

The causes of famine - A refutation of Professor Sen's theory

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ABSTRACT

This article argues that Sen's theory of famine will lead to the wrong diagnosis and the wrong remedies for famine and will therefore worsen the situation. His analysis of the Bengal famine is a case in point. It is, based on unreliable and inaccurate statistics. Even the statistics he does use contradict his thesis. His explanatory hypotheses are shown to be theoretically and factually wrong. The actions of the Bengal government of 1943 are looked at in the light of Sen's recommendations.

INTRODUCTION

The problem of famines and food shortages is one of the most acute facing agricultural economists. Today, 15 countries have famines and 30 million people face starvation. In the past ten years, Professor Amartya Sen's approach to the economics of famine has become influential. He has argued at some length that a major cause of famine is not a sudden decline in food availability, but a sudden redistribution of what food is available. It will be argued here that there are major weaknesses in his theory, which mean that it is more likely to cause famines than to cure them. It will also be reasoned that his theory and analysis are wrong and that there are inconsistencies between the arguments he presents. The implications of his theory, and many of the facts he gives, are contradicted by the facts in the sources he cites.

For several reasons this paper will consider only Sen's analysis of the Bengal Famine of 1943 - it is the one he gives most attention to, it is the best documented one, and it is the one for which his theory is most plausible. To be absolutely fair to him, the analysis will rely entirely on the sources he quotes, and no new evidence will be presented.

This analysis is presented purely as a refutation of Sen. It is not a complete analysis of the Bengal Famine - only a book could do justice to so important and so complex a subject, and the book would not overlap with Sen's analysis to any degree. It is not presented as a supply-side analysis in contrast to Sen's demand-side analysis. On the contrary, it was the weaknesses and contradictions in his demand analysis that showed that his supply figures could not be accurate. The practical problems of administration, physical distribution or rationing will not be considered here, though they were important in the Bengal famine; nor will the failures of long-term agrarian and food policy which made the situation so critical and so difficult to deal with. However, the points that are discussed are not trivial: the failure of the authorities to understand them caused three million deaths in 1943.

The language of normal economic theory will be used, rather than that of Sen's entitlement theory. There are several reasons for this. First, Sen himself used this language when dealing with the Bengal famine, with his occasional mentions of entitlement declines, etc, being

¹ The author would like to thank the referees, not only for their helpful comments, but for the large amount of work they put into checking sources and quotations; and also Professor G. Peters for the use of the facilities of the Institute of Agricultural Economics, Oxford University. The paper draws heavily on the full report of the study (P. Bowbrick, *A Critique of Professor Sen's Theory of Famines*, Institute of Agricultural Economics, Oxford, UK, 1986) in which the arguments, the facts and the references are set out at some length.

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external to his analysis. Second, we are concerned with what actually happened, rather than with the labels put on the effects. Third, the use of the value-loaded vocabulary of entitlement would confuse people who are not familiar with it, or who do not agree with it. Finally, discussions have made it clear that different people interpret his entitlement theory in quite different ways.

It is always possible to provide a few facts in favour of the flat earth hypothesis or any other. Accordingly, this paper will examine each of Sen's hypotheses to see if they are supported by *all* the facts, including those he does not quote. It is also possible to present a series of minor hypotheses, none of which is falsified by the evidence, but none of which receives much corroboration from it. The only satisfactory way of testing these is to see whether they are compatible with each other, and whether they fit into a general model of the market being examined.

Famines may be caused by: a fall in food supply, a rise in the demand for food (e.g. because of an influx of refugees), a redistribution of what food is available (e.g. with hyperinflation or unemployment meaning that some people cannot afford to buy food), or shortages within a season, caused by transport problems, etc. It is difficult for a casual observer to isolate the cause of a particular famine, because a famine caused by crop failure, for example, will necessarily be accompanied by speculation, a redistribution of income, reduced purchasing power by some groups and by regional shortages.

Adam Smith thought that, in practice, all famines were caused by a sudden fall in food supply.² Likewise, modern economists have thought that such famines were the norm, but that they can be caused, on occasion, by other factors. Sen, on the other hand, has argued that the cause of many or most famines is a redistribution of supplies resulting from a shift in purchasing power. He has been scathing about those who consider that a sudden food availability decline (FAD) is the primary cause, and about those who consider an examination of aggregate food supply of primary importance in the analysis of famine. He has been particularly scathing about those who consider a decline in food availability to have caused the Bengal famine of 1943.³

Food availability

Unlike Sen, I consider that one cannot discuss famines without constantly taking into account aggregate food supply. For this reason, I would like to distinguish several degrees of shortage:

No shortage - there is enough food to go round and famine can only occur if there is serious maldistribution.

First degree shortage - there is sufficient food to provide a barely adequate diet for everyone, provided that there is rationing. If there is not, some sections of the population will suffer from serious malnutrition or starvation.

Second degree shortage - there is insufficient food for long-term survival, but rationing would keep most of the population alive, though suffering from deficiency diseases, until the next harvest.

Third degree shortage - there is insufficient food for long-term survival. If everyone were given a bare survival ration, food would

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run out before the next harvest. Mass starvation is inevitable without imports.

Since there is always some maldistribution, the situation will always be worse than this classification indicates. Even when there is no shortage, some people suffer from malnutrition.

By definition, a redistribution famine of the type Sen describes can only occur if there is no shortage or, perhaps, if there is a first degree shortage - if the shortage is any worse, there is a famine anyway. This means that

² Adam Smith, *The Wealth of Nations*, Everyman, 1910, 1977, ii, P 26.

³ Amartya Sen, 'Famines as failures of exchange entitlements', *Economic and Political Weekly*, Special No, August 1976; A. Sen, 'Starvation and exchange entitlements: a general approach and its application to the Great Bengal Famine', *Cambridge Journal of Economics*, No 1, pp 33--59, 1977; and A. Sen, 'Famine Mortality: a study of the Bengal Famine of 1943', in Hobsbawm et al, *Peasants in History: Essays in Memory of Daniel Thorner*, Calcutta, Oxford University Press, 1980. Also A. Sen, 'Famines', *World Development*, Vo18, No 9, pp 613--21, September 1980b; A. Sen, *Poverty and Famines*, Clarendon Press, Oxford, UK, 1981; A. Sen, 'Ingredients of famine analysis: availability and entitlements', *Quarterly Journal of Economics*, August 1981b, pp 433--464; and A. Sen, *Resources, values and development*, Blackwell, Oxford, UK, 1984. When Sen denounces the FAD approach, he is sometimes denouncing an unbelievably narrow approach which I am quite certain that no economist ever held. Sometimes he is denouncing the view of the Bengal government, which was virtually the same as his own. Sometimes he is denouncing the balanced approach of the Famine Commission (Famine Inquiry Commission, *Report on Bengal*, New Delhi, government of India, 1945a; Famine Inquiry Commission, *Final Report*, Madras, government of India, 1945b).

to say a famine is of the redistribution type is not only to diagnose the cause, but also to assert that there is really no shortage.

Why does it matter?

The disagreement between Sen and mainstream economists is not of mere academic interest. It strongly influences the action that a government will take to prevent or ameliorate famine.⁴ Millions of lives depend on it. Throughout this paper it will be argued that Sen's theory of the causation of famines, and the methods of analysis he considers appropriate will lead to a misdiagnosis of the cause and the seriousness of the famine and the appropriate action to deal with it.

It would be easy enough to show that, by using Sen's analysis, an economist in the threatened country is likely to misdiagnose the problem and the remedy. Such an economist is unlikely to be a highly-trained theoretical economist; he has limited resources and extremely unreliable statistics; his work is subject to extreme time pressure and political pressure; and he has an awesome responsibility. Instead, I propose to show that Professor Sen, using the analysis that he developed, has reached the wrong conclusion and stuck to it in spite of criticisms, and that his bias has been one that would lead to famine. His many books and papers were not subject to the time constraint that faces the economist in the field; he has dealt with some of the best-documented famines in history and he has had the advantages of hindsight and ex-post data - he was in a better position to make a diagnosis than the man in the field, and yet he was wrong.

It will also be shown that the effects of misdiagnosing a famine as a Sen-type famine are serious. The resulting government action will be totally ineffective or will worsen the situation. Making the opposite mistake and diagnosing a Sen-type famine as a food availability decline (FAD) famine does not matter: the action taken will rapidly bring the famine to an end.

Misdiagnosis can worsen the situation because the degree of shortage, i.e. the food availability per head per day, does not remain constant from one harvest to another. For example, if a government issues too high a ration, a worse shortage will be created and mass starvation is a possibility. The misdiagnosis means that there will be no imports when imports are the only answer.

