons that are not directly connected with food production at all. The entitlement approach places food production within a network of relationships, and shifts in some of these relations can precipitate gigantic famines even without receiving any impulse from food production.

[4]See, for example, Borgstrom (1969), Ehrlich and Ehrlich (1972), Brown and Eckholm (1974), and Aziz (1975).

[5]See, among others, D. G. Johnson (1967, 1975), Borgstrom (1973), Aziz (1977), Taylor (1975), Sinha (1976a, 1976b, 1977), Barraclough (1977), Buringh (1977), Etienne (1977b), Lappé and Collins (1977), Poleman (1977), Rado and Sinha (1977), Harle (1978), Hay (1978a, 1978b), Sinha and Gordon Drabek (1978), and Interfutures (1979).

It is not my purpose to deny the importance of food production, or of some of the well-analysed issues in international food policy. It is rewarding to consider international insurance arrangements to reduce the food supply vulnerability of particular countries. [6] It is relevant to know how international food aid affects domestic production and distribution, and the world food prices. [7] It *is* also useful to do food balance sheets and integrate them into social account procedures, and to go into more elaborate analysis of 'food systems'. [8] The focus that emerges from this monograph looks at a different direction, namely the need to view the food problem as a relation between people and food in terms of a network of entitlement relations.

Some of the relations are simple (e.g. the peasant's entitlement to the food grown by him), while others are more complex (e.g. the nomad's entitlement to grain through exchange of animals, leading to a net gain in calories -- see Chapters 7 and 8). Some involve the use of the market mechanism (e.g. selling craft products to buy food -- see Chapter 6), while others depend on public policy (e.g. employment benefits, or relief in *langarkhanas* and destitution camps -- see Chapters 6-9). Some are affected by macroeconomic developments (e.g. demand-pull inflation -- see Chapters 6 and 9), while others deal with local calamities (e.g. regional slump -- see Chapter 7), or with microeconomic failures (e.g. denial of fishing rights to a particular community in a particular region [9]). Some are much influenced by speculative activities, while others are not. [10]

It is the set of these diverse influences seen from the perspective of entitlement relations that received attention in this

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[10]In the Bengal famine of 1943 professional speculators played an important part in the second phase of the famine (see Chapter 6, and Sen, 1977b). Holt and Seaman (1979) have argued for analysing this phase in terms of a 'catastrophe' pattern, and in this rapid change speculation was clearly important. On catastrophe theory, see Thom (1975) and Zeeman (1977).

[6]See, D. G. Johnson (1975, 1976), Kaldor (1976), Taylor and Sarris (1976), Aziz (1977), Josling (1977), Weckstein (1977), Reutlinger (1978), Konandreas, Huddleston and Ramangkura (1979), among others.

[7]See Mann (1968), Rogers, Srivastava and Heady (1972), Isenman and Singer (1977), Lappé and Collins (1977), Taylor (1977), and Svedberg (1978, 1979).

[8]See Joy and Payne (1975), Pyatt and Thorbecke (1976), Lörstad (1976), UNRISD (1976), Dickson (1977), Manetsch (1977), Hay (1978a, 1980), de Haen (1978), Chichilnisky (1979), and others, for pointers to different approaches.

[9]See Rangasami (1975), dealing with a local famine in the Goalpara district of Assam in India. See also Rangasami (1974a, 1974b).

monograph, through the analysis of actual famines which have taken place in recent years. In considering food policy, what emerges from this work is the importance of this angle of vision.

10.4 MARKET AND FOOD MOVEMENTS

Whether markets serve well the remedial function of curing famines by food movements has been the subject of a good deal of debating over centuries. Adam Smith (1776) took the view that it did, and that point of view was eloquently defended by Robert Malthus (1800) among others (see Appendix B). These arguments in political economy were widely used by policy-makers, not least in the British Empire. [11]

When a famine was developing in Gujerat in 1812, the Governor of Bombay turned down a proposal for moving food into an affected areas by asserting the advisability of leaving such matters to the market mechanism, quoting 'the celebrated author of the *Wealth of Nations*'. [12] Warren Hastings, who had tackled a famine in Bengal in 1783-4 by using public channels for moving food into the region, was rapped on the knuckles by Colonel Baird-Smith for not having understood his Adam Smith, adding that Hastings could 'scarcely have been expected' to have absorbed Adam Smith so soon (1783) after the publication (1776) of the *Wealth of Nations*. [13] The basically non-interventionist famine policy in India lasted late into the nineteenth century, changing only around the last quarter of it.

Firm believers in the market mechanism were often disappointed by the failure of the market to deliver much. During the Orissa famine of 1865-6, Ravenshaw the Commissioner of Cuttack Division, expressed disappointment that private trade did not bring much food from outside which should have happened since 'under all ordinary rules of political economy the urgent demand for grain in the Cuttack division ought to have created a supply from other and more favoured parts'. [14]

Rashid (1979) has argued that even a non-monopolized group of traders can act together in a monopolistic way to hinder

[11]See Bhatia (1767), Ambirajan (1978) and Rashid (1980).
[12]Quoted in Ambirajan (1978), p. 71. See also Aykroyd (1974).
[13]Quoted in Ambirajan (1978), p. 75.
[14]See Ambirajan (1980), p. 76; italics added.

movement of grains to relieve excess demand. [15] This could be so, but in a slump famine starvation and hunger can go hand in hand with little market pull, and even competitive traders may have little incentive to bring in foodgrain from elsewhere. Adam

Smith's proposition is, in fact, concerned with efficiency in meeting a market demand, but it says nothing on meeting a need that has not been translated into effective demand because of lack of market-based entitlement and shortage of purchasing power.

Indeed, in many famines complaints have been heard that, while famine was raging, food was being *exported* from the famine-stricken country or region. This was, in fact, found to be the case in a relatively small scale in Wollo in 1973 (Chapter 7), and also in Bangladesh in 1974 (Chapter 9). It was a major political issue in the Irish famine of 1840s: 'In the long and troubled history of England and Ireland no issue provoked so much anger or so embittered relations between the two countries as the indisputable fact that huge quantities of food were exported from Ireland to England throughout the period when the people of Ireland were dying of starvation.' [16] Such movements out of famine-stricken areas have been observed in Indian famines as well. [17] In China, British refusal to ban rice exports from famine-affected Hunan was one of the causes of an uprising in 1906, and latter a similar issue was involved in the famous Changsha rice riot of 1910. [18]

Viewed from the entitlement angle, there is nothing extraordinary in the market mechanism taking food away from famine-stricken areas to elsewhere. Market demands are not reflections of biological needs or psychological desires, but choices based on exchange entitlement relations. If one doesn't have much to exchange, one can't demand very much, and may thus lose out in competition with others whose needs may be a good deal less acute, but whose entitlements are stronger. [19] In

[15]It is also possible to show how easily speculation can be destabilizing (see Hart, 1977).
[16]Woodham- Smith (1975), p. 70.
[17]See Ghosh (1979). Also Bhatia (1967) and Rashid (1980).
[18]Esherick (1976). Food movement from Bangladesh into India during the Bangladesh famine was also a politically explosive issue.
[19]This is one of the reasons why it is misleading to characterize a famine arising from a crop failure as being due to a fall in food availability. With crop failure people's incomes also collapse -- and their ability to attract food from elsewhere -- and the situation is best seen as a failure of entitlement and not as just a drop in food availability.

fact, in a slump famine such a tendency will be quite common, unless other regions have a more severe depression. Thus, food being *exported* from famine-stricken areas may be a 'natural' characteristic of the market which respects entitlement rather than needs.

10-5 FAMINES AS FAILURES OF ENTITLEMENT

The entitlement approach views famines as economic disasters, not as just food crises. The empirical studies brought out several distinct ways in which famines can develop -- defying the stereotyped uniformity of food availability decline (FAD). While famine victims share a common predicament, the economic forces leading to that predicament can be most diverse.

A comparative picture of some aspects of four famines studied in Chapters 6, 7, and 9 is presented in Table 10.1, though it misses out many other contrasts discussed in detail in those chapters. (The famines in the six Sahel countries analysed in Chapter 8 have not been included in the table because of some lack of uniformity between the experiences of the different Sahel countries, but the over-all picture is rather similar to that of the Ethiopian famines.)

That famines can take place without a substantial food availability decline is of interest mainly because of the hold that the food availability approach has in the usual famine analysis. [20]

It has also led to disastrous policy failure in the past. [21] The entitlement approach concentrates instead on the ability of different sections of the population to establish command over food, using the entitlement relations operating in that society depending on its legal, economic, political, and social characteristics.

I end with four general observations about the entitlement approach to famines. First, the entitlement approach provides a general framework for analysing famines rather than one particular hypothesis about their causation. There is, of course, a

[20] In addition to explicit use of the FAD approach, very often it is implicity employed in separating out the total food supply per head as the strategic variable to look at.

[21] The failure to *anticipate* the Bengal famine, which killed about three million people, and indeed the inability even to *recognise* it when it came, can be traced largely to the government's overriding concern with aggregate food availability statistics (see Chapter 6 above, and Sen, 1977b).

TABLE 10.1

Comparative Analysis of Four Famines

	Was there a food availability decline	*Which occupation group provided the largest*	*Did that group suffer substantial*	*Did that group suffer exchange entitlement*
which				

		number	*endowment*	
famine?	*collapse?*	*of famine victims?*	*loss?*	*shifts?*
Bengal famine 1943	No	Rural labour	No	Yes
Ethiopian famine (Wollo) 1973	No	Farmer	A little, Yes	Yes
Ethiopian famine (Harerghe) 1974	Yes	Pastorallst	Yes	Yes
Bangladesh famine 1974	No	Rural labour	Earlier, yes	Yes

very *general* hypothesis underlying the approach, which is subject to empirical testing. It will be violated if starvation in famines is shown to arise not from entitlement failures but either from choice characteristics (e.g. people refusing to eat unfamiliar food which they are in a position to buy, [22] or people refusing to work [23]), or from non-entitlement transfers (e.g. looting [24]). But the main interest in the approach does not, I think, lie in checking *whether* most famines are related to entitlement failures, which I suspect would be found to be the case, but in characterizing the nature and *causes* of the entitlement failures where such failures occur. The contrast between different types of entitlement failures is important in understanding the precise causation of famines and in devising famine policies: anticipation, relief, and prevention.

Second, it is of interest that famines can arise in over-all boom conditions (as in Bengal in 1943) as well as in slump conditions (as in Ethiopia in 1974). Slump famines may appear to be less contrary to the 'common sense' about famines, even though it is, in fact, quite possible for such a slump to involve contraction of

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[22]However, anecdotal accounts of dietary inflexibilities can be less flexible than the dietary habits themselves, as judged by the following interesting statement by Dom Moraes, the distinguished poet: '. . . in India in the 1940's there was a famine in Bengal and millions of people died. During the famine, the British brought in a large amount of wheat. Now, the people of Bengal are traditionally rice eaters and they would not change their eating habits; they literally starved to death in front of shops and mobile units where wheat was available. Education must reach such people' (Moraes, 1975, p. 40). Education must, of course, reach all, but there is, in fact, little evidence of the hungry refusing any edible commodities during the Bengal famine (see Famine Inquiry Commission, 1945a; also Ghosh, 1944 and Das 1949). The explanation of people dying in front of shops has to be sought elsewhere, in particular in the shortage of purchasing power and the minuteness of free distribution compared with the size of the hungry population queuing up for any food whatsoever (see Chapter 6 above).

[23]Haile Selassie, the Emperor of Ethiopia, apparently provided the following remarkable analysis of the famine in his country in June 1973: 'Rich and poor have always existed and always will. Why? Because there are those that work...and those that prefer to do nothing.... We have said wealth has to be gained through hard work. We have said those who don't work starve.' (Interview report by Oriana Fallaci; quoted by Wiseberg, 1976, p. 108.) They have indeed 'said' that for many centuries, in different lands.

[24]Such non-entitlement transfers have played a part in some famines of the past. As an example, see Walter Mallory's (1926) account of the 1925 famine in Szechwan: 'The Kweichow troops invaded southern Szechwan and after some fighting were driven out. When they left they took with them all available beasts of burden, loaded with grain. The Szechwan troops who replaced them brought very little in the way of supplies and forthwith appropriated the remainder of the food reserves of the district -- leaving the population, who had no interests in either side, to starve' (pp. 78-9).

outputs *other than* those of food (e.g. of cash crops). Boom famines might seem particularly counter-intuitive; but, as discussed, famines can take place with increased output in general and of food in particular if the command system (e.g. market pull) shifts against some particular group. In this relative shift the process of the boom itself may play a major part if the boom takes the form of uneven expansion (for example favouring the urban population and leaving the rural labourers relatively behind). In the fight for market command over food, one group can suffer precisely from another group's prosperity, with the Devil taking the hindmost. [25]

Third, it is important to distinguish between decline of food *availability* and that of *direct entitlement* to food. The former is concerned with how much food there is in the economy in question, while the latter deals with each food-grower's output of food which he is entitled to consume directly. In a peasant economy a crop failure would reduce both availability and the direct entitlement to food of the peasants. But in so far as the peasant typically lives on his own-grown food and has little ability to sell and buy additional food from the market anyway, the immediate reason for his starvation would be his direct

entitlement failure rather than a decline in food availability in the market. Indeed, if his own crop fails while those of others do not, the total supply may be large while he starves. Similarly, if his crop is large while that of others go down, he may still be able to do quite well despite the fall in total supply. The analytical contrast is important even though the two phenomena may happen simultaneously in a general crop failure. While such a crop failure may superficially look like just a crisis of food availability, something more than availability is involved. This is important to recognize also from the policy point of view, since just moving food into such an area will not help the affected population when what is required is the generation of food entitlement.

Finally, the focus on entitlement has the effect of emphasizing

[25] When the fast progressing groups are themselves poor, the development of the famine may be accompanied by a reduction in the number of people below some general 'poverty line', leading to a recorded reduction of poverty as it is conventionally measured, i.e. in terms of head-count ratio. The problem is less acute with distribution-sensitive measures of poverty. See Appendix C.

legal rights. Other relevant factors, for example market forces, can be seen as operating *through* a system of legal relations (ownership rights, contractual obligations, legal exchanges, etc.). The law stands between food availability and food entitlement. Starvation deaths can reflect legality with a vengeance.