Again, if the government decides that the famine is not the result of a shortage but the result of speculation, as Sen argues, it might force merchants to release enough grain onto the market to keep supplies at the normal level. In fact, if supplies were 25% below average, the result would be that all food supplies would be exhausted three months before the next crop was due. The whole population would die.

Unfortunately, the uninformed layman, whether politician or administrator, is easily convinced that high prices are due to something he

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thinks he understands, like speculation, hoarding or inflation (Sen's explanations), and something he can deal with by administrative action. He feels that he has acted decisively and usefully if he arrests a few speculators and seizes their stocks for distribution. There is a reluctance to accept the horrifying responsibility of a third degree shortage.

Dealing with a famine

The mainstream view, as well as the view of the most hardened believers in FAD, is that all famines should be dealt with by issuing free food to the poor, by relief works with payments in food, and by loans to prevent the impoverishment of farmers and artisans.⁵ Market intervention (i.e. price control, control of stocks, seizure of stocks, prohibition of exports, etc) is also normal.

In addition to this, rationing is taken to be a possible complete solution for a first or a second degree shortage, although the practical problems are such that it would be unsafe to rely on it. There are problems arising from poor administration, corruption, political interference or difficulties with physical distribution. There may not be sufficient maldistribution for 'fair shares' to make things better. In Bengal in 1933 for example, only 22% of the population were well nourished, and since these people, the middle classes, ate considerably less rice (though more protective foods) than the average, equal rations of rice would actually worsen the situation.⁶ Rationing is

⁴ This paper is not concerned with long-term food policy: suffice it to say that the traditional food security and famine prevention measures of producing a surplus in normal years and building up an emergency stockpile are not appropriate if famines are not caused by supply shortage.

⁵ See for example, Bengal Administration, *Bengal Famine Code*, (Revised edition of December 1895) Calcutta, 1897.

⁶ Famine Commission, *op cit*, Ref 2, p 6, P 204.

more likely to be effective as a method of reducing total consumption than of producing optimum allocation. Imports are seen as essential for dealing with third degree shortages and, in practice, for most second degree shortages.

Sen disagrees. He states that it is wrong to concentrate attention on degree of shortage when determining how to tackle a famine, and indeed that it is wrong to consider the degree of shortage at all. The remedies he proposes are:

No matter how a famine is caused, methods of breaking it call for a large supply of food in the public distribution system. This applies not only to organizing rationing and control, but also to undertaking work programmes and other methods of increasing purchasing power for those hit by shifts in exchange entitlements in a general inflationary situation ... A large food stock would have also helped in breaking the speculative spiral that ushered in the Phase II of the famine. Thus there is no reason to revise the criticisms made of the official failure to obtain more food in the public distribution system through greater procurement and larger imports from outside Bengal.⁷

At first sight this appears to be similar to the mainstream view; indeed, in his reply to my paper at the Development Studies Association Conference 1985, Professor Sen stated that his prescriptions are the same as mine. This is disingenuous: he would not have written so many books and papers on the subject merely to confirm the orthodoxy he attacks so violently. Some of the differences are as follows:

- The mainstream view is that, ideally, at least enough food should be imported to meet the shortfall in supply. However, since Sen does not recognize that there is a shortage, he does not accept that any food has to be imported at all. Indeed, the only logic for imports is that it is rather easier to get food into the public distribution system by importing it than by forced purchases and the seizure of stocks.
- There is also an enormous difference in the quantities brought into

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- the public distribution system. Since Sen sees speculation rather than shortage as the cause of famine, it is sufficient that enough should be procured 'to break the speculative spiral', i.e. a much smaller quantity. The disastrous consequences of this approach in the face of the second degree shortage in 1943 will be described later. The mainstream view, going back to Malthus at least, is that purchases of grain for distribution through the public system (Sen's recommendation) can be disastrous. Because there is a shortage, government merely bids up the price to astronomical levels. People still starve as there is no change in supply, though it may be different groups that are affected. What actually happens is that, first, traders and speculators make vast fortunes, and second, there is destitution on a far wider scale than would otherwise have been the case. This happened in Bengal in 1943.
- As has been shown earlier, in his belief that there is no shortage, Sen would suggest a scale of rationing that would merely exacerbate the situation, producing a worse shortage and quite possibly leading to universal starvation. Rationing is always disastrous if there is a third degree shortage.

The difference between the two approaches in practice will be seen in the analysis of the Bengal Famine of 1943.

The Bengal Famine

In 1943, Bengal suffered from a famine that resulted in perhaps 1.5 million deaths by starvation and the same number of deaths in the epidemics that hit a population weakened by hunger. Sen's major source of information on this was the excellent report of the Famine Inquiry Commission which was highly critical of the Imperial government, the Indian government, the Bengal government and the grain traders, whose incompetence, callousness and greed exacerbated the famine and prevented any effective action being taken to cure it.⁸ There are also some contemporary, highly political books by Hindu and Muslim nationalists which reached similar conclusions.⁹

Rice was the staple food of Bengal, accounting for 80-90% of the calories consumed. There were three crops; the December 'aman' crop which accounted for 74% of output; the upland 'aus' crop harvested in August and September, accounting for 24%; and the 'boro' crop harvested in February or March, providing 3%.

⁷ Sen *op cit*, Ref 2, 1981, P 79.

⁸ Famine Commission, *op cit*, Ref 2, 1945.

⁹ For example, T.K. Dutt, *Hungry Bengal*, Indian Printing Works, Lahore, Pakistan, 1944; K.C. Ghosh, *Famines in Bengal, 1170-1943*, Indian Associated Publishing, Calcutta, India, 1944; T.K. Ghosh, *The Bengal Tragedy*, Hero Publications, Lahore, Pakistan, 1944.

Japan entered the war in 1941, and by March 1942 had occupied Rangoon. This cut off Burma's rice exports to India, where there was a 'deficit, and caused shortages which lasted throughout the war.¹⁰ Rice prices rose through the year (see Figure 1). On 16 October 1942, a cyclone accompanied by tidal waves and torrential rains hit West Bengal, destroying 30% of the winter rice crop, destroying food stores and killing 14 500 people and 190 000 cattle. There was immediate destitution in the area, and famine relief was begun.¹¹ Prices rose doubling within a month when this poor crop was harvested.¹² By March 1943, there was hunger throughout Bengal, and from July to November the famine was in full swing. Relief was totally inadequate. In November the new Viceroy, Wavell, increased imports and sent in the army to improve distribution. Hunger was reduced, but epidemics hit the hunger-weakened population. Three million people died. Two-

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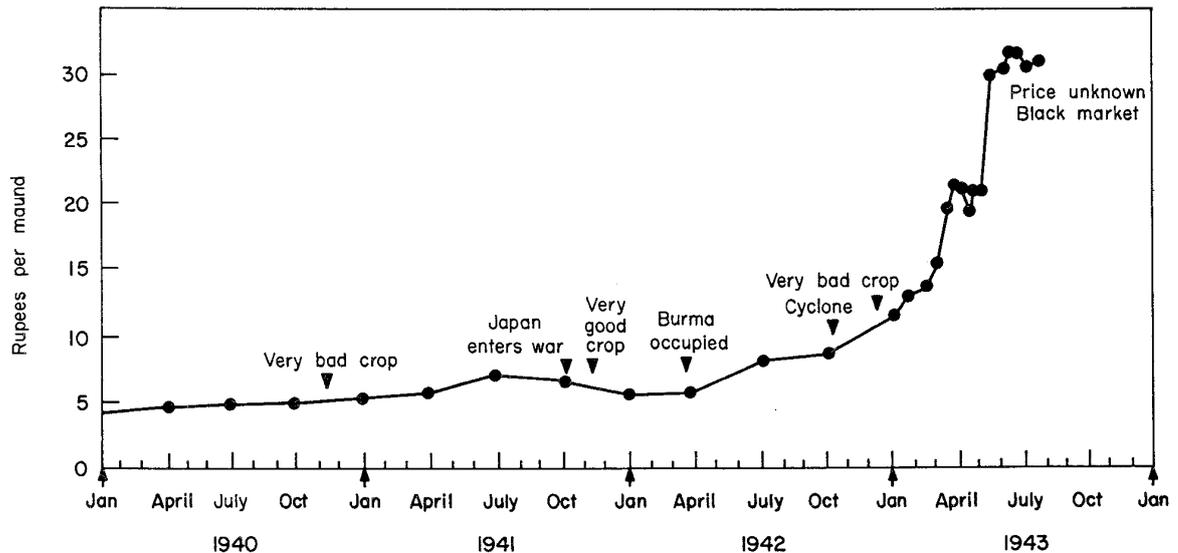


Figure 1. Wholesale price of coarse rice on the Calcutta market, 1940-43.