Appendix A

Exchange Entitlement

A.1

FIXED PRICE EXCHANGES

X is the non-negative orthant of n-dimensional real space, representing the amounts of *n* commodities; it is the set of all non-negative vectors of all commodities. γ is the power-set of *X,* i.e., the set of all subsets of *X.* Let x be the vector of commodities (including 'labour power') that the person owns, and p is the *n*-vector of prices faced by him.

Given his ownership vector x, his exchange entitlement set *E*(x) is the set of vectors any one of which he can acquire by exchanging x.

$$(A_1) \qquad E(x) = \{y \mid y \in X \;\&\; py \leq p\,x\}.]$$

The function E (.) from X to γ is his 'exchange entitlement mapping', or E-mapping, for short.

Two explanatory points. First, clearly $x \in E(x)$. Second, the exchanges covered by (A_1) are not, of course, confined to selling all of x, and a part of it can be retained (since this will not affect the exchange-possibility of the remainder, as given by (A_1)

Let the set of commodity vectors that satisfy the specified minimum food requirement be given by $F \subseteq X$. Starvation must occur, in the absence of non-entitlement transfers (such as looting), if $E(x) \cap F = \varphi$. The 'starvation set' S of ownership vectors consists of those vectors x in X such that the exchange entitlement set $E(X)$ contains no vector satisfying the minimum food requirements. Obviously, S depends on F and the E-mapping.

$$(A_2) \qquad S = \{x \mid x \in X \ \& \ E(x) \in F = \varphi\}.]$$

To illustrate consider a simple two-commodity case with commodity I standing for food, and let OA in Figure A_1 represent the minimum food requirement. The price ratio is given by p. The starvation set S is given by the region OAB.

More generally, when food is not one commodity but many and the 'food requirements' can be met in many different ways, let the minimum cost of meeting the food requirements, i.e. for attaining any vector in F, be $m(p, F)$.

$$(A3) \qquad m(p, F) == \min px \mid x \in F.$$

FIG. A_1 Starvation set

The starvation set can be alternatively characterized for this case as:

$$(A_4) \qquad S = \{x \mid x \in X \ \& \ px \ll m(p, F)\}.$$

Finally, it may be noted that it is possible to specify F taking into account taste constraints (see Chapter 2). In applying these concepts to the analysis of famines as opposed to regular poverty the taste constraints may, however, play a rather limited role. It is also possible to include essential non-food requirements in the specification of F.

A.2 VARIABLE PRICE EXCHANGES

If the person is not a price-taker, then the simple model outlined above will not work, in particular equations (A_1), (A_3), and (A_4). In general, we can characterize the exchange possibilities in terms of a 'net cost function' $f(y, z)$, representing the net cost of buying y and selling z:

(A_5) $f(y, z)$ is a real-valued function, with $f(O, O) = O$.

The E-mapping can now be redefined as:

(A_6) $$E(x) = \{(x - z + y) \mid y, z \in X \;\&\; z \leq x \;\&\; f(y, z) \leq O\}.$$

The interpretation of z is, of course, that of the vector of sales by this person, while y stands for his purchases. Obviously, $x \in E(x)$.

The starvation set S is still given by (A_2), but now coupled with (A_5) and (A_6).

A.3 DIRECT PRODUCTION AND TRADE

The person can use his ownership vector not only for trade, or for his own consumption, but also for production. The production possibilities open to him can be characterized by another mapping $Q(.)$ from X to Γ, representing, for any vector of inputs s, the set $Q(s)$ of output vectors, any of which he can produce.

(A_7) $Q(.)$ mapping from X to Γ with $Q(O) = \{O\}$, unit set consisting of the null vector.

Consider, now, the person owning x, buying r to be used as inputs, buying y to be used for consumption, selling z to meet the cost of purchases, and producing q by using a part s of x *plus* purchased inputs r. The exchange entitlement mapping is now given by:

(A8) $$E(x) = \{(x - s + q - z + y) \mid r, s, y, z \in X \;\&\; (s + z) \leq (x + q) \;\&\; q \in Q(s + r) \;\&\; f(r + y, z) \leq O\}.$$

The functions $f(.)$ and $Q(.)$ can be defined to take note of taxes, subsidies, social security benefits, etc.The starvation set once again is given by (A_2), combined with this.

A.4 SPECIAL CASES

We can now consider some special stipulations, taking (A_2), (A_5), (A_7), and (A8) as the general structure.

Stipulation (i): r = O.
Stipulation (ii): $Q(s) = \{s\}$, unit set, keeping s unaffected.
Stipulation (iii): $f(y, z) = p(y - z)$, where p is a non-negative n-vector.

If we stipulate (i), (ii), and (iii), we are back to the case covered in Section A.$_1$, with exchange entitlement mapping characterized by (A I) and the starvation set by (A_4). If only (i) and (ii) are stipulated but

not (iii), then we have the case without direct production, but also without fixed prices for exchange, essentially the same [1] as the one discussed in Section A. $_2$. If only stipulation (i) is imposed, direct production is permitted with owned resources only, without the person being able to set himself up at all as an 'entrepreneur', purchasing inputs for productive use. Combined with (iii) this provides an

[1]The only difference is a purely formal one, viz., that production being 'undertaken' with s yielding just s is not really a 'production' at all, though $Q(s) = \{s\}$ makes it look like that, formally.

analogue to the usual simple characterization of production and competitive trade, as in figure A $_2$, with OAB standing for E (x), given the production frontier CD and the inter-good exchange rate given by angle ABO.

A.5 ECONOMIC STATUS AND MODES OF PRODUCTION

The landless labourer, having nothing to sell other than his 'labour power' and not in a position to undertake production on his own, is covered by stipulations (i) and (ii), i.e. the case discussed in Section A. $_2$. If the wage rate is fixed and so are the commodity prices, then this reduces to the simpler case covered in Section A. $_1$, with stipulation (iii) being imposed as well.

The small peasant farmer, undertaking production with his own resources, including his labour power, land, etc., corresponds to the case with stipulation (i). Since typically small peasants, even in the poor developing countries, buy some inputs from outside, and sometimes even labour power (especially at the time of harvesting), it is perhaps best to think of stipulation (i) as being a bit of an exaggeration, with the true situation being captured accurately only in some model within the general framework of Section A. $_3$.

The share-cropper also falls in this category, since he undertakes production, gets some part of the return (and $Q(.)$ must now be seen as his return function and not the function of total production), and buys some inputs (though typically not all). If the owner provides all the resources other than the share-cropper's labour power, then the case is one in which stipulation (i) does hold, interpreting $Q(.)$ as a function of his own labour.

The large farmer will clearly violate all the stipulations in question. But if he is an absentee landlord, then there will be a new stipulation that s will not contain any of one's own labour. If the absentee landlord rents out his land at a fixed rent then it will again be a case as in Section A. $_I$ or A. $_2$, without production being directly involved in the landlord's exchange entitlement. If he leases it out to a share-cropper, then whether the production circumstances are directly involved or not will

depend on whether he plays an active part in the production decisions. If he does, then the choices introduced by $Q(.)$ are open to him; if not, he is just selling the services of his land for a reward, which, though variable, is not within his control once contracted out.

Similar contrasts can be drawn outside agriculture as well, e.g. the industrial proletariat living on selling his labour power, the capitalist industrialist producing mainly with purchased inputs, and so on.

When a labourer fails to find employment, the entitlement question depends on what arrangements for social security there happens to be.

FIG. A_2 Entitlement set with Own Production and Competitive Trade

If there are guaranteed unemployment benefits, then the entitlements arising therefrom can be characterized as a special case of entitlement related to labour power as such. This will require a dual set of prices for labour power, viz. a wage rate w if the person finds employment and a social insurance benefit b if he does not, with wb. The entitlement is characterized not in terms of what he *expects,* but in terms of whether or not he can actually find employment. The focus is not on a person's subjective assessment, but on the real possibilities. This means that even in a given market situation there may be big differences between the positions of different workers in it, depending on whether the person's entitlement gets determined by his wage rate (or wage rates) or by social security benefits. In the absence of a social security system, the contrast

is even sharper, since the entitlement of his labour power will be zero if he cannot obtain employment. [2]

A.6 OWN-PRODUCTION ENTITLEMENT

In Sections $A._1$ and $A._2$ a person's exchange entitlement was considered in terms of trade only. Later, production was incorporated into the general structure of exchange entitlement, treating production as a form of exchange (with 'nature'). But in some contexts, it is useful to distinguish between the entitlements arising purely from trade and those arising purely from production without any trade. The 'pure trade entitlement relation' $T(.)$ can be defined in exactly the same way as the exchange entitlement relation was defined in the absence of production possibilities -- the only difference being that now production possibilities can exist without being taken into account in the T-mapping.

$$(A_9) \qquad T(x) = \{(z - z + y) \mid \ y, z \in X \ \& \ z \leq x \ \& \ f(y, z) \leq O\}.$$

The other pure case is production without any trade, and this leads to the 'own-production entitlement relation' $P(.)$, as defined below. In Chapter 5 $P(.)$ was also called the 'direct entitlement relation'.

$$(A_{10}) \qquad P(x) = \{(x - s + q) \mid s \in X \,\&\, s \leq x \,\&\, q \in Q(s)\}$$

It is easily checked that $T(x)$, $P(x) \subseteq E(x)$, but $E(x)$ is *not* in general $\subseteq T(x) \cup P(x)$. Note also that x belongs to both $T(x)$ and $P(x)$.

The own-production entitlement relation gives an idea of what the person can secure independently of the working of the rest of the economy. If $P(x) \cap F$ is non-empty, then the person can see to it that he does not starve, no matter how the rest of the economy operates. This consideration is of some importance when the trade relations are subject to sharp fluctuations owing to forces operating on the economy as a whole, as is frequently the case in times of famine. The case of $P(x) \cap F \neq \emptyset$ will be called 'trade-independent security'.

In the literature of 'general equilibrium', it is typically assumed that every one has trade-independent security. As Tjalling Koopmans (1957) puts it, 'they assume that each consumer can, if necessary, survive on the basis of the resources he holds and the direct use of his own labor, without engaging in exchange, and still have something to spare of some type of labor which is sure to meet with a positive price in

[2]This is one reason why the concept of 'exchange entitlement' cannot be reduced to a derivative of *'terms* of trade', since the possibility of trade is itself a part of the picture captured by exchange entitlement, including non-trade (e.g. unemployment). Another reason is, of course, the fact that exchange entitlements include production possibilities as well.

any equilibrium' (p. 59). [3] But this is a very exacting assumption, and is violated by most of humanity in modern societies. While a peasant with his own land and other resources needed to grow food may indeed have trade-independent security,.an industrial worker with only his labour power to sell clearly does not. Nor would even the industrial capitalist, unless he happens to keep a large stock of food, since the strength of his position in terms of command over food arises from exchange and not from direct holding or of own-production entitlement.

Even within the rural economy, landless agricultural labourers have little chance of survival except through selling their labour power, and the position contrasts sharply with that of peasants. Indeed, the growth of a labouring class with nothing but labour power to sell (i.e., the emergence of labour power as a 'commodity' in the Marxian sense) has led to a very widespread absence of trade-independent security, and -- as discussed in Chapter 5 -- the problem of vulnerability to famine situation has much to do with this development. The phase of economic development *after* the emergence of a large class of wage labourers but *before* the development of social security arrangements is potentially a deeply vulnerable one. [4]

Finally, even for landless rural population, the exchange entitlement can vary a great deal depending precisely on tenancy arrangements. Security of tenure gives an entitlement of a kind that, while formally involving trade, can be seen as something very like own-production entitlement. Even a share-cropper with security of tenure is, in this respect, in a much less vulnerable position than an agricultural labourer, who can be fired quite easily. Another advantage that the share-cropper has over agricultural labourer relates to the fact that his returns typically take the form of a part of the actual output. If the output happens to be foodgrains, this makes him a good deal less vulnerable to the vagaries of the market than the agricultural labourer employed at a monetary wage. This lower vulnerability can, of course, co-exist with vicious 'exploitation' of the share-cropper, viewed from a different perspective.

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[3]See also Arrow and Hahn (1971), pp. 116-22.

[4]Some problems of this "pure exchange system transition" -- PEST for short -- are discussed in Sen (1980d).

Appendix B

Illustrative Models of Exchange Entitlement

B.1
INTRODUCTORY REMARKS

The determination of exchange entitlements in any real economy is a complex process, since a variety of influences -- economic, social, and political -- operate on the parameters in *f*(.), *Q*(.), etc., for each group. The process, as discussed in the text, will also vary substantially according to the precise institutional structure of the economy. While there is clearly little point in trying to develop a general theory of exchange entitlement determination (Appendix A was, of course, concerned exclusively with *characterization* rather than *determination* of exchange entitlements), there is perhaps some merit in illustrating the nature of the problem by considering some simple models. Two such models are presented in this Note, one based on Malthus analysis in *An Investigation of the Cause of the Present High Price of Provisions* (1800), and the other trying to capture an important aspect of the causation of the Bengal famine in 1943, analysed in Chapter 6.

B.2
MALTHUS ON THE POOR LAWS AND THE PRICE OF CORN

There is little doubt that Malthus's analysis of food shortage in 1800 was a supplement to his theory of population presented two years earlier:

To what then can we attribute the present inability in the country to support its inhabitants, but to the increase of population? I own that I cannot but consider the late severe pressures of distress on every deficiency in our crops, as a very strong exemplification of a principle which I endeavoured to explain in an essay published about two years ago, entitled, *An Essay on the Principle of Population, as it affects the future Improvement of Society*. It was considered by many who read it, merely as a specious argument, inapplicable to the present state of society; because it contradicted some preconceived opinions on these subjects. Two years' reflection have, however, served strongly to convince me of the truth of the principle there advanced, and of its being the real cause of the continued depression and poverty of the lower classes of society, of the total inadequacy of all the present establishments in their favour to relieve them, and of the periodical returns of such seasons of distress as we have of late experienced. [1]

But over and above claiming confirmation for his theory of food shortage arising from population expansion, Malthus also presented a theory linking food shortage to the behaviour of prices and

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[1]Malthus (1880), p. 25.

distribution, and that theory was not essentially dependent on the *genesis* of the food shortage. It is that theory with which I am concerned in this Note, and not with Malthus's theory of population.

Malthus's analysis of adjustments of food prices had two notable features. First, prices had to rise to eliminate a sufficient number of demanders from the market to make the current supply last. The price rise was caused not by speculative activities but simply by the role of prices to adjust demand to supply.

It seems now to be universally agreed, that the stock of old corn remaining on hand at the beginning of the harvest this year was unusually small, notwithstanding that the harvest came on nearly a month sooner than could have been expected in the beginning of June. This is a clear, decided, and unanswerable proof that there had been no speculations in corn that were prejudicial to the country. All that the larger farmers and cornfactors had done, was to raise the corn to that price which excluded a sufficient number from their usual consumption, to enable the supply to last throughout the year. [2]

The second feature was the role attributed to the operation of the system of parish allowances in making it difficult to eliminate the demand for food by the poor, thereby leading to a much larger increase in prices.

This price, however, has been most essentially and powerfully affected by the ability that has been given to the labouring poor, by means of parish allowances, of continuing to purchase wheat notwithstanding its extraordinary rise. [3]

Malthus did not, of course, condemn the parish allowances for this reason, but regarded it as absurd that the poor should complain of the price rise.

I do not, however, by any means, intend to infer, from what I have said, that the parish allowances have been prejudicial to the state; or that, as far as the system has been hitherto pursued, or is likely to be pursued, in this country, that it is not one of the best modes of relief that the circumstances of the case will admit. The system of the poor laws, in general, I certainly do most heartily condemn, as I have expressed in another place, but I am inclined to think that their operation in the present scarcity has been advantageous to the country. The principal benefit which they have produced, is exactly that which is most bitterly complained of -- the high price of all the necessaries of life. The poor cry out

[2]Malthus (1880), p. 16. It is worth remarking that Malthus's arguments in favour of the stabilizing role of speculation, on grounds that if the speculator 'be wrong in his speculation, he loses perhaps very considerably himself' (p. 15), is in line with the modern defence of speculation as a stabilizing activity. Indeed, Malthus anticipates by a good many years John Stuart Mill's similar argument, to which the ancestry of the defence of the stabilizing role of speculation is usually traced. (See Hart, 1977, for an illuminating analysis of the limitation of the argument.)

[3]Malthus (1880), p. 16.

loudly at this price; but, in so doing, they are very little aware of what they are about; for it has undoubtedly been owing to this price that a much greater number of them has not been starved. [4]

Indeed, in the system of parish allowances, Malthus saw a mechanism that would magnify the price rise owing to the food shortage in an almost unending price explosion.

The poor complained to the justices that their wages would not enable them to supply their families in the single article of bread. The justices very humanely, and I am far from saying improperly, listened to their complaints, inquired what was the smallest sum on which they could support their families, at the then price of wheat, and gave an order of relief on the parish accordingly. The poor were now enabled for a short time, to purchase nearly their usual quantity of flour; but the stock in the country was not sufficient, even with the prospect of importation, to allow of the usual distribution to all its members. The crop was consuming too fast. Every market day the demand exceeded the supply; and those whose business it was to judge on these subjects, felt convinced, that in a month or two the scarcity would be greater than it was at that time. Those who were able, therefore, kept back their corn. . . . The corn, therefore, naturally rose. The poor were again distressed. Fresh complaints were made to the justices, and a further relief granted; but, like the water from the mouth of Tantalus, the corn still slipped from the grasp of the poor; and rose again so as to disable them from purchasing a sufficiency to keep their families in health. The alarm now became still greater, and more general. . . . With further relief and additional command of money in the lower classes, and the consequent increased consumption, the number of purchasers at the then price would naturally exceed the supply. The corn would in consequence continue rising. [5]

Malthus was most critical of the proposal to insulate the poor against price rises by making the wages paid to the poor proportional to food prices. He saw in this the possibility of dragging the middle classes down to starvation also.

It has often been proposed, and more than once I believe, in the House of Commons, to proportion the price of labour exactly to the price of provisions. This, though it would be always a bad plan, might pass tolerably in years of moderate plenty, or in a country that was in the habit of considerable exportation of grain. But let us see what would be its operation in a real scarcity. We suppose, for the sake of the argument, that by law every kind of labour is to be paid accurately in proportion to the price of corn, and that the rich are to be assessed to the utmost to support those in the same manner who are thrown out of employment, and fall upon the parish. We allow the scarcity to be an irremediable deficiency of one-fourth of all the provisions of the country. . . . The middle classes of society would very soon be blended with the poor; and the largest fortunes could not long stand against the accumulated

[4]Malthus (1800), pp. 18-19.
[5]Malthus (1800), pp. 11-13.

pressure of the extraordinary price of provisions, on the one hand, and the still more extraordinary assessments for allowances to those who had no other means of support, on the other. The corn-factors and farmers would undoubtedly be the last that suffered, but, at the expiration of the three quarters of a year, what they received with one hand, they must give away with the other; and a most complete levelling of all property, would take place. All would have the same quantity of money. All the provisions of the country would be consumed; and all the people would starve together. [6]

Malthus hastened to reassure his readers, most of whom had -- I take it -- little to gain from 'a most complete levelling of all property' and from the food shortage being shared by all starving 'together', that 'there is no kind of fear, that any such tragic event should ever happen in any country' (p. 18).

Malthus's analysis can be captured in terms of a simple model, dealing both with the influence of poor laws on prices, and consequently on the exchange entitlement of the different classes, and with the 'tragic' possibility so feared by Malthus. Let the money incomes of the rich and poor be y_1 and y_2 per head respectively, and their respective numbers be n_1, and n_2. The income of the poor consists of their money earning w and receipt of transfer t from the rich arranged by the Poor Laws, while the income of the rich consists of their money earning u *minus* what they have to pay for the Poor Law transfers. The transfers are aimed at giving the poor the ability to buy a decent ration r of food grains at the prevailing price p, if that is possible. The 'tragic event' considered by Malthus refers to the hypothetical possibility that there are no limits to transfers as long as the rich are richer than the poor.

Considering the exchange entitlement of the rich and the poor only for the special case of command over corn, they are given respectively by e_1 and e_2 :

$$(B_1) \qquad e_i = y_i/p, \qquad \text{with } i = 1, 2$$

$$(B_2) \qquad y_1 = u - (tn_2/n_1), \qquad \text{subject to } y_1 \geq y_2,$$

$$(B_3) \qquad y_2 = w + t.$$

If the proposed Poor Law transfer t is inadequate to provide the poor with adequate exchange entitlement for them to enjoy the decent ration r, then the transfer t is to be revised upwards, as long as the income of the rich y_1 remains higher than y_2. So there are two alternative conditions of equilibrium, viz.:

$$(B_4) \qquad \text{either} \qquad e_2 = r$$

$$\text{or} \qquad y_1 = y_2.$$

[6]Malthus (1800), pp. 17-18.

As long as $e_2 \ll r$, and $y_2 \ll y_1$, the value of the transfer t is to be raised upwards.

Finally, the model of price determination that Malthus considers in this case is simply one of the price being high enough to meet the money demand for a given supply of corn. Assuming that the poor spend all their income on corn, while the rich spend a proportion c -≤ 1 of their income on corn, the total money demand is given by:

$$(B_5) \qquad D = cy_1 n_1 + y_2 n_2.$$

The price of corn for the given supply q is, then,

$$(B_6) \qquad p = D/q.$$

The exchange entitlement of the poor can be shown, by combining (B_1), (B_5), and (B_6), to equal the following:

$$(B_7) \qquad e_2 = (y_2 q)/(cy_1 n_1 + y_2 n_2).$$

If e_2 is large enough to meet the ration requirement r, then an equilibrium is well established at that point without the rich being levelled down to the level of the poor. This is one case that Malthus considers, and he comments on the effect of Poor Law transfers on raising the price of corn. It is easily checked that the price of corn is indeed positively related to the transfer value t, given $c \gg 1$:

$$(B_8) \qquad p = \{ cun_1 + wn_2 + tn_2(1 - c)\} /q.$$

It is the recognition of this relationship that prompts Malthus to express his ire that the poor, in crying out 'loudly at this high price', are very little aware of what they are about; for it has undoubtedly been owing to this price that a much greater number of them has not been starved'. Malthus also spells out the process of equilibriation in terms of a sequence of steps with the value of transfer t having to be raised to meet *r,* and then this rise in *t* causing the price of corn to rise, leading to the need for a fresh upward revision of the transfer value *t.* While the dynamic model is under-specified, it is easy to complete it, in more than one way.

The other case that Malthus considered is the 'tragic event' in which the equilibriation takes place with $y_1 = y_2$: 'all would have the same quantity of money'. The stage is set for this by combining the plan of making the income of the poor proportional to 'the price of provisions' for them to be able to meet food requirements in full, while there is 'an irremediable deficiency of one-fourth of all the provisions of the country'. Forgetting the arbitrary figure of one-fourth, the point is that the food supply *q* is being taken to be less than what will be needed to

entitle everyone to the norm of the food ration of r. This amounts to the following:

$$(B9) \qquad q \gg (n_1 + n_2)r.$$

Considering the inequality (B9) with the equation (B7), it is easily obtained:

$$(B10) \qquad e_2 \gg \{y_2(n_1 + n_2)r\}/(cy_1 n_1 + y_2 n_2)$$

Assuming that, as long as the rich have an income at least as large as that of the poor, i.e. $y_1 \geq y_2$, the expenditure on food by the rich must also be at least as large as that of the poor, i.e. cy1 ≥ y2 it follows from (B10) that $e_2 \ll r.$ Thus, assuming that *e* goes to 1 as y_1 approaches y_2, the only possible equilibrium emerges when c = 1 $y_1 = y_2$, that 'tragic event' when 'all the people would starve together', rather than the rich starving less than the poor.In this formulation of Malthus's model the effect of price rise on the income of grain sellers has not been explicitly brought in. This is, of course, easy enough to do -- most simply by making *u* and *w* rise with price *p* -- and it will not affect either of the two propositions under discussion. It will introduce a'money-expenditure multiplier effect' of a rise in t, reinforcing its direct price-raising effect. And it will leave the reasoning about the only possible equilibrium being one of $e_2 = r,$ or of $y_1 = y_2,$ quite unaffected.

B.3
A MODEL OF INTER-CLASS DISTRIBUTION AND EXCHANGE ENTITLEMENT

Malthus's model is one of short-run price determination with supply of foodgrains being given. This feature of' it is not inappropriate for analysing a famine situation developing when the foodgrains output has

already been fixed by the preceding crop for quite a few months. In providing a simple model of interdependence to capture one aspect of the Bengal famine of 1943, I shall retain this feature. But the classification of the population has to be different from that of Malthus to bring in different classes with different economic roles. And the 'circularity' of exchange has to be studied.In what follows, a five-class economy will be considered, denoted by
the indices 1, . . ., 5 respectively as:

1. agricultural capitalists and landlords;
2. peasants;
3. urban and semi-urban workers (urban industrial labour force, military construction workers, urban casual labourers, etc.);
4. rural workers (agricultural labourers);

rural household producers (rural service providers, craftsmen, etc.). [7]

This is, of course, quite a drastic simplification (contrast the class structure considered in Chapter 6), but it is adequate for the purpose of bringing out some of the more important contrasting movements of exchange entitlement.

The number of people in each group is denoted by ni, with $i = 1, \ldots, 5$, respectively. The foodgrains output in peasant farms is given by q_2 per peasant, and in non-peasant farms by q_1 per person of the landed class. The money wage rates of protected and unprotected workers are given respectively by w_3 and w_4. The money income of the rural household producers is denoted by v per person; the physical units of output is taken to be one unit per person (thus the price of the product per unit is also v).

The price of foodgrains is determined by the money demand D^f for the marketed supply of foodgrains and that supply is determined by proportions m_1 and m_2 marketed out of the non-peasant and peasant farming outputs respectively.

$$p = D^f/(n_1 m_1 q_1 + n_2 m_2 q_2). \qquad \text{(B11)}$$

The money demand for the marketed supply of foodgrains comes from urban and semi-urban workers, rural workers and rural household producers, with the respective money demands being represented by

with $i = 3, 4, 5$.

(B 12)

The price of household products of group 5 are determined also by the money demand for it, Dv, and its supply, which is given by n5 since the physical output is one per person. Dv is made up of demands from the various groups.

(B13) $v = D^v/n_5$.

(B14)

Now the demand relations. Agricultural capitalists and landlords, and peasants, respectively spend proportions h_1 and h_2 of their money

[7]In this model, the industrial capitalists have not been explicitly considered. They are, of course, implicitly present in the determination of employment and wage rates to the urban and semi-urban labour force, and in the political economy underlying rationing of foodgrains. But as far as their own demands are concerned it is assumed that industrial capitalists' demand for foodgrains and rural household products is a negligible part of the total demand in the two respective markets.

incomes on rural household products. Urban and semi-urban workers are taken here to be protected by a wage policy -- or rationing at controlled prices with government subsidizing real income by food subsidy (see Chapter 6) -- in such a way that each of them can obtain r amount of foodgrains. They do not demand any rural household services or goods. Rural workers spend a proportions c_4 and h_4 on foodgrains and rural household products, respectively, and $c_4 + h_4 = 1$. Rural household producers spend proportions c_5 and h_5 on foodgrains and rural household products, respectively, and $c_5 + h_5 = 1$. (It is assumed that rural household producers also demand products of their sector in the market; this is to take note of the fact that there are many types of such products in reality.)

(B15) with i = 1, 2.