Source: Famine Inquiry Commission, see text, *op cit*, Ref 2.

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thirds of the population was affected, going hungry or selling their possessions to buy food.¹³

The Famine Commission provided a complex analysis of a complex situation, but said that the basic cause of the famine was a sudden decline in food availability (FAD), because of a 30% fall in the rice crop, aggravated by the loss of the Burma rice imports and the fact that there was an unusually small stock at the beginning of the year. Gross mismanagement of the crisis, particularly by the Bengal and Indian governments, meant that there was no effective action to alleviate it. They took only the action appropriate to

¹⁰ W.R. Aykroyd, *The conquest of famine*, Chatto and Windus, London, UK, 1974.

¹¹ Famine Commission, *op cit*, Ref 2, pp 32, 65, 66, 236.

¹² *11bid*, P 33. In interpreting price statistics it is necessary to remember that: 1) News of the cyclone was censored as a military secret for two weeks. It was mid- to late November before the press realized the extent of the damage, and even then the implications on the food supply of other areas was not appreciated. 2) Most damage was not directly caused by the tidal wave, but by fungus and root rot after flooding, and so was observed some time after the cyclone (Famine Commission, *op cit*, Ref 2, p 32). 3) Harvesting seasons for the 'December' crop varied from November to January, depending on area. 4) Prices rose more rapidly in some areas and, as predicted by margin theory, the rise was faster and a greater percentage in production areas. 5) Nearly all agricultural price statistics, and particularly prices in such markets, are subject to enormous errors (see, for example, P. Bowbrick, 'Market margin investigations and price control of fruit and vegetables', *Irish Journal of Agricultural Economics and Rural Sociology*, Vo16, p 9-20, 1976). In rural or urban Bengal in 1943, in wartime and with the threat of famine, such figures can be indicative at best. Calcutta market reports, for example, show *exactly* the same price month after month at a time when Sen and his sources are agreed that prices were rising - suggesting that the price was asked by a uniformed official rather than a plain-clothed man buying a sample which would later be weighed.

¹³ Sen (*op cit*, Ref 2, 1977, P 33) calls this famine 'possibly the biggest famine in the last hundred years'. However, in G.B. Masfield, *Famine: Its Prevention and Relief*, OUP, Oxford, UK, 1963 (who he quotes on the history of famine), there are six mentioned where the death toll was higher than the official figures, nearly ten times greater in one case: India, 1876/7, 5 million; China, 1876/7, 9-13 million; Russia, 1920-1, 'Millions'; Hunan China, 1929, 2 million; and Russia, 1932/3, 3-10 million. The Sahel famine of the 1970s also had a greater death toll.

a first degree shortage or a Sen-type famine. The relief measures were totally inadequate for a problem of this scale - there should have been massive imports; a rationing system should have been introduced for Calcutta at least; the government should have seized all grain stocks and taken over the whole grain trade; and there should have been grain distribution and relief works.

Sen is scathing about this explanation. He claims that this famine and many others were not caused by FAD, and that a FAD approach to the analysis is wrong. He says that the famine arose and was inadequately handled largely because the Bengal government had the wrong theory, the FAD approach.¹⁴ His own causal hypotheses are examined below, and are compared with the alternative explanation based on a sharp fall in food supply.

Professor Sen's version

Professor Sen presents his version in support of his claim that this famine and many others were not caused by a decline in food availability, and that the FAD approach to famine analysis is inappropriate. He says that there was *at least* 11 % more food available in Bengal in 1943 than there had been in 1941 when there was no famine, so the famine could not have been caused by a decline in food

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availability.¹⁵ Instead, it occurred because of a change in the distribution of existing food supplies arising from wartime conditions, particularly inflation. This meant that some groups of the population received higher incomes and ate more, leaving little for the rest of the population. At the same time, others had insufficient money to buy food, so they starved.

A complete list of the explicit causal hypotheses he puts forward is shown below.¹⁶

- 1) Demand factors related to inflation raised the rice price in 1942.
- 2) An uneven expansion of income and purchasing power.
- 3) Impoverishment of occupational groups not directly affected (from March 1943 on).
- 4) The change from the stable prices of 1914--1939 to an era of more rapidly rising prices.
- 5) Speculative withdrawal and panic purchases were encouraged by administrative chaos (especially between December 1942 and March 1943, but also up to November).
- 6) '... demand forces were reinforced by an "indifferent" winter crop and by vigorous speculation and panic hoarding from March to November 1943'.
- 7) The prohibition of the export of cereals from other provinces.
- 8) The policy of removing boats from areas threatened with Japanese invasion.¹⁷
- 9) The policy of removing excess grain stocks from areas threatened with invasion.¹⁸

His arguments tend to the conclusion that some groups of people ate more grain than usual, leaving less for the rest of the population.¹⁹

The examination of Sen's theory will consider first, whether there was in fact a shortage. Then his explanatory hypotheses will be examined all of them, as there is considerable disagreement as to which he considered essential. Finally, government policy during the famine will be discussed.

Was there a shortage?

Sen's argument depends on his analysis of the production figures showing that there was no shortage. If either his figures or his analysis of them are shown to be wrong, his whole argument collapses. In this section it will be shown that the production figures are so unreliable that they can give no support to his argument.

His production figures came from the Famine Commission, which is at pains to show how unreliable they are. They are based on a *crop forecast*, not even a post-harvest estimate, and are based on subjective estimates of the areas planted and the probable yield.²⁰

¹⁴ Sen, *op cit*, Ref 2, 1984, P 477

¹⁵ For example, Sen, *op cit*, Ref 2, 1977b, pp 42, 53; 1980, P 80.

¹⁶ Sen, *op cit*, Ref 2, 1977, pp 50, 51; 1981a, pp 75-78.

¹⁷ 16Sen, *op cit*, Ref 2, 1984, P 461; 1980b, p 619.

¹⁸ *Ibid.*

¹⁹ Sen ignores the Hindu-Muslim conflict which most commentators consider a serious factor (e.g. Dutt, *op cit*, Ref 8; Ghosh, *op cit*, Ref 8; and N.S.R. Rajan, *Famine in Retrospect*, Pamda Publications, Bombay, India, 1944. Also, N. Mansergh, ed, *The Transfer of Power*, 1942-7, Vol II, HMSO London, UK, 1971; N. Mansergh, *The Transfer of Power*, 1942-7, Vol IV, HMSO, London, UK, 1973, P 358). It was even claimed by a leading politician that 'Bengal had been deliberately starved out by other provinces' which refused to permit the export of grain (P. Moon, ed, *Wavell: The Viceroy's Journal*, OUP, Oxford, UK, 1973, P 239). He also ignores the sabotage of the railways which were bringing in grain.

²⁰ As the estimates were based on area planted rather than harvested, and as yields were based on estimates made during the growing season, they would not have made full allowance for the effects of the cyclone between estimation date and harvest date. It is difficult to see why Sen should quote Blyn's estimates as though they provided independent evidence (G. Blyn, *Agricultural Trends in*

For instance, the following is the method followed in the province of Bengal. Each Circle Officer (a gazetted revenue officer with jurisdiction over three or four 'thanas' [i.e. 400 square miles] ascertains from personal inspection and by questioning other local officers and cultivators, the relation which the area under the crop bears to the normal acreage of that crop in that area, this normal acreage being determined in accordance with certain instructions. The Circle Officers send their estimates to the Subdivisional Officer who, after making such corrections as he considers necessary, either from his own knowledge, experience and observations or by enquiry, sends a consolidated estimate for the

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subdivision to the District Officer. The latter, in his turn, makes such modifications as he thinks necessary on the basis of his own experience and information obtained from the District Agricultural Officers and other sources, and forwards the district estimate to the Director of Agriculture. Clearly, acreage estimates prepared in this manner cannot be accurate.²¹

In 1942 the estimates would have been particularly bad because parts of Bengal, notably those hit by the cyclone, were on the verge of an insurrection, and the army was busy, burning villages etc.

The collectors of the statistics did not know the normal acreage or yields, only people's estimates of the deviation from the norm, so there was a substantial error in the estimate of total production as well as an unknown aggregation bias. This was particularly important for the December 1942 crop, as the damage was limited to certain areas.²²

Desai provides a useful review of the agricultural and other statistics of this period, and his rigorous use of them is exemplary.²³ He compares the official estimates of agricultural surveys with the results of scientific surveys carried out by Mahalanobis. He shows that the discrepancies are large, with survey estimates being between 47% and 153% of the official estimate. The discrepancies also vary from year to year, with the sample estimate of the jute crop being 2.6% above the official estimate in 1941, and 52% above it in 1946. (With jute, where exports provided a check, the sample proved correct.) Since there was no sample survey of the rice crop until after the famine, we do not know how inaccurate the 1942 forecast was. On the basis of Mahalanobis's survey after the famine, the Famine Commission revised the estimates for all previous years, putting them up by 20%. This changed the level of the estimate, but there was no way of correcting for error around this estimate with hindsight.

Another form of bias arises from subjective eye estimates of the prospective yields. Mahalanobis found that, even with scientific sampling methods on a mature crop, enumerators tended to select the best fields and the best areas of damaged fields.²⁴ This gives a large upward bias when much of the crop is damaged, as in 1942. The bias would be much worse with untrained observers using subjective methods.

The quality of the data was also bad, even in the better organized studies:

... the apathy of the administrators and the peculiar difficulties in which statistical work has to be carried out in India has to be experienced in order to be properly appreciated.

I may perhaps quote one concrete example. In 1939 the Government of Bengal decided to prepare a complete record, plot by plot, of the land sown with jute. After these records were prepared the Government arranged to have certain portions checked by permanent Government officers. The primary records, when checked, were found so unreliable that the Bengal Government ordered all the records to be destroyed.²⁵

There is also a more serious form of bias - the scale of incompetence and corruption was so vast that virtually every administrator and politician had cause to want evidence suppressed or altered. There is some indication that pressure was brought on statisticians to do this.²⁶

Sen makes a great deal of the fact that '*the rice crop in Bengal was recognized to be indifferent rather than exceptionally bad*'.²⁷ In fact, the document he quotes stated that there was *both* cyclone damage in certain areas *and* an indifferent crop in Bengal generally. The combined effect was seen as being exceptionally serious.

India, 1891-1947: *Output, Availability and Production*, University of Pennsylvania Press, Philadelphia, PA, USA, 1966). They are based on the same poor data and they are even more aggregated.

²¹ Famine Commission, *op cit*, Ref 2, 1945b, pp 44-5.

²² As the cyclone, tidal waves, flooding and disease which caused so much damage had never occurred before, there was no experience to guide anyone. Previous famines had been due to drought in other areas of Bengal. It appears that no attempt was ever made to check these crop forecasts against anything else, or to amend them in the light of experience, so it was not known if they even indicated the direction of the change. Checking would in any case have been difficult as only a proportion of the crop was marketed and the marketing system was not monitored.

²³ R.C. Desai, *Standard of Living in India and Pakistan, 1931-2 to 1940-41*, Popular Book Depot, Bombay, India, 1953.

²⁴ P.C. Mahalanobis, 'Recent experiments in statistical sampling in the Indian Statistical Institute', *Philosophical Transactions of the Royal Society*, Part iv, pp 326-378, 1946. G.R. Alien gives examples of this bias when subjective methods are used (*Agricultural Marketing Policies*, Blackwell, Oxford, UK, 1959, pp 164-6).

²⁵ *Ibid*.

²⁶ Quoting Document No 265, p 357 in Mansergh, *op cit*, Ref 18.

²⁷ Quoting Document No 265, p 357 in Mansergh, *op cit*, Ref 18.

We must conclude from this that the statistics are so bad that one cannot confidently say that the true production lay within 50% of the official estimate in anyone year, if, like Sen, we rely entirely on official crop figures. However, Sen did not rely on the absolute figures. He relied on his assessment that production for 1943 was at least 11 % higher than that for 1941. Since both figures could be 50% out, and the bias is not random, it is quite possible that the 1941 crop could be three times that of the 1943 crop (again if one relies entirely on crop figures). This means that the margin of error of his statement is of the order of 3000%.

Sen's production figures are so unreliable that they can give no support to his thesis, a thesis which relies entirely on these figures. Since the effect of a Type I error, accepting his thesis when it is wrong, is to cause or worsen a famine, then it must be rejected.

Carryover

Even if they were correct, Sen's production figures would not be sufficient to show that there was no shortage as they do not allow for stocks. The amount of food available can be defined as current production plus imports plus stocks. The Famine Commission argues that it was not normal to start eating the December crop until March, both because of the need for normal stocks and because the rice is not palatable for some months after the harvest so there was a three month carryover.²⁸ The very poor crop of December 1940 meant that the rice ran out earlier than usual and people started eating the crop of December 1941 as soon as it was harvested. This means that consumption in 1941 was well above the 'adjusted current supply of rice,'²⁹ quoted by Sen, while the consumption of 1942 was well below it. Since stocks were used up at the beginning of 1942, stocks were low at the end in spite of a good harvest. This means that the amount of grain available for consumption in 1943 was nearer to the 'adjusted current supply' than it was in 1941. Even if the 'adjusted current supply' had been 11% higher in 1941 than in 1943, as Sen claims, the amount actually eaten was much lower.

This, if true, is fatal to Sen's thesis. He rejects *all* the arguments of the Famine Commission on carryover. Indeed, he makes the very serious allegation that: 'Later the facts were squared with theory by "revising" the facts, by introducing mythical variations in the unobserved item called "the carry-over from previous years"'.³⁰ He provides no supporting evidence. Instead, he states that there was no carryover from year to year, or if there were, which he denies, there was a larger carryover into 1943 than into 1941.

I cannot accept Sen's suggestion that we should ignore the carryover on the grounds that we have no statistical data on the stock position.³¹ Still less can I accept his assertion that variations in carryover were mythical - surely there is no country that does not aim at a substantial carryover and it seems beyond belief that exactly the same amount was carried over from a famine year as from a year of bumper harvests.³²

I shall not recapitulate the arguments put forward by the Famine Commission and others to show that there was a much reduced carry over into 1943. Instead, I shall show that Sen's own figures destroy his case. Table 1 is based on exactly the same figures as Sen's, except that I have arbitrarily chosen a carryover of 8 500 000 tons at the beginning of 1941. This shows that a surplus of nearly one year's supply

²⁸ See Famine Commission, *op cit*, Ref 2, 1945 pp 179-99, Professor Hussein's minority report; Government of India, *Report on the Marketing of Rice in India and Burma*, Government of India Press, Calcutta, India, 1942.

²⁹ This is: production plus imports, ignoring stocks, rather than what would normally be considered as supply.

³⁰ Sen, *op cit*, Ref 2, 1977, P 75. *31**ibid*, pp 42, 55.

³¹ *ibid*, pp 42, 55.

³² It might be mentioned that all the explanations Sen gives for the famine are equally unquantified (mythical?) variations in equally unobserved (non-existent?) items. The difference is that where the Famine Commission gives ten pages of argument and facts in support of their carryover explanation, Sen gives only a sentence or two in his explanations.

Table 1. Stocks of rice in Bengal, 1939–1943 (tons × 10³).

	Stocks at this date	Plus				Minus		
		Aman crop	Boro crop	Aus crop	Imports	Seed	Consumption	
	1 January 1939	8500	0	201	0	182	434	3977
	1 June 1939	4472	0	0	1758	300	11	3977
	1 November 1939	2542	7805	0	0	0	0	1591
	1 January 1940	8756	0	194	0	100	426	4017
	1 June 1940	4607	0	0	1525	258	13	4017
	1 November 1940	2360	5178	0	0	0	0	1607
	1 January 1941	5932	0	203	0	100	468	4057
	1 June 1941	1710	0	0	2250	232	14	4057
	1 November 1941	121	8876	0	0	-2	0	1623
	1 January 1942	7372	0	206	0	0	453	4098
	1 June 1942	3027	0	0	1649	0	14	4098
	1 November 1942	565	6024	0	0	0	0	1639
	1 January 1943	4949	0	218	0	100	520	4138
	1 June 1943	609	0	0	2390	100	17	4138
	1 November 1943	-1056						

Source: Based on figures in the Famine Inquiry Commission (FIC), see text, *op cit*, Ref 2, p 215.

Notes: Opening stock is an arbitrary assumption. Consumption per head is the mean current supply less seed for the years 1928–42. This is below the mean for the first half of the century. A population growth rate of 1% has been assumed (Sen, 1977, p 40). The remaining 64 000 tons of 1943 imports are assumed to have come in November and December. No allowance is made for the unrecorded exports by road and countryboat in 1942. These would have increased the deficit substantially.

in January 1939 turns into a deficit of one million tons in 1943 - enough to cause the famine.

Even if they were correct, Sen's production statistics would not show that there was no shortage in 1941. It is necessary that his assumptions on carryover should also be true. Not only are they extremely unlikely and contrary to all the evidence, but his own figures show them to be wrong. This section refutes his thesis.