(B16)

(B17)

(B18)

(B19)

(B20)

(B21)

Piecing together (B_{13}), (B_{14}), (B_{15}), (B_{18}), (B_{20}), and (B_{21}), the price v of rural household products is seen to be given by the following:

$$v=[p(n_1 m_1 q_1 h_1 + n_2 m_2 q_2 h_2) + n_4 w_4 h_4]/n_5(I-h_2) \quad \text{(B22)}$$

Using (B11), (B12), (B16), (B17), (B19), (B21), and (B22), and noting that $c_i + h_i = 1$ for $i = 4, 5$, it can be shown that the price of foodgrains is given by the following:

$$p=n_4 w_4/[n_1 m_1 q_1 (I-h_1) + n_2 m_2 q_2 (I-h_2) - n_3 r]. \quad \text{(B23)}$$

In this short-run model the following parameters are taken as fixed: the outputs q_i, the shares marketed m_i, the numbers involved n_i, and the consumption ratios h_i and *ci.* The money wage w_4 of the rural workers is also taken as fixed, the payments being seasonal and having been made. The difference that is being considered arises from an expansion of the urban and semi-urban activities owing to military expenditure, defence-related industries, and construction, and related economic activities. The simplest characterization of that is in terms of a raising of r, the real ration guaranteed in the urban sector. (Much of the change in 1943 Bengal, which this model tries to imitate in general terms, took the form of drawing labour from ill-paid occupations or the pool of unemployment to a rather buoyant wage sector. The industrial labour

force and the general residents of Calcutta were also guaranteed fairly substantial food rations through the state policy of procurement and subsidization of the retail price; see Chapter 6.)

It is easily checked, from (B_{22}) and (B_{23}), that

$$\text{(B}_{24}\text{)} \qquad \frac{dp}{dr} > 0, \text{ and } \frac{dv}{dr} > 0.$$

This is straightforward enough, but the more interesting question concerns the effect of a higher r on the exchange entitlement of each class of people considered. While exchange entitlement $E(\mathbf{x})$ specifies a set of commodity vectors, any of which can be commanded by the person in question by using his ownership vector $\mathbf{x}$ (see Appendix A), I shall in this particular exercise confine the analysis to the total amount of foodgrains e_i that could be commanded by a typical member of each class i.

The entitlement per head e_3 of the protected urban labour force is, of course, given by *r,* and that of the peasants e_2 is simply given by the food produced per head in peasant farms. The entitlement e_4 of rural workers is given by the amount of food that the wage rate w_4 will buy, and the corresponding figure for rural household producers e_5 equals the food that *v* will buy. And the entitlement of agricultural capitalists and landed classes is determined by the output q_1 minus the amount of food that has to be sold to meet the wage bill per person in class 1, i.e. the wages of (n_4/n_1) rural workers.

$$(B_{25.1}) \qquad e_1 = q_1 - (n_4 w_4 / n_1 p) = q_1 - e_4 (n_4 / n_1).$$

$$(B_{25.2}) \qquad e_2 = q_2$$

$$(B_{25.3}) \qquad e_3 = r.$$

$$(B_{25.4}) \qquad e_4 = (w_4/p)[n_4 h_4 (w_4/p)]$$

$$(B_{25.5}) \qquad e_5 = (v/p) = [n_1 m_1 q_1 h_1 + n_2 m_2 q_2 h_2 + n_4 h_4 (w_4/p)]/n_5 (I - h_5).$$

It follows from (B_{24}) and (B_{25}) that the effect of a higher value of *r* is to:

(1) *increase* the exchange entitlement e_1 of *agricultural capitalists,* etc.:

(2) keep *unaffected* the exchange entitlement e_2 of *peasants;*

(3) *increase* the exchange entitlement e_3 of the *protected urban labour force;*

(4) *reduce* the exchange entitlement e_4 of the *rural labour force;*

(5) *reduce* the exchange entitlement e_5 of the *rural household producers.*

In so far as this simple model catches an aspect of the Bengal famine of 1943, this is more obviously so for Phase I than for Phase II of the famine (see Chapter 6). Phase II of the famine was much dominated by speculative activities which have not been brought in at all in the model presented above.

A speculative reduction of the proportion of foodgrains marketed, i.e. lower values of m_1, and m_2, will have the consequence of *reinforcing* the effects noted above (see $B_{25.1}$ - $B_{25.5}$). Such a reduction, compared with normal years, was observed in Phase I as well (see Chapter 6). But in Phase II the speculative activities of professional traders as well as the market movements reflecting a terrible panic would require the analysis presented above to be supplemented in a more radical way.

I end this Appendix with five remarks. First, in so far as the 1943 output (including the December 1942 harvest) was somewhat -- though not severely -- lower than average, the position of the peasants too would have been worse in 1943 compared with that in a typical year. The analysis presented above assumes everything else the same, and while it does capture the fact that the famine affected most the agricultural labour force and the providers of rural services and crafts, it does not bring out that other groups also suffered a certain amount. In the case of the peasants, there is also the further fact, which has been noted, that some peasants sold off their grains supply too early, egged on by traders dangling before them higher prices than usual, and then had to buy back grains later for their own consumption at a much higher price. This type of dynamic process must be an important feature of a more complete model, especially of Phase II.

Second, the distress of the rural labour force has been captured in the model presented here only in terms of a declining command over food given by the wages, [8] but another feature was a reduction of employment, on which there are few firm data but much informal evidence. This, of course, would have led to a dramatic decline of exchange entitlement for those thrown out of employment.

Third, while the urban labour force is characterized here as being fully cushioned against food price rise, this was not so for the whole period or for all the urban labour force. Again, the model has exaggerated a true feature into an over-simplified generalization. Perhaps it is also worth remarking that the protection enjoyed by the urban labour force in the Bengal famine of' 1943 was also rather unusual, and in considering the relevance of the model presented here for other famines, the economic operations of the different classes will have to be differently delineated.

Fourth, the model presented here is one of single-period interdependence. It is possible to investigate the same interdependences in a multi-period context; and even to consider a cumulative buildup of these effects.

[8] In the model the money wages w_4 of agricultural workers have been taken to be given, but in reality w_4 typically went up with food prices but much less than proportionately (see Chapter 6).

Finally, in the model presented above the decline of the rural household producers is traceable ultimately to the distress of others, viz. the rural labourers. This interdependence could be heightened by incorporating the fact that destitution of rural labourers would also lead to their incomes being largely spent all on foodgrains, involving a dramatically lower h_4 -- the *proportion* of income spent on non-food household products -- and thus even greater distress for rural household producers. The characterization of this interdependence presented in the model is, of course, an over-simplification; but -- as discussed in Chapters 5-10 -- the general phenomenon of 'derived destitution' is one of the features of famines that requires a good deal more attention than it tends to get. This feature is among the consequences of interdependence analysed in this section.

Appendix C

Measurement of Poverty

C.1. POVERTY GAPS AND HEAD COUNTS

S is the set of people in a community of *n* people. Person *i*'s income y_i, and those whose incomes are no higher than π (the poverty line) are poor, making up the set $T \subseteq S$. The poor, *q* in number, are ranked according to income, and person *i* in *T* has the rank *r(i),* being *r(i)*th richest among the poor. Equi-incomed persons are ranked in any arbitrary order, but once the ranking has been done, *r(i)* is, in fact, a strict ordering.

The poverty gap of person i in *T* is gi, given by:

(C1) $g_i = \pi - y_i.$

The total poverty gap of the poor is denoted g, and is given by:

(C2)

The two standard measures of poverty are the head-count ratio *H* and the income-gap ratio *I,* given respectively by:

(C3) $H = q/n$

(C4) $I = g/q\pi.$

Denote the mean income of the poor as *y** and their mean poverty gap as *g*:*

(C5)

(C6) $g^* = \pi - y^* = g/q.$

The income-gap ratio can also be expressed as:

(C4*) $I=g^*/\pi$.

Consider now the following axioms of legitimacy of poverty measures. Take **x** and **y** as two n-vectors of income with x_i and y_i the incomes of person i in the two cases, respectively, and let the poverty measures be such that **x** and **y** yield values $P(\mathbf{x})$ and $P(\mathbf{y})$ respectively (given π and S). In all the axioms proposed in this section the set S of people and π the poverty-line income are assumed to be given. $T(\mathbf{x})$ and $T(\mathbf{y})$ are the poor in S respectively for **x** and **y.**

Monotonicity Axiom If for some $j \in T(\mathbf{x}) \cap T(\mathbf{y})$: $x_j > y_j$, and for all $i \in S$ such that $i \neq j$: $xi = yi$, then $P(x) > P(y)$.

Weak Transfer Axiom If for some $j \in [\{T(\mathbf{x}) \cap T(\mathbf{y})\} \cup \{(S - T(\mathbf{x})) \cap (S - T(\mathbf{y}))\}]$ and $k \in T(\mathbf{x}) \cap T(\mathbf{y})$: $[(x_j > y_j \geq y_k > x_k)$ **&** $(x_j - y_j = y_k - x_k)]$, and for all $i \in S$ such that $i \neq j, k$: $x_i = y_i$, then $P(\mathbf{x}) > P(\mathbf{y})$.

The monotonicity axiom says that, given other things, a reduction in income of someone below the poverty line must increase the poverty measure. The weak transfer axiom says that a pure transfer of income to a poor person below the poverty line from a richer person, without making either cross the poverty line, must reduce the poverty measure. [1]

It is easily checked that the head-count measures H violates both the monotonicity axiom and the weak transfer axiom. H is invariant with respect to both the fall of the income of a poor person, and to transfers of the kind envisaged in the weak transfer axiom. [2] In fact, a *reverse* transfer, i.e. from the poor to someone richer, will either leave H unchanged or make it go down, but will *never* make it go up. The income-gap ratio I satisfies the monotonicity axiom, but violates the weak transfer axiom when j is below the poverty line throughout, i.e. when $j \in T(x)$. It follows immediately that no function of H and I, $\psi(H, I)$, can satisfy the weak transfer axiom. Indeed, both H and I are blind to distribution among the poor.

However, both H and I satisfy one of the possible qualities of a poverty measure that was discussed in Chapter 2, to wit, independence of the income levels of those who are *above* the poverty line. One consequence of this is that no fall in the income of the poor can be *outweighed* by any rise -- no matter how large -- in the incomes of the rich.

Focus Axiom If $x_i = y_i$ for all $i \in T(\mathbf{x}) \cup T(\mathbf{y})$, then $P(\mathbf{x}) = P(\mathbf{y})$.

The focus axiom is motivated by the view that the poverty measure is a characteristic of the poor, and not of the general poverty of the nation. It does not, however, try to reflect the *relative* burden of poverty, viz. what proportion of income of the rich would be needed to wipe out the poverty gaps of the poor, [3] since that is clearly eased by the rich being

[1] In Sen (1976a) the 'transfer axiom' was more demanding in that the poverty measure was required to record a decline even if the transfer made the richer person fall below the

poverty line, thus swelling the number of the poor. That version makes poverty measurement, in an important way, independent of the number below the poverty line, which raises other problems (see Section C.3 below).

[2]Contrast: 'Its [the new Poor Law's] only effect was that whereas previously three to four million half paupers had existed, a million total paupers now appeared, and the rest, still half paupers, merely went without relief. The poverty of agricultural districts has increased every year' (Engels, 1892, p. 288).

[3]See Anand (1977) and Beckerman (1979a, 1979b) for the relevance of that perspective for policy discussion.

richer, even when all the poor remain just as poor and miserable.

C.2
AXIOMATIC DERIVATION OF MEASURE P

The approach used in the derivation of measure *P,* which was informally discussed in Chapter 3, can be justified either by bringing in the notion of personal welfare conceived in ordinal terms (or -- redundantly -- in more demanding cardinal terms), or by directly axiomatizing on income distributions. In earlier contributions (Sen, 1973b, 1976a), the former, welfare-based, notion was used, but here the simpler and directly income-based format will be employed.

Poverty can be conceived of as a weighted sum of the poverty gaps of the poor:

(C7)

where v_i is the weight on the poverty gap g_i of person *i,* and *A (n, q, π)* is a normalizing parameter dependent on the total number of people *n,* the number of poor people *q,* and the poverty line *π.* Note that it has *not* been specified that v_i must depend only on the size of person *i's* poverty gap g_i or income level y_i, so that -- despite the superficially additive form -- no separability requirement has been imposed by (C7).

In the light of the perspective of relative deprivation (see Chapter 3), it may be reasonable to think of the weight v_i of the poverty gap of *i* to be dependent on *i*'s relative position *vis-à-vis* others in the same reference group. If the reference group is the group of the poor, this makes *r(i),* i.e. the rank of the poor person *i* among the poor, a relevant determinant of v_i. Going one step further, v_i can be made an increasing function of *r(i),* so that the weight depends on where *i* stands in the ranking *vis-à-vis* other poor people. The simplest case of such as increasing function is the identity mapping *m =f(m).*

Ranked Relative Deprivation (Axiom R) Poverty is measured as in (C7) with the weight v_i on person *i's* poverty gap equalling *i's* income rank among the poor:

(C8) $v_i = r(i).$

The rule, as discussed in Chapter 3, is in the same spirit as Borda's (1781) use of rank-order weighting. [4]

The other axiom used at this stage is based on the idea that the inadequacy of the head-count ratio and the income-gap measure taken together arises from their inability to be sensitive to the distribution of

[4]See Sen (1976b) for the use of a similar axiom in making distribution-sensitive comparisons of real income. On that general problem, see also Graaff (1977), Hammond (1978), Osman (1978), Sen (1979a), Marris (1980), and Broder and Morris (1980).

income among the poor, and when that distributional problem is eliminated, a combination of *H* and *I* should suffice. Thus, in dealing with alternative cases in *each* of which all the poor persons have the same income, *H* and *I* should be informationally adequate. One of the simplest ways of combining *H* and *I* in a function ψ *(H, I)* is to take their product, which provides a convenient normalization.