Other evidence

When working with such unreliable statistics, it is wrong to depend on a single set of statistics. Instead, economists demand confirmation from other statistics, other data. This other evidence does not support Sen. Many people gave warnings of the famine, warnings which conflicted with the official production estimates. As early as December 1942, after the cyclone and before the 'aman' crop had been harvested, the trade was talking of the worst crop in 20 years.³³ Traders bought up any stocks they could in Bengal and they went into the neighbouring provinces of Orissa and Bihar to buy grain and standing crops. They were prepared to smuggle the rice into Bengal if trade restrictions prevented them from doing it legally. The trade had its own way of estimating supplies (including stocks) and did not rely on official estimates. In this case, they were so certain of their estimates that they invested all they could borrow, and of course they made a lot of money as a result. The Bengal government ignored their warnings.

Bhatia, quoting from the unpublished evidence to the Famine Commission, states that public men and organizations had warned the government.³⁴ Sen himself quotes pressure, from 'a businessman much involved in rice trading', to increase imports by one million tons as late as October 1943.³⁵ This would of course have been against the businessman's interests if he had large speculative stocks.

During the famine, it became increasingly apparent that the shortage was much more serious than the production statistics suggested. The total failure of all the government's intervention measures to bring down the price is particularly significant. The government's attempts to 'break the Calcutta market' by dumping large quantities on the market failed, both because it proved impossible to buy or seize any large quantities and because what was put on the market vanished without a ripple. During the period of free trade with Bihar and Orissa, 91 000

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tons was imported and dumped on the market (and some was bought illegally and smuggled in). The effect was to push up prices sharply in Bihar and Orissa, but there was no noticeable effect on prices in Calcutta.³⁶ This suggests that 91 000 tons was a large proportion of any surplus in Bihar and Orissa, but was a very small amount in relation to the Bengal deficit.³⁷ The house-to-house search for stocks showed only that the stocks were much lower than expected.

Conservative estimates?

³³ Famine Commission, *op cit*, Ref 2, p 33.

³⁴ Bhatia, *op cit*, Ref 26, p 35.

³⁵ Sen, *op cit*, Ref 2, 1977, P 54, quoting from Document 174 in Mansergh, *op cit*, Ref 18, p 390.

³⁶ Famine Commission, *op cit*, Ref 2, p 532.

³⁷ Calcutta would consume only 21-24 thousand tons of rice and 15 000 tons of wheat a month (Famine Commission, *op cit*, Ref 2, p 203).

Sen states repeatedly that his estimates are both conservative and reliable. He says that his calculations are based on 'a careful tally on food availability in Bengal'. He talks of presenting 'the results of a food supply calculation, taking into account local production and trade, choosing - wherever the data permit - an assumption as unfavourable to 1943 as possible'. He concludes that 'Current availability of food was at least 11 per cent higher than in 1941, when there was nothing remotely like a famine.'³⁸ Elsewhere he says: 'This is most certainly an over-estimate for 1941 vis a vis 1943, but this is an acceptable bias as it favours the thesis we are rejecting', 'To bias the figures as much as possible against 1943 ...',³⁹ He may also be interpreted as claiming a much greater accuracy for them than is justified, because he frequently quotes different secondary sources as giving much the same estimate of total production or import needs.⁴⁰ Since these secondary sources are all based on the same official production estimates, no added confidence is given. His scathing comments on those who consider that the famine was caused by shortages emphasize the impression that he is totally confident of his figures.

In fact, the figures he gives are not in any sense conservative. I have shown the output figures to be unreliable. The import figures are no more reliable than such figures usually are, and in addition they fail to cover trade by road and country-boat - for these, he uses the Famine Commission guesses, and not a conservative figure. (Note that the Famine Commission assumes, and Sen accepts, an identical unrecorded net import in 1941, a year of shortages and recorded net imports, and 1942, a year when Bengal had a surplus and the rest of India a shortage and when Bengal had substantial recorded net exports.) His conservative adjustments consist of making a slight allowance for unrecorded wheat imports, an alteration of a fraction of 1 % of the total. Again, he makes much of choosing a 1 % population growth rate instead of 0.46%, which makes a difference of 1 % when he uses it for comparing 1941 with 1943. These conservative adjustments do not make any noticeable improvement to the accuracy of the aggregate figures he uses.

To state that such estimates are conservative is a misstatement of perhaps 30%, and to state that they are the result of a careful tally is a further misstatement. This, in itself, is enough to cast doubt on all the evidence he presents in favour of his thesis.

Professor Sen's explanations examined

Inflation

Sen's first causal hypothesis is that the famine was caused by factors related to wartime inflation:

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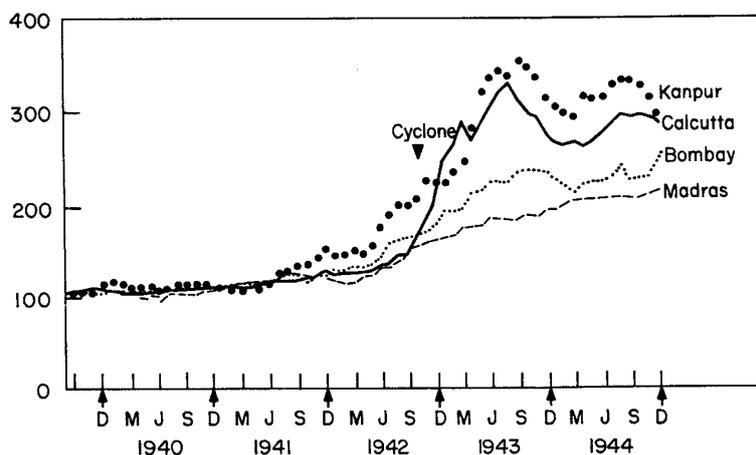


Figure 2. Working Class Cost of Living Indices in Kanpur, Calcutta, Bombay and Madras.

Note: August 1939=100.
Source: Singh, 1965.

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essentially related to demand factors . . . The price increase in the phase I period, while not confined to Bengal, was much more acute in Bengal than elsewhere (see Singh, 1965, pp 95-99; Palekar, 1962). This was, to a great extent, the result of

³⁸ Sen, *op cit*, Ref 2, 1984, P 461

³⁹ Sen, *op cit*, Ref 2, 1977, P 40.

⁴⁰ See, for example, Sen, *op cit*, Ref 2, 1977, pp 53-4.

general inflationary pressure in a war economy. The fall of Burma had brought Bengal to the war front and Bengal saw military and civil construction at a totally unprecedented scale. The war expenditures were financed to a great extent by printing notes.⁴¹

Sen incorrectly uses the Working Class Cost of Living Index (from Singh) as a measure of general inflation in comparison to food prices. To a large extent the Working Class Cost of Living Index *is* the food price. Even if it was permissible to use it, it would not support his thesis. Figure 2 shows that it rose at much the same rate in Bengal as elsewhere in India up to the cyclone and the stoppage of interprovincial trade, after which it rose rapidly in line with rice prices.⁴²

Sen does not explain why this massive inflation should only have hit Bengal, nor does he explain why it should have stopped after the December 1944 crop was harvested. He does not explain how paying a good wage to a few hundred thousand factory workers should have increased the grain price paid by 60 million people by a factor of four to 20 times. It is particularly strange as he quotes evidence that this extra demand was offset by declining demand and employment in the agricultural sector.⁴³ Nor does he explain why the part of Orissa also hit by the cyclone should also have had a famine, though it did not have the same inflationary pressure.

He also fails to explain the enormous scale of the price increase. The population normally spent perhaps 90% of its income on food. Agricultural wages fell, other agricultural incomes were static from one harvest to the next and industrial wages were kept down by giving an issue of food in place of a price increase. Accumulated personal possessions were sold on a massive scale to pay prices that were four to 20 times normal.⁴⁴

If one accepts that there was a shortage, the price rises are easily explained. Prices rose because of a crop failure. When government tried to buy rice for relief with virtually no limit to price, it pushed the price up to astronomical levels because the rice was not there. This is the inevitable result of applying Sen's prescription when there is a shortage.

It must be concluded that his analysis does not support his hypothesis and his facts tend to refute it.

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Uneven expansion of purchasing power

Closely linked to the above hypothesis is the one that the famine was associated with an uneven expansion of purchasing power, meaning that the rich could buy more, leaving less for the poor.⁴⁵ It is set out most clearly as follows:

In a poor community take the poorest section, say, the bottom 20% of the population and double the income of half that group, keeping the money income of the rest unchanged. In the short run prices of food will now rise sharply, since the lucky half of the poorest group will now fill their part-filled

⁴¹ Sen, *op cit*, Ref 2, 1977, P 50, quoting A. Singh, *Sectional Price Movements in India*, Banaras Hindu University, Benares, India, 1965, and SA Palekar, *Real Wages in India, 1939-1950*, International Book House, Bombay, India, 1962.

⁴² Indeed, throughout the war, government saw the rise in rice prices due to shortages as being a cause rather than an effect of inflation.

⁴³ Sen, *op cit*, Ref 2, 1977, pp 43, 44, 51.

⁴⁴ I am inclined to accept that 'it would probably be an underestimate to say that two thirds of the total population were affected by it' (Department of Anthropology, Calcutta University, quoted by Rajan, *op cit*, Ref 18). An independent estimate was made by P.C. Mahalanobis, R.K. Mukkerjee and A. Ghosh, 'A sample survey of after effects of Bengal famine of 1943', *Sankhya*, Vol 7, No 4, 1946, pp 337-400, based on a sample survey of the survivors. They estimate that of the 10.2 million families in the rural population, 1.6 million sold some or all of their land or mortgaged it, 1.1 million sold plough cattle, and in 0.7 million the head of the household changed to a lower-status occupation (including 0.26 million becoming destitute). These figures are not mutually exclusive: many families suffered loss of land and cattle, and many became destitute because they had sold all they had. Taking an average family size of 5.4, it seems that perhaps 10-15 million people were affected in these ways. However, many more were affected in ways that would not have been recorded in these statistics. Most went hungry; many were hit by disease; many were impoverished but kept the same occupation; many sold all they had except their land. 'Village labourers and artisans, at a somewhat higher economic level, sold their domestic utensils, ornaments, parts of their dwellings such as doors, windows and corrugated iron sheets, trade implements, clothes and domestic animals if they had any - sold indeed anything on which money could be raised - to more fortunate neighbours' (Famine Commission, *op cit*, Ref 2, p 67).

⁴⁵ Sen, *op cit*, Ref 2, 1977b, P 51; 1981, P 77.

bellies. While this might affect the food consumption of other groups as well, the group that will be pushed towards starvation will be the remaining half of the poorest community which will face higher prices with unchanged money income. Something of this nature happened in the economy of Bengal in 1943.⁴⁶

This change in income did not in fact take place. If 10% of the population had increased their consumption from 140z per day to 170z per day (see Table 2), this would have caused a 1.8% change in total demand.⁴⁷ Sen does not explain how a 1.8% change in total demand could cause a famine affecting 40 million people. Elsewhere he says:

Table 2. Estimates of per capita consumption of all cereals.

	Ounces per day
General average rate for Bengal	17
Sectional average rates:	
Rural population	17
Calcutta middle classes	13
Mofussil urban middle classes	13
Industrial working classes	16
Families whose monthly expenditure is Rs 10 or less	14

Notes: ^a FIC, see text, *op cit*, Ref 2, p 204. The estimates were furnished by Professor Mahalanobis, Honorary Secretary, Indian Statistical Institute, Calcutta. Professor Mahalanobis analysed the results of five different surveys conducted at different times between 1936 and 1942. Some of these were made at the instance of the Bengal government and others were undertaken by the Indian Statistical Institute or the Viswabharati Institute of Rural Reconstruction.

^b The number of families whose monthly expenditure was Rs 10 or less, was 3212 as against a total of 15 409 families in the sample; and the number of persons included in such families was 11 788, as against a total of 81 554 in the sample.

^c Other studies reviewed by the Foodgrains Procurement Committee suggests a lower limit to average per capita consumption of 15 ounces per day and an upper limit of 17 ounces.

*Those involved in military and civil defence works, in the army, in industry and commerce stimulated by war activities, and almost the entire normal population of Calcutta covered by distribution arrangements at subsidized prices ... could exercise strong demand pressures on food, while others excluded from this expansion or protection simply had to take the consequences of a rise in food prices.*⁴⁸

The narrowest interpretation of this is that perhaps one million employees used their high incomes to buy more food. They ate enough to cause three million deaths, and serious hunger for 40 million people. This implies their eating perhaps six times as much as their normal intake.⁴⁹ The broadest interpretation implies that some six million people in Greater Calcutta were eating twice as much as usual on average. As many did not, the others would have to have eaten more than this.⁵⁰ Not only were they eating this fantastic amount of food, but they were willing and able to pay from four to 20 times the normal price for it. Sen implies that this odd demand was confined to Bengal, and that people suddenly switched back to normal demand functions when the December 1943 crop was harvested.

The facts given in Sen's sources are different. It is not true that 'almost the entire population of Calcutta was covered'. The preferential schemes never covered more than a quarter of the population and they were often cut because of 'shortage of food'.⁵¹ Preferential supply schemes, plus the controlled and approved markets, received 32% of the grain available in Calcutta in the first quarter, 43% in the second, 23% in the third and 18% in the fourth (see Table 3). Furthermore, the consumption of Calcutta actually fell by 12%-45% during the famine, depending on the population estimates. The hypothesis as far as the army is concerned is dismissed

by the Famine Commission and elsewhere Sen himself accepts this.⁵²

This hypothesis, which is central to his argument, must be rejected on two grounds. First, it is impossible that such changes in distribution could have taken place. Second, Sen's own sources make it clear that the movement was in the opposite direction. His whole thesis must be rejected on these grounds alone.

⁴⁶ 46Sen, *op cit*, Ref 2, 1980b, P 618.

⁴⁷ This indicates that an increase in income will lead to a modest rise in rice consumption, while a large increase in income may lead to a fall in consumption.

⁴⁸ Sen, *op cit*, Ref 2, 1977b, P 51.

⁴⁹ In his reply to my Development Studies Association paper, Sen said that this sixfold discrepancy was due to the fact that I had ignored dependents. I did in fact allow for them - see for example, Famine Commission, *op cit*, Ref 2, pp 30, 31, 63 and my calculations presented in Table 2. Even if I had neglected them, a substantial discrepancy would remain.

⁵⁰ Note that with any assumption but zero carryover, this discrepancy would be larger.

⁵¹ Famine Commission, *op cit*, Ref 2, pp 31,32,63.

⁵² Famine Commission, *op cit*, Ref 2, p 18; and Sen, *op cit*, Ref 2, 1976, P 1279.

Table 3. Imports of grain to Calcutta 1943, compared with normal consumption and consumption under rationing.

		First quarter	Second quarter	Third quarter ^f	Fourth quarter ^f	Total 1943
Net imports of paddy and rice ^{ab}	tons	31 912	88 568	61 038	91 824	273 342
Imports of wheat ^a	tons	26 000	38 000	99 000	176 000	339 000
Less: wheat sent to country ^c	tons			(20 000)	(100 000)	(120 000)
Total grain available	tons	57 912	126 568	140 038	167 824	492 342
Grain required at 1944 ration level (Greater Calcutta) ^d	tons	118 193	118 193	118 193	118 193	472 772
Net imports as % of ration level	%	48	107	118	141	104
Normal consumption (high estimate) ^e	tons	181 835	181 835	181 835	181 835	727 342
Net imports as % of normal consumption	%	31	69	77	92	67
Normal consumption (low estimate) ^e	tons	134 310	134 310	134 310	134 310	537 241
Net imports as % of normal consumption	%	43	94	104	124	91
Grain required at 1944 ration level (Calcutta trade area) ^d	tons	92 191	92 191	92 191	92 191	368 762
Net imports as % of ration level	%	62	137	151	182	133
Normal consumption (high estimate) ^e	tons	141 832	141 832	141 832	141 832	567 326
Net imports as % of high estimate	%	40	89	98	118	86
Normal consumption (low estimate) ^e	tons	104 762	104 762	104 762	104 762	419 048
Net imports as % of low estimate	%	55	120	133	160	117
Supplied through employers' organizations and essential services	tons	12 487	36 063	17 902	20 164	86 616
Supplied through controlled shops and approved markets	tons	6 988	18 282	14 344	10 868	50 482
Total special distribution	tons	19 475	54 345	32 246	31 032	137 098
Controlled supply as % of total supply	%	33	42	23	18	27
Controlled supply as % of 1944 ration level (Greater Calcutta)	%	16	45	27	26	28

Notes: ^a FIC, see text, *op cit*, Ref 2, pp 219–33. Based on trade statistics and figures supplied by the Civil Supplies Department of the government of Bengal.

^b Stocks at the beginning of the year were very low because of reduced imports in 1942 (FIC, see text, *op cit*, Ref 2, p 219). Paddy has been converted to rice equivalent. Bengal government figures suggest that net imports were lower by 22 000 tons.

^c The 120 000 tons sent to country areas are assumed, quite arbitrarily, to have been exported in the last two quarters.