Normalized Absolute Deprivation (Axiom A) If for all $i \in yi = y^*$, then:

(C9) $P = HI.$

THEOREM C1 For large numbers of the poor, the only poverty measure satisfying Axioms R and A is given by:

(C10) $P = H\{I+(1-I)G\}.$

when *G* is the Gini coefficient of income distribution among the poor.
Proof. In (C7), putting g* = gi for all i, we get:

(C11) $P = \frac{1}{2}\{A(n,q,\pi)g^*q(q+1)\}.$

This, combined with (C3), (C4*), and (C9), yields:

(C12) $A(n,q,\pi) = 2/(q+1)n\pi.$

Combining (C7), (C8), and (C12), we obtain:

(C13)

Noting that the Gini coefficient for any *q*-membered population with mean income *y** and income ranks *r(i) = 1, . . . , q* can be easily written as (see Sen, 1973a, p. 31):

(C14)

a little simplification yields:

(C15) $P=H[1-(1-I)\{1-Gq(q+1)\}].$

For large *q,* (C15) reduces to (C10), thereby establishing the theorem. [5]

An alternative expression of P can be obtained by eliminating I and

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[5]This proof is essentially the same as in Sen (1976a), except for the somewhat remoter axiomatization used there, involving personal welfare levels. In fact, in Sen (1976a), the axioms are first used to translate the welfare-based requirements into corresponding income requirements, and then the proof goes through on the income space, in the same way as above. See also Osmani (1978).

replacing it by its equivalent $1-(y^*/\mu)$, as seen from (C_4^*) and (C6). This procedure, discussed by Anand (1977), yields:

(C_{16}) $P = H\{I-y^*(I-G)/\mu\}$

Note also that the measure *P* satisfies the monotonicity axiom, the weak transfer axiom, and the focus axiom.

C.3
ALTERNATIVES AND VARIATIONS

In this section some variations of the poverty measure *P* are considered. Axioms R and A can be varied in certain ways, yielding measures that differ from *P* in some specific respects. The concept of poverty has enough ambiguity to permit such alternative interpretations (see Chapters 2 and 3). But all these variations share with measure *P* a sensitivity to distributional considerations among the poor, in addition to the aspects of poverty captured by *H* and *I.*

One idea is to modify the income-gap element I in the measure of deprivation by taking the mean poverty gap not as a percentage of the poverty level income π but as a percentage of the mean income of the community, where μ is the mean income of the entire community.

$$(C_{17}) \qquad I^* = g^*/\mu.$$

HI^* clearly equals the ratio of the aggregate poverty gap to total national income or **GDP:** [6]

$$(C_{18}) \qquad HI^* = g/n\mu.$$

Alternative Normalized Absolute Deprivation (*Axiom A**) If for all $i \varepsilon T$: $yi=y^*$, then:

$$(C_{19}) \qquad P = HI^*.$$

It is easily checked that Axioms A* and R lead to a modified poverty measure P_1, which has been proposed and extensively explored by Sudhir Anand (1977), and which differs from P by a multiplicative constant reflecting normalization per unit of national mean income rather than the poverty line income:

$$(C_{20}) \qquad P_1 = P\pi/\mu.$$

P_1 has the feature of being sensitive to the income of the non-poor as well. A rise in the income of a non-poor person, given other things, will reduce I^* and obviously will also reduce the modified poverty measure P_1. If a rise in the income of *anyone* can be taken to be a reduction of the poverty of the nation, then P_1 is to be preferred over P, since P is

[6]Beckerman (1979a, 1979b) puts this measure to good use as an indicator of the relative burden of poverty, but also warns against reading too much into this ratio.

insensitive to income rises of the rich. It may also be noted that HI^* expresses the percentage of' national income that would have to be devoted to transfers if poverty were to be wiped out by redistribution, and in this sense HI^* reflects the *relative* burden of poverty of the nation compared with its aggregate income.

On the other hand, it can be argued that the relative burden of poverty is really a different exercise from the description of poverty in terms of prevailing notions of deprivation. More importantly, *P1* has the characteristic that some increase in the income shortfall of the poor may be compensated by a sufficently high rise in the income of the non-poor.

And this can be objected to on the ground that poverty is a characteristic of the poor, and a reduction of the incomes of the poor must increase the measure of poverty, no matter how much the incomes of the non-poor go up at the same time (see Chapter 2). *P* satisfies this condition, formalized as the focus axiom, but *P1* does not.

The choice of the index must ultimately depend on the purpose for which such a measure is sought. For descriptive excercises on 'the state of the poor' (to quote the title of' the famous treatise of' F. M. Eden (1797)), *P* would have an obvious advantage over P_1. But if, on the other hand, the intention is to check the country's *potential* ability to meet the challenge of poverty, P_1 has a clear advantage. The two versions, therefore, are concerned with two rather different things.

Variants of Axiom R may also be considered. Nanak Kakwani (1980a)has provided various alternatives to Axiom R yielding some measures closely related to the measure *P*. An especially interesting one -- we may call it P_2 -- makes the weight *vi.* on the short-fall of person *i* depend not on the number of people among the poor *vis-à-vis* whom *i* is relatively deprived, but on the aggregate income of these people. P_2 has the merit of making *i*'s extent of deprivation sensitive to the actual incomes enjoyed by those who are richer than him though lying below the poverty line. On the other hand, P_2 takes no note of how the aggregate income of these people is divided among them, and, more importantly, no note even of the number of persons among whom this aggregate income is divided. The sense of relative deprivation is made to depend on the sum-total of income of those who, while poor, are better off then the person in question, and no other information is used regarding the disposition of that sum-total.

In a different contribution, Kakwani (1980b) modifies Axiom R to provide a more general structure. Essentially, Kakwani's axiom makes the weight v_i the kth power of the income rank of person *i* among the poor.

Axiom R^* Poverty is measured as in (C_7) with the weights v_i given by:

(C_{21}) $$u_i = [r(i)]^k.$$

For the poverty measure, call P_3, derived from this, the sensitivity of between-poor income distribution will depend on the value of *k.* The poverty measure *P* obviously corresponding to *k = 1,* making it, as Kakwani (198ob) puts it, 'equally sensitive to a transfer of income at all positions'. The generalization involved in P_3 permits various alternat-ive assumptions about transfer sensitivity, e.g. giving greater weight to transfers of income at the lower end of the distribution of income.

A different generalization based on a reinterpretation of the poverty index *P* has been proposed by Blackorby and Donaldson (1980a). They note that the measure *P* can be seen as the product of the head-count ratio *H* and the proportionate gap between the poverty-line income п and the Atkinson-Kolm 'equally distributed equivalent income' (e^g) of

the incomes of the poor when the evaluation is done with the Gini social evaluation function. [7]

$$(C_{22}) \qquad P = H(\pi - e^g)/\pi \text{ with } eg = y^*(I - G).$$

If the social evaluation function is changed, a new poverty measure would emerge correspondingly, with the equally distributed equivalent income defined according to that social evaluation function. [8]

$$(C_{23}) \qquad P_4 = H(\pi - e)/\pi.$$

Blackorby and Donaldson chose an ethical interpretation of the poverty measures. The value of e reflects that level of income which, if shared by all the poor, would be judged by the social evaluation function to be exactly as good as the actual distribution of income among the poor. But it is easily seen that the format permits a descriptive interpretation as well, viz. e standing for that level of income which, if shared by all the poor, will be regarded as displaying as much over-all poverty as the actual distribution of income among the poor. The issues involved in the choice between descriptive and ethical interpretations of poverty have been discussed in Chapters 2 and 3 and will not be pursued further. [9] The poverty measures can be mathematically interpreted in either way, and the real question is one of relevance

[7] For the concept of equally distributed equivalent income, see Kolm (1969) and Atkinson (1970). For the relation of the poverty measure *P* to the Gini evaluation function, see Sen (1973b, 1976a), and related matters in Sen (1974, 1976b). See also Graaff (1946), Sen (1973a), Pyatt (1976, 1980), Sastry (1977, 1980), Osmani (1978), Dorfman (1979), Kakwani (1980a), Yitzhaki (1979), Fields (1980), Donaldson and Weymark (1980a, 1980b), Radhakrishna and Sarma (1980), and Sastry and Suryanarayana
(1980).

[8] Blackorby and Donaldson (1980a) point out the need for some assumptions about the general characteristics of such a social evaluation function, especially its homotheticity, and strict separability of a kind that permits one to rank the distribution of income among the poor independently of the incomes of those who are richer.

[9] See also Sen (1978b).

of the excercise to the motivation that leads to the search for a measure of poverty.

A particular descriptive characteristic of the poverty measure *P* has been the subject of some detailed investigation. While it is clear that the measure *P* of poverty must record a rise when there is a transfer of income from a poorer person to one who is richer provided that does not make the richer person cross the poverty line, exactly the opposite can happen-depending on the exact values -- when such a crossing does take place (see Sen, 1977a, p. 77). It is arguable whether a poverty measure should not show increased poverty whenever some income is transferred from a poorer to a richer person, no matter whether this

makes the richer person cease to be regarded as poor because of his crossing the poverty line. Thon (1979, 1980) has explored the analytical relations involved in such monotonic transfer sensitivity, and has proposed a variation of *P* that would ensure that the poverty measure records an increase whenever there is a transfer of income from a person who is poor to one who is richer. He modifies Axiom R to make the weight v_i on the poor *i*'s income gap g_i equal his income rank R(*i*) among *all* the people in the community, and not merely among the poor (as under Axiom R).

*Axiom R*** Poverty is measured as in (C_7) with the wesights v_i given by:

(C_{24}) $\qquad\qquad u_i = R(i).$

Combined with the original structure with slight modifications, Axiom R** precipitates Thon's variant -- we may call it P_5 -- of the poverty measure satisfying this monotonic property. [10]

There remains, of course, the substantial issue as to whether a poverty measure *should* always register an increase whenever there is such a transfer, even when the transfer actually reduces the number of the poor. [11] In so far as the index of poverty is interpreted to represent the condition of the poor -- how many and each precisely how poor -- a good case can perhaps be made for permitting the possibility that a

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[10]  This can be easily compared with the poverty measure *P* as expressed in (C_{13}).

[11] The 'transfer axiom' considered (but not used in the derivation of *P*) in Sen (1976a) demanded: 'Given other things, a pure transfer of income from a person below the poverty line to anyone who is richer must increase the poverty measure' (p. 219). In Sen (1977a) this was modified to the less demanding requirement, corresponding to the weak transfer axiom considered here: 'Given other things, a pure transfer of income from a person below the poverty line to anyone richer must strictly increase the poverty measure unless the number below the poverty line is strictly reduced by the transfer' (p. 77) This contrast is the central one between *P* and P_5.

reduction of the prevalence of the poor might under some circumstances compensate a rise in the extent of penury of those who remain below the poverty line. The old measure *P* includes this possibility, while Thon's P_5 does not. If, however, the focus is on inequality or living standard and not specifically on the predicament of people in falling below the poverty line, then the unqualified transfer axiom would make a good deal of sense, since the poverty-alleviating role of crossing the poverty line would be then rendered less crucial. [12] Again, the variation proposed has merits that are conditional on the purpose for which the poverty measure is being sought.

Another interesting variant of the poverty measure *P* has been proposed by Takayama (1979), related to an approach that has been extensively explored by Hamada and Takayama (1978). From the

actual income distribution a 'censured' income distribution is obtained by replacing the incomes that exceed the poverty line by incomes exactly equalling the poverty line (sn). Takayama (1979) then takes the Gini coefficient G_c of the censured income distribution as the measure of poverty -- we may call it P_6. Other measures of inequality are also applied to the censured distribution to derive corresponding measures of poverty in Hamada and Takayama (1978).

The approach has some clear merits. The Gini coefficient of the censured distribution is a much neater -- and closer -- translation of the Gini measure of inequality into a poverty measure. It doctors the income distribution itself by ignoring the information on the actual incomes of' the people who are not poor, but counts them in with poverty line incomes. Takayama (1979) has also provided an interest-

[12]The unqualified 'transfer axiom' is, of course, essentially the same as the 'Pigou-Dalton condition' used in the measurement of inequality (see Atkinson, 1970), and of the living standard of a community (see Sen, 1976b, 1979a). The measurement of poverty is, however, quite a different type of exercise for which note must be taken of the 'poverty line', and the unqualified transfer axiom takes no note of this at all. An important result recently established by Kundu and Smith (1981) throws further light on this question. They show that no uniformly continuous poverty measurement function can satisfy simultaneously the unqualified 'transfer axiom' and 'population monotonicity axioms' demanding that an addition to the poor population (respectively, non-poor population), other things given, must increase (respectively, decrease) the poverty value. While Kundu and Smith's 'population monotonicity axioms' are really very demanding in this particular form, the conflict that they pinpoint is a more general one. The tension arises from the fact that the unqualified 'transfer axiom' takes no note whatever of the poverty line, whereas the 'population monotonicity axioms' treat that line as the great divider. Sensitivity to the poverty line is indeed an appropriate characteristic of axioms for poverty measurement, and this can be incorporated in many different ways. The 'week transfer axiom' used here (and in Sen, 1977a) takes note of the poverty line in the way already specified. It is this modified axiom -- and not the unqualified 'transfer axiom' -- that the measure *P* satisfies (see Sen, 1977a, p. 77), determining precise trade-offs through axioms R and A.

ing axiomatization of his measure of poverty G_c, and Hamada and Takayama (1978) have suggested derivations for similar poverty measures based on other inequality indexes applied to the censured distribution.

The main drawback of this approach lies in its robust violation of the monotonicity axiom, viz. that a reduction of income of anyone below the poverty line, given everything else, must increase the poverty measures. A person below the poverty line may still be among the relatively richer in the censured distribution of income with an income above the mean and the median of that distribution. A reduction of his income will in an obvious sense reduce the extent of inequality in the censured distribution, but in an equally obvious sense the community must now be having *more* -- not less -- poverty. So the simplicity of the formulae used by Takayama (1979) and Hamada and Takayama (1978) is achieved at some real cost -- to wit, dropping the monotonic relation between the poverty measure and vector -- dominance of deprivation of the poor.