^d Initially, it is assumed that grain imports were spread through the Greater Calcutta area. This would not have appeared in the statistics because road traffic, personal baggage and illegal shipments were ignored. Later the assumption that all grain was consumed in the Calcutta Trade Area is considered. This area was assumed to consume 78% of the Greater Calcutta total (FIC, see text, Ref 2, *op cit*, p 219).

^e The per capita consumption under rationing was between 65% and 88% of the normal level, depending on assumptions about the total population (FIC, see text, Ref 2, *op cit*, p 219).

^f The records for the third and fourth quarters do not include arrivals by countryboat, as no records were maintained for two months, and as the amounts were small for other months.

Inequalities in distribution

Those who believe in the FAD approach which Sen is attacking place great emphasis on the change in purchasing power during a famine, which means that the poor cannot buy food and that the people who had previously been moderately well off are impoverished. They emphasize the need for relief works, soup kitchens, special agricultural loans, loans for artisans and weavers, etc.⁵³ They considered that most farmers in 1942 had a reasonable yield with high prices and so were better off. However, rural indebtedness meant that the crop often went to a moneylender or landlord who made all the profits. The indebted farmers had to buy back their food, on credit, at an inflated price. Consumers spent most of their money on food and so could not afford other goods or services - those who supplied these goods and services died.

Sen denies that the FAD approach recognizes these phenomena, though his examples are drawn from sources which adopted the FAD approach. He then makes the unwarranted assumption that because these switches in distribution accompanied the famine, they caused it.⁵⁴

The question is not just why should one group have starved rather than another, but why should anyone have starved at all. Sen does not answer this question, while the Famine Commission answers both. His hypothesis must be rejected.

Speculation

Sen brings up the old bogeyman of speculation as one of the most important causes of the famine. He talks of 'speculative withdrawal', especially between December 1942 and March 1943, but also up to November. There was also 'vigorous speculation' from March to November.⁵⁵

There is an enormous literature on speculation, hoarding and storage

⁵³

For example, Famine Commission, Bengal Famine Code, *op cit*, Ref 4. The Bengal Famine Code is the only document I know which says that *all* famines are FAD. This appears to be a reaction against the disaster caused by diagnosing the 1883 Orissa famine as a Sen-type famine, and applying the measures Sen advises.

⁵⁴

His analysis of Mahalanobis, Mukkerjee and Ghosh, on which he spends so much time is, therefore, irrelevant to his thesis. The analysis is, in any case, wrong, as he has used raw, unweighted data derived from a heavily stratified sample (Mahalanobis et al, *op cit*, Ref 44, Tables 4.2 and 7 A5) rather than the adjacent weighted figures.

⁵⁵

Sen *op cit*, Ref 2, 1977, P 50; 1981, P 76.

dating back at least to Adam Smith. One thing is agreed - that the uninformed layman's criticisms of speculation are unfounded. Yet Sen does not provide a model to show why the uninformed layman should be correct in this instance. Instead he quotes the Famine Commission in his support. This is a mistake because the Famine Commission described speculation at a different time, a type of speculation that could not have caused the famine. Speculation would only have caused the famine if it reduced the total supply on the market. Neither the Famine Commission nor anyone else has suggested that speculators reduced total supply either by exporting or holding stocks until the next season (which would have lost individual traders a lot of money). On the contrary, the traders imported (legally or illegally) all the grain they could buy. Furthermore, house-to-house searches for grain in mid-1943 showed that there were no enormous stocks. The failure of speculators to respond to the government's market intervention also suggests that there were no large stocks.

There was normal speculation. Speculators did buy grain and standing crops in late 1942, hoping to profit as prices rose. This certainly raised prices, though it may be argued that this was far less important in raising prices than government procurement in 1943. The price rise impoverished millions of people and determined that the poor would die because they had no money to buy food. However, if there was a second or third degree shortage, it was inevitable that millions would die in the absence of large imports. The market mechanism determined that one group of people would die rather than another, but it did not increase the death rate.⁵⁶ In fact, given that the government did not import, it reduced deaths. As Adam Smith argued, the speculator puts everyone on 'thrift and good management' from the beginning of the season, effectively imposing rationing.⁵⁷ He also ensures that all the crop is not consumed at the beginning of the year and that prices are lower and supplies are higher at the end of the year than would be the case without speculation.

It should not be forgotten that if the Bengal government had been successful in their efforts to get speculators to release stocks and bring down prices at the beginning of 1943, or if it had seized and distributed stocks, then Bengal would have run out of food before the next crop and tens of millions would have died.

Had there been a second degree shortage and normal storage with perfect knowledge, there would not have been the steady rise in prices that actually occurred. Speculators would have bought in stocks immediately after the cyclone, pushing up prices. They would then have released a more or less constant amount per month over the season with a small price rise over the year to cover storage costs (Figure 3). Had there been no shortage and excessive speculation, as Sen suggests, the price would have risen sharply, then would have fallen to near zero as traders competed to sell surplus stocks - anyone left with surplus stocks when the price went down would lose money (Figure 4). The fact that prices continued to rise throughout the season suggests one or both of the following:

- There was *insufficient* speculation, so not enough was stored until the end of the season, and prices rose then. Traders may have been expecting that massive imports would supply the market then.
- Government procurement forced up prices.⁵⁸

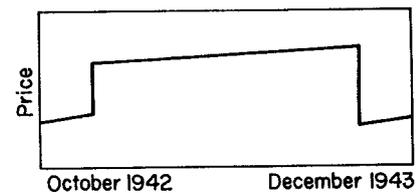


Figure 3. Expected rice price if there was a shortage but normal speculation.

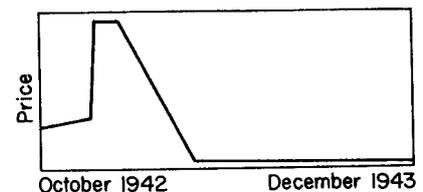


Figure 4. Expected rice price if there was no shortage and excessive speculation (Sen's hypothesis).

⁵⁶ The impoverishment of a large part of the population did of course have important long-term effects.

⁵⁷ Smith, *op cit*, Ref 1, P 24.

⁵⁸ One could of course develop more complex and dynamic analyses based on the changing demand and supply situation and changing expectations throughout the season, such as the one roughed out in Appendix 3 of Bowbrick, 1986, which happens to be compatible with the shortage explanation. However, Sen has presented no analysis at all.

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Sen is also at variance with the facts given in his sources on the subject of the timing of the speculation. There was little left on the market for speculators to buy between December and March, and after that there was little indeed available at a very high price - hardly the time for 'vigorous speculation'. The Bengal government's belief in the existence of enormous speculative stocks was a major reason for their failure to act effectively. The belief in speculation, rather than the speculation itself, was the villain. 'The popular fear of engrossing and forestalling may be compared to the popular terrors and suspicions of witchcraft'.⁵⁹

It is concluded that Sen's bald statement that the famine was caused by speculation is contrary to accepted theory, and he has given no reason why in this case the accepted theory is wrong. He is also contradicted by the facts in the sources he cites. The point is firmly refuted.

Hoarding

Sen states that hoarding was a cause of the famine and that there were panic purchases between December 1942 and March 1943. He also talks of panic hoarding from March to November 1943 as being the cause of the famine. For hoarding to be the cause of the famine, it would have had to either change the supply in the season or change the distribution, with the rich consuming or storing more than their needs and leaving less for the rest of the population. The fact that stocks were held by farmers or consumers rather than traders would not have this effect. Nor would the fact that they continued to maintain excessive stocks built up in previous years.⁶⁰

In fact, officials complained of hoarding in 1939 when war broke out, in 1941 when Japan entered the war, in 1942 when Burma fell and during the famine of 1943. Presumably, by 1943 it was not the accumulation of hoards but their maintenance that was talked of, which would not have worsened the food situation. It is difficult to understand how, as Sen says, there could have been panic hoarding from March to November 1943 - the famine was already under way, very little was on the market, and very few people could afford to buy even their urgent requirements at the going prices. If anything, the accumulation in previous years meant that an unusually large amount was carried over in private hands from the excellent crop of the previous year, mitigating the effect of the shortage.

How many people could hoard? In Bengal, only 20% of the population were well fed even in a normal year; most of the salary and wage earners lived from hand to mouth, and most cultivators borrowed against their next crop to buy food. Some people could have accumulated three or four months' supply at a time over a normal year, but this would have run out in the middle of the famine. Very few could have or would have accumulated enough to last from one harvest to another with some left over. However, Sen states that not only did people do this in the high price year of 1943, but they were able to carry on building up their hoards until November 1943, as prices rose to 20 times the normal level.⁶¹

Sen's assertion that there was hoarding is made without any supporting evidence or analysis. What evidence there is makes it unlikely that there was any increase in the amount hoarded in 1943, and virtually impossible that there was in March to November 1943 as he states. This hypothesis is refuted. Hoarding, like speculation, is a

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bogeyman invoked by politicians and administrators. Because they believe that there are large private hoards and that there is really plenty of food, they take no effective action. The result can be famine.