While *P* has certain unique advantages, which its axiomatization brings out, several of the variants are certainly permissible interpretations of the common conception of poverty. [13] There is nothing defeatist or astonishing in the acceptance of this 'pluralism'. Indeed, as argued earlier (Chapters 2 and 3), such pluralism is inherent in the nature of the exercise. The variants are all in the same tradition as measure *P,* being concerned not merely with *H* and *I,* but also with the distribution among the poor.

[13] Osmani (1978) has also analysed several different poverty indicators, and has taken explicit note of multi-commodity issues.

Appendix D

Famine Mortality: A Case Study

In this Appendix [1] the size and pattern of mortality in the great Bengal famine of 1943 are studied. Mortality in the Bengal famine was a hotly debated issue during and just after the famine, and has, in fact, remained so. The pattern of mortality is worth studying also for the light it throws on the nature of the famine. The general features of the famine and its possible causation were studied in Chapter 6.

D.1. HOW MANY PER WEEK: 1,000, 2,000, 26,000, 38,000?

'The Secretary of State for India', wrote *The Statesman*, the Calcutta newspaper, on 16 October 1943,

seems to be a strangely misinformed man. Unless the cables are unfair to him, he told Parliament on Thursday that he understood that the weekly death-roll (presumably from starvation) in Bengal including Calcutta was about 1000, but that 'it might be higher'. All the publicly available data indicate that it is very much higher; and his great office ought to afford him ample means of discovery. [2]

Sir T. Rutherford, the Governor of Bengal, wrote to the Secretary of State for India on 18 October 1943, two days after *The Statesman* editorial:

Your statement in the House about the number of deaths, which was presumably based on my communications to the Viceroy, has been severely criticised in some of the papers. My information was based on what information the Secretariat could then give me after allowing for the fact that the death-roll in Calcutta would be higher owing to the kind of people trekking into the city and exposure to inclement weather. . . . The full effects of the shortage are now being felt, and I would put the death-roll now at no less than 2000 a week. [3]

Was this higher figure of 2,000 close to the mark?

The Famine Inquiry Commission (1945a) noted that 'from July to December 1943, 1,304,323 deaths were recorded as against an average of 626,048 in the previous quinquennium', and the difference attributed

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[1]This Appendix draws heavily on Sen (1980b), written in memory of Daniel Thorner.
[2]"The Death-Roll", editorial, *The Statesman*, 16 October 1943. See also Stephens (1966). Ian Stephens was the editor of *The Statesman*, a British-owned paper, which distinguished itself in its extensive reporting of the famine and its crusading editorials.
[3]*Letter to Mr. L. S. Amery*, no. L/E/8/3311; document no. 180 in Mansergh, (1973), vol. IV, pp. 397-8. The earlier communication referred to by Rutherford is document no. 158 in the same volume.

to the famine comes to a bit over 678,000. [4] This would make the average weekly death-roll in excess of 26,000 rather than 2,000.

The Famine Inquiry Commission went on to note that 'all public health statistics in India are inaccurate', and' even in normal times deaths are not fully recorded'. In rural Bengal deaths were reported by the village *chowkidar* (village watchman), in addition to his other duties, and he was 'usually illiterate, and paid about Rs. 6 or Rs. 7 a month'. During the famine period, 'in certain places the salaries of *chowkidars* were not paid and they deserted their posts to obtain work on military projects and aerodromes', while 'some of them died'.

The replacement of dead and vanished *chowkidars* was no easy matter and several weeks and months might elapse before successors could be found, during which deaths presumably went unrecorded. Further, in the height of the famine thousands of people left their homes and wandered across the countryside in search of food. Many died by the roadside -- witness the skulls and bones which were to be seen there in the months following the famine. Deaths occuring in such circumstances would certainly not be recorded in the statistics of the Director of Public Health. [5]

Taking note of all this, the Commission arrived at the conclusion that 'the number of deaths in excess of the average in 1943 was of the order of one million' -- nearly all of it in the second half of the year. [6] On this estimate the death-roll in the second half of 1943 would seem to have been around 38,000 *per week.*

D.2
KHOW MANY IN FACT?

No reason was given by the Commission for choosing the particular correction ratio that was used, except the thoroughly respectable one that it was arrived at 'after due consideration of the available facts' (1945a, p. 109). To this figure of one million deaths attributed to the famine of 1943, the Commission added the number of registered deaths in the first half of 1944 in excess of the previous

quinquennial average without any correction. The reason for this asymmetry stemmed from the Commission's belief that there was 'an unquestionable improvement in the collection of mortality statistics' at the end of 1943 owing to efforts made by civil and military medical authorities (p. 109). The excess death registration for the first half of 1944 amounts to 422,371. Adding this to the estimate of one million for 1943, the Commission rounded off the mortality toll of the famine thus:

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[4]Famine Inquiry Commission (1945a), p. 108. For the year as a whole the difference came to 688, 846.

[5]Famine Inquiry Commission (1945a), p. 109. See also Census of India 1951, vol. VI, part IB, pp. 1-2.

[6]Famine Inquiry Commission (1945a), pp. 108-9.

'about 1.5 million deaths occurred as a direct result of the famine and the epidemics which followed in its train' (p. 110).

Dr Aykroyd, a distinguished nutrition expert, who was a member of the Commission and who in fact made the Commission's estimates of mortality, has recently stated (as was quoted in Chapter 6) that he now thinks 'it was an under-estimate, especially in that it took too little account of roadside deaths, but not as gross an under-estimate as some critics of the Commission's report, who preferred 3 to 4 million, declared it to be' (Aykroyd, 1974, pp. 77). Who were these critics and how did they arrive at their figures?

The most quoted estimate -- from the Anthropology Department of the Calcutta University -- was based on a sample survey. The following estimates were released on 21 February 1944 -- much before the Famine Inquiry Commission had even been appointed:

The Anthropology Department of the University of Calcutta has carried out a sample survey of ten of the famine-affected districts of Bengal. The statistics for eight districts have so far been tabulated. They cover eight hundred sixteen-family units with a total membership of three thousand eight hundred and eighty. The total deaths in these groups during June-July 1943 and November-December 1943, has been three hundred eighty-six or ten per cent during six months (i.e. 100 per thousand). As the death rate for Bengal does not exceed thirty per thousand per annum, i.e., fifteen per thousand for six months, the excess mortality (100-15) of eighty-five per thousand, that is, eight and a half percent, has to be ascribed to famine and the pestilence that followed in its wake. As some areas in North Bengal were much less affected than Western or Central Bengal or the deficit areas of Eastern Bengal, some reduction has to be made to estimate the total mortality figures for Bengal. It will probably be an under-estimate of the famine to say that two-thirds of the total population were affected more or less by it. On this basis the probable total number of deaths above the normal comes to well over three and a half millions. [7]

The applicability of an excess mortality rate of 8 ½ per cent to two-thirds of the population of Bengal is, in fact, a piece of pure guesswork -- and an illegitimate one at that, since the sample that was surveyed was chosen from the worst affected areas in Bengal. Later the leader of the group, Professor K. P. Chattopadhyaya, himself pointed out limitations of this estimate, and proposed a figure of 2.2 million for excess deaths in

1943. Adding the half a million excess deaths taken by the Famine Inquiry Commission for 1944, Chattopadhyaya came to a 'minimum' estimate of 'total excess mortality' equalling 2.7 million. [8]

Between Chattopadhyaya's figure of 2.7 million and the Famine Inquiry Commission's 1.5 million (not to mention the minute estimates

[7]Reprinted in Ghosh (1944), Appendix G.
[8]Chattopadhyaya and Mukherjea (1946), p. 5.

in contemporary official statements in London and New Delhi [9]), there remains a wide gap. The lack of evidence on the representative nature of Chattopadhyaya's sample renders it dubious and the arbitrariness of Commission's correction factor makes it difficult to evaluate their estimate also. [10] But a more fundamental question concerns the time coverage of the mortality estimates. Both these figures cover up to June 1944. The acute starvation associated with the famine had ended around December 1943, even though 'the death rate remained high throughout the greater part of' 1944' (Famine Inquiry Commission, 1945a, p. 1). When did the death rate, in fact, return to 'normal'? The Famine Inquiry Commission did not answer this question.

It could not have. At the time the Report was submitted in 1945, the death rate had not yet returned to normal. When did it do so? This is clearly one of the first things to ascertain, since the forces of post-famine epidemics to which the Commission refers in incorporating the excess deaths in the first half of 1944 in its total mortality estimate, went on raging for years.

For this, and indeed for any other year-to-year study, we have to rely on death registration data with suitable corrections. It is argued in the *Census of India 1951*, in its report on the 'Vital Statistics of West Bengal: 1941-50', that, while there are errors in registration, 'under-registrations are fairly uniform and do not take sudden leaps and bounds from year to year' (vol. VI, Part 1B, pp. 1-2). [11] While it seems most likely that the registration ratio did decline in 1943 and improved again in 1944, there seems to be little reason for assuming a radically different proportion of post-1944 registration compared with pre-1943 ratios.

For West Bengal, Jain's use of the reverse survival method yields an under-registration of deaths of 33.9 per cent in 1941-50. This makes the actual mortality 51 per cent higher on the average than registered

[10]Aykroyd (1974) is candid in acknowledging the arbitrariness of his estimate: 'at all events, the figure of 1.5 million deaths is in the history books, and whenever I come across it I remember the process by which it was reached' (p. 77).
[11]It is perhaps also worth remarking that, for India as a whole, the ratio of registered deaths to the estimated number of deaths obtained by using the 'reverse survival method' for 1941-5 by S. P. Jain (1954) is 0.73, while the same method had yielded a ratio of 0.74 for 1931-40. See Jain (1954), p. 44. The estimates for earlier decades are of Kingsley Davis: 0.74 for 1931-40, 0.72 for 1921-30, and 0.70 for 1911-20.
[9]There is something puzzling about the official statements on the minute size of mortality. Lord Wavell records in his 'journal' on 19 October 1943, when he became the

new viceroy, that the outgoing viceroy, Lord Linlithgow, confessed to him that 'in July he expected that deaths in Bengal might be up to 1000,000 or 1 ½ million, and that we looked like getting off better than he had thought possible' (Wavell, 1973, p. 34). Presumably the government had meanwhile persuaded themselves that the situation was *incomparably* better than had been 'thought possible'!

mortality. I shall use this ratio of correction uniformly, though it should be noted that this would tend to *underestimate* famine mortality, since registration was especially bad in 1943 -- the year of the famine and of peak death even in terms of registration data. There is, thus, a *downward* bias in our estimation of famine deaths. [12]

In Table D1 numbers of the registered deaths for each year from 1941 to 1950 are given for West Bengal. The time pattern is one of *monotonic* decline except for the one severe jump upwards in 1943. In fact, despite falling each year after 1943, annual mortality did not return to the 1942 level even by the end of the decade. Since the number of deaths had tended to fall each year, the Famine Inquiry Commission's procedure of taking the average mortality in the previous *quinquennium* as the 'normal' mortality may understate excess mortality for the famine years. Instead, I have made two sets of estimates: estimate A, with the 'normal' being taken to be the average of the deaths in 1941 and 1942, and estimate B, with the 1942 death rate being taken as the 'normal'. Estimate B yields, naturally, a higher series of 'excess deaths', which are presented for 1943-50 in Table D1 and Figure D1. However, even estimate B can be thought to be understating the magnitude of excess mortality, since the relevant comparison is not with the level in the *pre-famine* year, but with the level to which the expected death rates *would*

TABLE D1

Recorded Deaths in West Bengal, 1941-50

		Excess deaths	
	Deaths	*A*	*B*
1941	384,220		
1942	347,886		
1941-2 Average	366,053		
1943	624,266	258,213	276,380
1944	577,375	211,322	229,489
1945	448,600	82,547	100,714

1946	414,687	48,634	66,801
1947	387,165	21,112	39,279
1948	385,278	19,225	37,392
1949	372,559	6,506	24,673
1950	356,843	-9,210	8,957

Source: Based on death statistics from *Census of India 1951* vol. VI, part 1B, Table 6.

[12]A substantial *net* migration from East to West Bengal during the late 1940s would also tend to underestimate the actual death rate during 1941-50, and thus underestimate the under-registration of deaths, thereby underestimating famine mortality.

FIG. D1 Recorded Deaths during 1941-50 in West Bengal

have fallen in the post-famine years *but for* the intervention of the famine. [13]

The numbers of excess deaths under assumptions A and B respectively for each year are given in Table D1. The 'excess' becomes negative for A from 1950 onwards and for B -- it can be checked from later data -- from 1951 onwards; this is so with a stationary *total* death norm, which -- as discussed above -- *understates* the levels of excess mortality.

Adding up until the excess mortality is eliminated yields a total of excess mortality owing to the famine of 648,000 for Assumption A and 784,000 for assumption B. If the turmoil of the partition of Bengal in 1947 and the displacement resulting from it make us reluctant to read the impact of the famine in the excess mortality figures beyond 1946, we

[13]Note that the *absolute* number of deaths went on falling through the decades, despite the increase in the size of the population, which failed to increase only during the immediate famine years; see *Census of India 1951*, vol. VI, part 1B, pp. 2-4.

can be conservative and count the excess figures only during 1943-6. [14] This yields a total registration excess mortality of 601,000 under assumption A and 673,000 under B.

If Jain's (1954) estimate of under-registration in West Bengal during 1941-50 is applied uniformly, then these excess registration figures would have to be raised by 51 per cent to arrive at the actual excess

mortality. [15] This yields 908 thousand and 1.10 [16] million respectively under A and B.

All of this relates to West Bengal only. The famine was at least as serious in East Bengal -- later East Pakistan, now Bangladesh. Unfortunately, there is no 'reverse survival' estimate of under-registration for East Bengal comparable with Jain's calculation for the West of Bengal. I have not, therefore, tried to make an independent estimate of famine mortality in East Bengal. However, the Census of Pakistan 1951 reports an estimate, viz. a figure of 1.714 million, 'worked out from official statements, which as explained are largely estimates in the absence of reliable reports'. [17] Added to my estimates for West Bengal, this yields 2.622 million and 2.730 million respectively, under assumptions A and B. Note that the East Bengal figures given in the Pakistan Census take account of deaths only up to 1944 and not up to 1946, as in our West Bengal estimates. Taking note of the facts that (1) the population of what became West Bengal was almost exactly a third of the population of undivided Bengal in 1941; (2) the registered number of deaths in West Bengal tended to be around a third of the total number of deaths in Bengal before 1943; and (3) in the famine year the number of registered deaths in West Bengal was again almost exactly a third of that in Bengal as a whole, [18] if we feel bold enough to treat

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[14] Note, however, that the strictly monotonic decline of the number of deaths continued right through 1947 (see Table DI). The *death rate per thousand* also underwent a strictly monotonic decline, since a declining number of deaths with an increasing population size implies a strictly monotonic fall of the death rate. Excess mortality figures beyond 1946 have, however, been ignored to avoid overestimating famine mortality, by biassing the procedures in the opposite direction.

[15] This may be compared with the Famine Inquiry Commission's correction of recorded excess mortality in 1943 of 688,846 to one million, which amounts to a correction factor of 45 per cent. (For some inexplicable reason the Commission notes the correction ratio to be 'some 40 per cent' -- p. 109.) For 1944, however no correction was made by the Commission. A 'pilot survey' conducted by government of Bengal in 1948 found the correction factor to be 46.4 per cent (see Chaudhuri, 1952, p. 9).

[16] See Famine Inquiry Commission (1945a, pp. 114-15).

[17] *Census of Pakistan 1951*, Chapter III, p. 30. The arbitrary nature of this estimate is emphasized, and reference is also made to the fact that, 'according to popular belief, however, the deaths from famine in East Bengal were between two and two and a half million'.

[18] The number of registered deaths in 1943 was 624,266 for West Bengal and 1,873,749 or Bengal as a whole (see Famine Inquiry Commission, 1945a, p. 108, and *Census of India*, 1951, vol. VI, part IB, p. 21).

famine excess mortality in West Bengal to be a third of that in undivided Bengal, then the total Bengal famine mortality works out as 2.724 million and 3.048 million respectively under assumptions A and B.

These figures are put together in Table D2. Since the Famine Inquiry Commission and K. P. Chattopadhyaya both gave excess mortality figures separately for the famine year 1943, the results of our calculation with blow-up for Bengal are shown separately for 1943 also. It is interesting that Chattopadhyaya's over-all estimate comes fairly close to those presented here, but the coincidence is accidental, since his

figure refers to mortality in 1943 and in the first half of 1944 only. In fact, for 1943 as such the estimates given here are quite close to those of the Famine Inquiry Commission. The bulk of the difference in our respective total estimates arise from (1) the longer time coverage in my estimates (using, however, the same logic as employed by the Commission itself in attributing high post-famine mortality to the famine), and (2) continued correction for under-registration of deaths even beyond 1943 (using results of corrections through the 'reverse survival' method).

TABLE D2

Estimates of Bengal Famine Mortality

	Excess mortally in 1943 (millions)	*Total excess mortally due to the famine (millions)*
Famine Inquiry Commission	1.00	1.50
K. P. Chattopadhyaya	2.20	2.70
Assumption A + Pakistan Census		2.62
Assumption B + Pakistan Census		2.73
Assumption A blown up for all Bengal	1.17	2.72
Assumption B blown up for all Bengal	1.25	3.05

Since there were several downward biases -- as explained -- built into the estimates presented here, we may be inclined to pick a figure around 3 million as the death toll of the Bengal famine. (It has also the merit of being a 'round' number -- that arbitrary preference shown by our ten-fingered species captivated by the decimal system.) But what emerges most powerfully from our analysis is not so much the largeness of the size of total mortality, but its time pattern -- lasting for years after the famine. This was largely due to the epidemics associated with the famine, and to this issue I now turn.

D.3
HOW DID THEY DIE?

In December 1943, Bengal reaped a harvest larger than any in the past. Curiously enough, it was also the month in which the death rate in Bengal reached its peak in this century. The famine in the form of starvation had by then come largely to an end -- starvation deaths seemed to have peaked around September and October that year. Cholera mortality reached its maximum in October and November. Malaria peaked in December, and continued in its elevated position through the next year and later. Smallpox reached its height in March and April 1944, and a greater height still one year later. The starvation phase of the famine had given way to the epidemic phase.

Table D3 presents the yearly time series of registered deaths from some of the principal causes. The sharp jump upwards in 1943 of cholera, malaria, fever, dysentery, diarrhoea, etc., can be easily seen. For seasonal reasons the impact of smallpox was not felt until the following year since it hits primarily in early spring. Taking the average mortality in 1941 and 1942 as the 'normal' mortality for each disease respectively, 'excess mortality' from each disease has been calculated for the period 1943-6. The last row presents the inter-disease breakdown of excess mortality.

Before discussing the inter-disease pattern of excess mortality, it is worth commenting on the absence of starvation as a major reported cause of death during that great famine. One reason for this peculiarity is that starvation was not typically used as a separate category in reporting deaths. This was due partly to the habit of using traditional categories in reporting causes of death, but also to the fact that typical starvation deaths show other identifiable symptoms at the final stages, and these *proximate* 'causes' tend to fit well into the traditional categories. For example, it is common to die of starvation through diarrhoea (indeed, 'famine diarrhoea' is a well-known phenomenon) as well as dysentery -- partly as a result of eating uneatable objects. Clearly, many of the deaths reported under 'dysentery, diarrhoea and enteric group of fevers' were, in fact, starvation deaths. The same holds for several other categories, including the general category of deaths owing to 'fever'. [19]

Excluding 'fever', which is a diverse basket of diseases varying from influenza and measles to cerebro-spinal fever and Kala-azar, the ranking of the main diseases in terms of their contributions to excess mortality were (in decreasing order): malaria, cholera, 'dysentery, diarrhoea and enteric group of fevers', and smallpox. The nature of these ailments as well as direct accounts suggest that the explosive

[19] Compare the problem of interpreting the large number of deaths from lethal scurvy during the Irish famine of 1845-6.

TABLE D3

Diseases and Deaths in West Bengal, 1941-6 Registrations

	Dysentery, diarrhoea, and enteric group of fevers	*Cholera*	*Malaria*	*'Fever' (excl. malaria)*	*Smal*
1941	25,321	15,612	85,505	109,912	9,28
1942	23,234	11,427	85,078	97,764	1,02
1941-2 Average	24,278	13,519	85,291	104,838	5,15
1943	41,067	58,230	168,592	159,398	2,26
1944	36,040	20,128	166,897	176,824	19,1
1945	24,463	8,315	123,834	122,549	23,9
1946	25,651	9,774	102,339	121,391	4,97
Excess:					
1943-6	*30,109*	*42,371*	*220,498*	*164,810*	*29,7*
Share of total excess (%)	5.0	7.1	36.7	27.4	5.0

Source: Based on current registration data, reported in *Census of India 1951*, vol. VI, part 1B. Note 'fever' and under 'dysentery, diarrhoea, and enteric group of fevers', but the overlap is quantitativel

outbursts of epidemics during and immediately following the famine were affected not merely by starvation and malnutrition, but also by other factors, e.g. the impact of the famine on sanitary arrangements, water supply, and other civic amenities, exposure to vectors through

movements in search of food, as well as inability to receive medical attention owing to destitution and a breakdown of public health facilities. [20] In addition, infectious deseases can spread directly to people who may not have been affected otherwise by the famine. Epidemics do, of course, also have a rhythm of their own. [21] Once an epidemic occurs, its echo effects may last for quite a few years.

The diseases unleashed by the Bengal famine had the dual characteristics of being both (1) epidemic diseases associated with previous famines, and (2) endemic diseases in the region. Malaria had been associated with Indian famines at least from the nineteenth century, [22] and epidemics of cholera and smallpox had been observed in many previous famines, including the Bengal famine Of 1770. Dysentery and diarrhoea are, of course, 'peculiarly famine diseases' -- as the Famine Inquiry Commission described them. The same applies to the mixed bundle called 'fever' other then malaria. But all these diseases were also endemic in the region. Malaria and fevers, which are sometimes difficult to distinguish, [23] were the biggest killers in the pre-famine days, followed at quite some distance by 'dysentery, diarrhoea and enteric groups of fevers', cholera, and smallpox in that order. In the sharing of famine mortality, the relative positions are not very different, with malaria and fever being followed at a substantial distance by cholera, 'dysentery, etc.,' and smallpox, in that order.

Perhaps the most interesting case is that of the dog that did not bark, viz. respiratory diseases including TB. These diseases killed many more in the pre-famine period than any of the other group of diseases, with the exception of malaria and other fevers. But, remarkably, mortality from TB and from other respiratory diseases seem to have been hardly influenced by the Bengal famine (see Table D3). This experience is not unusual in the context of other Indian famines, in which TB and other respiratory diseases have not typically played a

[20] See Famine Inquiry Commission (1945a) on these disruptive consequences of the famine and on the large-scale trekking of destitutes in search of food. See also Ghosh (1944) and Das (1949).

[21] See Bailey (1957). In fact, because of the spread effects of epidemics, the Bengal famine may also have contributed to deaths outside Bengal, especially in Orissa and Bihar. See Famine Inquiry Commission (1945a), pp. 104-5. See also *Census of India 1951*, vol. XI, part i, P. 41.

[22] See the Reports of the Indian Famine Commissions of 1898 and 1901. Also the findings of S. R. Christophers regarding the nineteenth-century famines, quoted in Famine Inquiry Commission (1945a), p. 122.

[23] On this see the Report of Indian Famine Commission of 1898.

prominent part, but there is something of a puzzle in this in a more general context. The linkage of TB and other respiratory diseases with malnutrition is well established (see Keys, 1950), and seems to be conceded even by those who dispute the influence of starvation as such on other diseases spread through infectious contagion (see, for example, Chambers, 1972, pp. 82-6).

Tuberculosis is, of course, slow to develop and is influenced more by chronic undernourishment than by a short period of severe starvation;

this might suggest that the spread of tuberculosis would not be much enhanced by a famine. But famine-induced movements and sanitary breakdowns may help in the expansion of the infection. More importantly, since tuberculosis and other respiratory diseases were already widespread in Bengal, it would be natural to expect that starvation during the famine would convert morbidity into mortality on a substantial scale. That this was not reported as having happened during and immediately after the Bengal famine thus does leave one with an interesting and important problem. Attributing this counter-intuitive phenomenon comfortably to an assumed error of reporting is tempting, but this explanation would be convincing only with empirical evidence of the existence of such a bias in a large enough scale. Also, since TB and other respiratory diseases typically had rather undistinguished records in previous Indian famines *as well,* an *ad hoc* explanation for the Bengal famine of 1943 as such is not what is needed.

The Bengal famine killed mostly by magnifying the forces of death normally present in the pre-famine period -- a magnifying role that other famines had played in the past. The universality of this endemic-to-epidemic relationship is, however, seriously affected by the apparent inertness of TB and other respiratory disease. This inertness also seems to contrast quite sharply with the view taken of these diseases in the international literature on famine-induced epidemics (see for example Keys, 1950, Foege, 1971, Chambers, 1972).

D4

WHAT REGIONAL DISTRIBUTION?

Excess mortality can be estimated separately for each district in West Bengal on the basis of the registration data presented in the *Census of India 1951* (vol. VI, part IB). These are presented in Table D4, with the 'normal' level of mortality being taken to be the average of the figures for 1941 and 1942. The percentage excesses for the famine year 1943 and for the period 1943-6 are presented separately, and the ranks in the two orderings of excesses are also given. The inter-district variations are quite remarkable, even though for every district the excess is positive both for 1943 and for the period 1943-6.

There are some differences between the two rankings. Malda, which ends up as the most affected district over-all, was one of the less affected

TABLE D4

Excess Mortality in West Bengal: Breakdown by District

District	*Average morality 1941-2 ('normal')*	*Exess morality, 1943*	*Excess morality, 1943-6*	*Percentage excess, 1943*

Malda	8,237	+3,080	+45,512	+37.4
Howrah	18,842	+15,832	+52,444	+84.0
Murshidabad	32,382	+32,691	+87,869	+101.0
Birbhum	23,007	+17,482	+51,369	+76.0
Calcutta	30,385	+21,883	+61,588	+72.0
Midnapur	52,489	+72,250	+104,747	+137.6
West Dinajpur	10,858	+1,600	+20,281	+14.7
Nadia	21,819	+17,021	+31,914	+78.0
24-Parganas	54,062	+37,151	+65,501	+68.7
Jalpaiguri	20,171	+6,633	+21,062	+32.9
Hoogly	21,688	+5,808	+18,299	+26.8
Burdwan	35,401	+12,057	+26,382	+34.1
Bankura	26,212	+13,958	+15,953	+53.5
Darjeeling	10,495	+763	+1,779	+7.3

Source: Based on *Census of India 1951*, vol, VI, part 1B.

districts in the famine year itself. Similarly, Midnapur, which was most affected in the famine year, ends up in a somewhat moderate position for the whole period. The pattern of the epidemics that followed the famine re-ordered the districts in terms of mortality. However, the two rankings are not unrelated, and the value of Spearman's rank correlation coefficient is 0.60, which offers no problem in rejecting the null hypothesis that the two rankings are independent.

What is perhaps of greater interest is the fact that the Bengal government's diagnoses of the relative severity of the famines in the different districts differed quite substantially from the excess mortality rankings for 1943-6 as well as for 1943 itself. A five-category classification of the subdivisions was issued by the Revenue Department

in 1944, and a four-category classification by the Department of Industries in the same year. [24] Putting together the classification of the subdivisions within each district, I have presented a broad three-class partitioning in Table D4 reflecting the two official views of 'degree of incidence of famines'. Both put Malda -- ultimately the most affected district -- in the lowest category of incidence. The two did the same to Murshidabad and Birbhum, but in fact both the districts had a high incidence of excess mortality in 1943 as well as in the period 1943-6. On the other hand, 24-Parganas, which neighbours Calcutta, and from where many destitutes trekked into Calcutta at the height of the famine, [25] was put in the highest category of incidence in both the official lists, despite being only moderately placed in the excess mortality rankings for the famine year as well as the post-famine period. [26] Since relief operations were strongly influenced by these diagnoses, the discrepancies are of a certain amount of practical interest.

Finally, a remark on the excess mortality in Calcutta is worth making. Most people who died in Calcutta from starvation and from related diseases in the famine year were destitutes who had moved into Calcutta in search of food; the regular residents of Calcutta were protected by various public and semi-public schemes of food distri-

[24]Quoted in Mahalanobis, Mukherjea and Ghosh (1946), pp. 11-14.

[25]A sample survey of the destitutes in Calcutta conducted in September 1943 revealed that nearly 82 per cent of the destitutes surveyed came from this one district (see Das, 1949, p. 58).

[26]Deaths occurring in Calcutta of people normally residing in 24-Parganas should, in fact, be attributed to the 24-Parganas itself. This correction would tend to raise somewhat the excess mortality rates of the 24-Parganas. The required corrections are difficult to estimate because of lack of precise data on 'normal residence' of those dying in Calcutta during the famine and post-famine years. But rough breakdowns would seem to indicate that the relative position of the 24-Parganas would not change drastically, especially for the period 1943-6. The contrast between the reality and the official perception will still hold, and the importance of being close to Calcutta in having one's distress officially observed will not disappear.

bution (see Famine Inquiry Commission, 1945a). Based on this observation, it has been frequently stated that the residents of Calcutta escaped the famine. [27] This is largely true as far as starvation is concerned, but in the epidemics that were induced by the famine, Calcutta had its own share of casualties, reflected by the excess mortality figures after 1943, i.e. after virtually all the famine destitutes from elsewhere had left or been repatriated.

D.5
WHICH OCCUPATION CATEGORY?

The death registration figures do not specify occupational backgrounds. We can, however, surmise something about probable death rates by examining the rates of destitution of different income groups. These were computed on the basis of a sample survey conducted by

Mahalanobis, Mukherjea and Ghosh (1946), already used in Chapter 6 above, and are presented in Table D5 (taken from Table 6.7 above). In the second column the destitution rates are added up with the transition to the occupation of 'paddy husking' - a typical destitution syndrome for rural women with children. On this basis it would appear that the

TABLE D5
Destitution Rates of Different Occupation Categories in Bengal: January 1943-May 1944

	proportion of destitution	*Proportion of destitution and transition to paddy husking*
Peasant cultivation and share-cropping	1.3	1.5
Part-time agricultural labour	1.4	2.0
Agricultural labour	4.6	6.1
Non-cultivating owners	1.6	2.4
Fishing	9.6	10.5
Craft	3.8	4.3
Husking paddy	4.7	-
Transport	6.0	6.9
Trade	2.2	2.6
Profession and services	2.1	2.6
Non-agricultural labour	3.7	4.5
Other productive occupations	4.6	4.6

Sources: See Table 6.7 above.

[27] E.g., 'In the end not a single man died of starvation from the population of Greater Calcutta, while millions in rural areas starved and suffered' (Sir Manilal Nanavati's note, Famine Inquiry Commission, 1945a, p. 102).

most affected groups were fishermen, transport workers, and agricultural labourers. In terms of absolute numbers, agricultural labourers as an occupation group were dominant.

One of the few direct surveys of the occupational basis of famine mortality was presented by Mukerji (1965) for five villages in the Faridpur district in East Bengal; the survey was conducted in 1944. The results are presented in Table D6. In these villages the highest mortality category is agricultural labour. The importance of agricultural labour among the famine victims is brought out also by the survey of destitutes in Calcutta conducted in 1943 by T. Das (1949.

Our information on this crucial aspect of famine mortality is limited and somewhat haphazard. And we have virtually no information at all on the occupational composition of post-famine mortality in the epidemics.

TABLE D6

Distitution in Five Surveyed Villages in Faridpur

Occupation on 1/1/43	*Proportion of destitution*(%)	*Proportion being 'wiped ojf' during 1943 (%)*
Peasant cultivation and share-cropping	18.4	6.4
Agricultural labour	52.4	40.3
Artisan	35.0	10.0
Petty trader	31.8	14.4.
Crop-sharing landlord	6.3	0.0
Priest and petty employee	27.3	27.3
Office employee	10.0	0.0
Landlord	0.0	0.0
Unproductive'	44-4	6.7
Total	28.5	15.2

Source: See Table 6.8 above.

D.6
AMINE MORTALITY AS MAGNIFIED NORMAL MORTALITY

Peculiarities in the pattern of famine mortality compared with normal mortality have been a subject of discussion for a long time. A supposedly lower impact of famines on women is one of the 'regularities' that has received some attention in India. Sir Charles Elliot, Famine Commissioner of Mysore in 1876 and Census Commissioner of India for the 1881 Census, summarized the general belief regarding nineteenth-

century Indian famines: 'all the authorities seem agreed that women succumb to famine less easily than men'. [28]

Was this the case with the Bengal famine? Das (1949) found, in his survey of destitutes in Calcutta in September 1943, that 'for every dead woman there were nearly two dead men' (p. 93). In its Report the Famine Inquiry Commission referred to Das's findings -- then available in unpublished form -- and also noted that there was a higher proportionate increase in male deaths compared with female deaths in 1943. [29] The Commission referred to the contrary result from Mahalanobis's survey of 2,622 families which found a higher percentage of mortality among women, but went on to comment on the 'considerable irregularity' in the various subdivisions covered in the survey.

The sex breakdown of pre-famine 'normal' mortality given by the average of 1941 and 1942 as well as that of the excess mortality in 1943 and in the period 1943-6 are all presented in Table D7, based on registration data. The ratios seem remarkably stable through the famine. While the proportion of men in excess mortality in 1943 is a bit higher than in the pre-famine average, the difference is small, and over the larger period of famine mortality the proportionate breakdown of the excess is just the same as for the pre-famine average. [30]

There may, of course, be biases in the registration system, but this should apply to registrations both before and during the famine. In fact, it is more likely that there was a serious bias in Das's sample survey of destitutes in Calcutta which contained a large proportion of families that had 'lost their male earning members', and this bias would be reflected in the results of the survey, which asked respondents to recall which members of the family had died. [31] To what extent this type of observation bias was present also in the accounts of the nineteenth-century famines, I do not know, but certainly as far as the 1943 famine is concerned there is little need for going into the rather contrived explanations [32] that have been proposed to explain the supposed contrast of sex ratios.

[28]For this and other observations, see *Census of India 1911*, vol. I, part I, appendix to Chapter VI; and also Das (1949), pp. 93-6.
[29]Famine Inquiry Commission (1945a, pp. 110-11). The Department of Anthropology had noticed the same, and referred to it as 'a very sinister and significant feature' of the Bengal famine (see Ghosh, 1944, Appendix G, p. 183).
[30]The male population exceeded the female population in Bengal, and the recorded death rate per unit of population was higher for women in every year during the decade 1941-50 through the famine (see *Census of India 1951*, vol. VI, part IB, Tables 7 and 8, pp.
29-30).
[31]Das (1949), p. 93.
[32]My favourites are some of those proposed by Mr. W. C. Bennet, C. S.: 'Women find employment as maid-servants in the houses of rich men when men have no work to look

TABLE D7

Excess Mortality of Men, Women, Children, and the old: West Bengal

	Average mortality, 1941-2		*Excess mortality, 1943*	
		Percentages		*Percentages*
	Numbers	*of total*	*Numbers*	*of total*
Men	191,943	52	140,439	54
Women	174,310	48	117,774	46
Children below 5	106,080	29	74,838	29
Old people above 60	57,044	16	40,212	16

Source: Based on current registration data, reported in *Census of India 1951*, vol. VI, part IB. Note figures for all ages,
and 'children below 5' and 'old people above 60' include those for both sexes.

Das (1949) also noted a much higher proportion of deaths among children, and opined that 'this will certainly cripple the next generation of the Bengalees'. [33] The Anthropology Department of Calcutta University had reported a similar bias in its press statement in 1944. [34]

Is this borne out by the registration data? The answer seems to be no. The data are given in Table D7. The proportion of children below five in average mortality in the immediate pre-famine period was 29 per cent, and that is also the percentage of children in excess mortality in the famine year (1943) as well as in the four-year period of famine mortality (1943-6). [35] The extraordinarily high level of mortality of children is, of course, an excruciating problem, but that is a characteristic not only of famine mortality but also of normal mortality in the absence of famine in this part of the world.

Table D7 also presents the mortality figures for the old people, those above sixty. Once again the proportions of famine mortality mirror the pattern of normal mortality.

I end this section with a final observation dealing with the monthly pattern of death at the height of the famine. Table D8 presents the monthly death registrations during June-July of 1943-4, when mortality was at its highest, and also the average monthly registrations in the preceding quinquennium. [36] The similarity between the two monthly patterns is striking. [37] This is brought out clearly by figure D2 as well. (For the benefit of the blind, I note that regressing monthly mortality *y* in the famine period on normal pre-famine monthly mortality *x,* by least-squares, yields a very high value of r^2. The estimated regression function, in fact, is $y = 3{,}175x$ -- 122,535, with r^2 having the convincing value of .95.) The famine seems to have worked by magnifying the forces of mortality each month, heightening the peak mortality relatively more.

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for'; 'women possess ornaments of value which they may dispose for their own benefit whenever necessary'; 'the woman in a Hindu family always keeps the household stores, and has no scruple in availing herself of the advantage it gives her' (see *Census of India 1911*, vol. I, part 1, appendix to Chapter VI, pp. 220-2).

[33] Das (1949), pp. 91-2.

[34] See Appendix G in Ghosh (1944).

[35] The Famine Inquiry Commission (1945a) noted a decrease in the number of deaths for infants under one month, but attributed this to a decrease in the number of births as well as to a reporting bias (p. 109). Adjustments for this group would not affect the total proportions of children in excess mortality by very much.

[36] The data come from Famine Inquiry Commission (1945a), p. 213.

[37] Cf. Jutikkala and Kauppinen's (1971) observation regarding 'catastrophic' and 'normal' mortality in pre-industrial Finland (1749-1850): 'The figures suggest that the seasonal distribution of deaths did not differ significantly between "catastrophic" and "normal" years' (p. 284).

TABLE D8

Mortally by Months during July 1943-June 1944 compared with Previous Quinquennial Average

	Deaths during	*Quinquennial average*

	1943-4	*deaths: 1938-42*
July	126,437	78,816
August	151,126	83,968
September	171,755	85,253
October	236,754	105,529
November	289,723	128,454
December	328,708	142,033
January	228,128	112,263
February	170,955	89,594
March	162,933	98,428
April	167,368	98,615
May	145,812	85,176
June	106,032	74,774

FIG. D2 Monthly Pattern of Recorded Mortality before and during the Famine

D.7
CONCLUDING REMARKS

While it is not possible to say at all precisely how many people were killed by the Bengal famine of 1943, there is evidence that an estimate of around 3 million would be closer to the mark than the figure of 1.5 million arrived at by the official Famine Inquiry Commission (and widely quoted in later works). The difference is largely due to:
1) continued high 'excess mortality' for several years after the famine, caused by famine-induced epidemics the impact of which the Commission considered only for 1943 and the first half of 1944;
(2) underestimation by the Commission of the actual extent of under-registration of deaths in official records.

Both these contrasts largely reflect differences between the data available to the Commission and those available now. Apropos(1), the

Commission, working in late 1944 and early 1945, could hardly have gone beyond the first half of 1944 in its mortality coverage. Apropos (2), the Commission chose to use an arbitrary correction for under-registration, not having any way of estimating it directly or indirectly. In contrast, we can use the results of 'reverse survival' exercises based on Census data of 1951*vis-à-vis* those of 1941 and the results of a direct sample survey held in 1948. There is thus no quarrel, only a very substantial difference in the respective estimates based on current information (see Section D.2).

While the gigantic size of excess mortality attributable to the famine is of a certain amount of interest, the *time pattern* of mortality is of possibly greater relevance. Very substantially more than half the deaths attributable to the famine of 1943 took place after 1943. The size of mortality did not return to the pre-famine situation for many years after the famine, and the epidemics of malaria and other fevers, cholera, smallpox, dysentery, and diarrhoea that sprung up during and immediately after the famine went on raging for a long time (see Tables D1 and D3 and Figure D1). This has obvious implications for health policy.

Regarding the regional pattern of famine mortality, the relative importance of different districts changed quite a bit between the starvation phase and the later epidemic phase (see Table D4). What is perhaps of greater interest is that the official diagnoses of the relative severity of the famine in the different districts differed substantially from the pattern emerging from the 'excess mortality' calculations, both for the starvation phase and for the later epidemic phase (see Section D.4). Since government relief and rehabilitation work was based on these official diagnoses, the contrasts were of practical import.

Information on the occupational pattern of mortality is very limited, but some general impressions emerge from a broadly based 1944 survey

covering the occupational pattern of destitution, and two local 1943 surveys directly going into deaths related to occupations (see Section D5). In absolute terms, the most severe incidence of famine mortality during the famine itself fell almost certainly on the class of agricultural labourers. Their *relative incidence* was high too, but that applies also to other groups like fisherman, transport workers and non-agricultural labourers in rural areas. In Chapter 6 the nature and causation of the observed occupational pattern of destitution were analysed, relating them to the positions of the different groups in the structure of production and exchange in the economy.

Regarding the diseases that took most of the toll, they had the dual characteristics of being both (1) endemic diseases in the region, and (2) epidemic diseases in past famines (see Section D.3). Gigantic as the famine was, it killed mostly by adding fuel to the fire of disease and mortality normally present in the region. This possibly explains why the seasonal pattern of famine deaths even during the actual famine and its immediate aftermath was essentially the normal seasonal pattern -- just linearly displaced severely upwards (see Table D8 and Figure D2). The sex and age patterns of famine mortality also seem to show remarkable

similarity with the normal pattern of mortality in pre-famine Bengal (see Table D7).

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