Failure to import

Sen says that a contributory cause of the famine was the failure of the government to import more grain. This contradicts his statement that there was adequate food available. Logically, he can only say that it was a failure to take one of the many possible, non-essential measures. The Famine Commission, on the other

⁵⁹ Adam Smith, *op cit*, Ref 1, P 24.

⁶⁰ The transient shortages caused by hoarding in a developed country are different. A supermarket tries to have not more than three days' supply in shop and warehouse, while a factory tries to keep stock down to a few weeks' supply. Any slight hiccup in demand may cause scarcities lasting a couple of weeks. In Bengal, 9-12 months' grain was produced at once, and most of the marketed surplus was stored by traders. The shortage lasted over a year. If one accepts that there was a major shortage, one can argue that demand became extremely inelastic at these levels of supply, so that even a small amount of hoarding could have affected prices. Sen does not accept the shortage though.

⁶¹ To put this into perspective, if 10% of the population had built up their stocks to 6 weeks supply in 1942, this would have increased total demand by just over 1 % in that year. In the unlikely event that they doubled their stocks instead of eating them in the famine year, it would still only add 1.1 % to total demand in 1943, if, as Sen says, there was no shortage. If there was a serious shortage though, there would have been a 1.6% increase in total demand, a significant proportion of the marketed surplus from the production sector.

hand, believed that there was a second or third degree shortage, so it was a culpable failure to take the only action which could have ameliorated the famine.

Borderline between two price regimes

Sen presents the following as a causal explanation of the famine. There is no further elaboration of the argument.

Finally, it is perhaps significant that the Bengal famine stood exactly at the borderline of two historical price regimes. Prices had been more or less stationary for decades (the 1941 rice price was comparable to that in 1914), and the price rises (especially of food) that began in 1942 were to become a part of life from then on. Institutional arrangements, including wage systems were slow to adjust to the new reality.⁶²

Why was it that Bengal alone should have been devastated by famine when the same applied to virtually every country in the world?

Boat denial policy

Sen considers the boat denial policy to have been a cause of the famine.⁶³ In May 1942, orders were issued for the removal of boats capable of carrying more than ten passengers from the coastal areas of Bengal, in order to deny them to the Japanese if they invaded. The Famine Commission was critical of the Bengal government for their operation of the scheme as it reduced fish catches and made transport difficult, hampering relief measures, and making normal trade impossible.⁶⁴ It slightly reduced the quantity of food available, and to this extent it was a cause of famine. Sen accepts the general view that the boat denial policy was of little importance in reducing total supply. However, since Sen believes that transport problems were overstated, and since he believes that anything hampering transport from the starving country areas to be the overfed towns was a good thing, it is difficult to see why he considers, it to have been harmful.⁶⁵

Undoubtedly, it meant that some areas were worse hit than others, but, as Sen makes clear when dismissing Alamgir's criticisms of his thesis, this is irrelevant to the thesis - there was some starvation in all areas so bad regional distribution will not explain why the famine occurred.⁶⁶

Rice denial policy

Among the 'factors working negatively on the supply of rice', Sen talks of:

*a cunning British policy of 'rice denial' to the oncoming Japanese [which] led to the removal of rice stocks from three coastal districts in Bengal in 1942 (without causing much anxiety to the Japanese, since they failed, for other reasons, to show up).*⁶⁷

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The exchange entitlement mappings took deep plunges, forcing these occupation groups into starvation. The story is made grimmer by ... the removal of rice stocks from three districts ... These added to the entitlement decline ... but this was an added impetus in a movement that was leading to a famine anyway.⁶⁸

⁶² Sen, *op cit*, Re! 2, 1971 b, P 51.

⁶³ Sen, *op cit*, Re! 2, 1984, P 4611; 1980b, P 619. See, however Sen, *op cit*, Re! 2, 1976, P 1279, where he expresses the opposite view.

⁶⁴ Famine Commission, *op cit*, Ref 2, pp 26-7.

⁶⁵ Both the Indian government and the Bengal government considered that physical distribution was a serious constraint on relief measures. Indeed, the main effect of Wavell's intervention with the army was that four times as much per week was distributed (see Famine Commission, *op cit*, Ref 2; Aykroyd, *op cit*, Re! 9; Wavell, *op cit*, Re! 18; and Mansergh, *op cit*, Re! 18, p 361).

⁶⁶ Sen *op cit*, Ref 2, 1981, P 63; M. Alamgir, *Famine in South Asia: Political Economy of Mass Starvation*, Gunn and Hain, Oelgeschlager, Cambridge, MA, USA, 1980, and Sen, *op cit*, Ref 2, 1980b, P 619.

⁶⁷ Sen, *op cit*, Re! 2, 1984, P 461. [The policy did a lot more than cause 'anxiety' to the Japanese: most of the Japanese casualties, and most of their deaths during the Burma campaigns were due to starvation. Starvation was a key factor in the Battle of the Box and Kohima. And this saved Indian lives. (P.B. 2011)]

⁶⁸ Curiously enough, elsewhere (e.g. Sen, *op en*, Ref 2, 1977, P 45; 1982, P 67) he quotes some of the facts directly from the Famine Commission, and concludes merely that 'it did contribute to local scarcities'. Elsewhere, too, (1976, p 1279) he states that it did not contribute to the famine (though stating that it did result in a loss of food).

The facts in Sen's source contradict him flatly. Less than 40 000 tons (0.34% of the total) were bought from a surplus area nearly a year before the famine hit, and were distributed to deficit areas weeks before the cyclone.⁶⁹ Since it was removed from an area where many grain stores were destroyed by the cyclone, it actually increased Bengal's supplies marginally.

What the Bengal government did

The main thrust of Sen's argument is that the Bengal government adopted the FAD approach. As a result, it failed to adopt the policy measures necessary to prevent inflation and redistribution; it failed to recognize the famine when it occurred, and it failed to take the necessary measures to deal with it.⁷⁰ The sources are agreed that this is untrue. Like Sen, the government believed that there was no real shortage (until, when the famine reached its peak, they had to recognize that there was a major shortage).⁷¹ They had virtually the same views on famine causation: inflation, speculation and hoarding. They recognized the need for measures to deal with shifts in purchasing power and acted accordingly, adopting the measures that Sen recommends. **In** fact, both Sen's diagnosis and his remedies were put to the test by the Bengal government. The result was a famine in which three million people died.

Monitoring the shortage

Sen is indignant that the government should have spent any time at all on monitoring available supply, once it had been decided that the famine was due to maldistribution:

The government's thinking on the nature of the food problem, while encompassing a variety of factors, seems to have been persistently influenced by attempts to estimate the size of the 'real shortage' on the basis of 'requirements' and 'availability'; it was a search in a dark room for a black cat which was not there.⁷²

I must disagree in the strongest possible terms. Any responsible government should constantly reconsider its initial diagnosis and its assessment of supplies in case the degree of food shortage is worsening. Making up one's mind at the beginning of the season and sticking to one's diagnosis in the face of the evidence is a recipe for disaster

In summarizing the discussion, it is convenient to divide the errors exposed into those that refute the whole of Sen's thesis and those that refute only part of it. Each of the following errors is, by itself, fatal to Sen's whole thesis. If anyone of them is accepted then his whole thesis must be rejected. It is not, of course, possible to argue in economics that his theory may be right but his facts are wrong.

- Production statistics are not accurate to within $\pm 50\%$, and the

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difference between them (which Sen relies on) is only accurate to $\pm 3000\%$.

- Sen's assumption of zero carry over conflicts with all available evidence.
- Sen's production and import figures do not prove his point that there was food available in 1943, but exactly the opposite.
- Apart from the unreliable production statistics, all evidence (including that on speculation and inflation) points to the fact that a) there was a short crop and b) there was a shortage.
- If changed distribution caused the famine, some groups of the population ate between two and six times as much as usual and paid between four and 20 times as much as usual to do so. It can be proved both logically and statistically that they did not.
- The actions of the government of Bengal were those Sen would recommend. Their failure to have any

⁶⁹ Famine Commission, *op en*, Ref 2, pp 25,26,29.

⁷⁰ Sen, *op en*, Ref 2, 1977b, P 75.

⁷¹ Famine Commission, *op cit*, Ref 2, pp 12, 13,30,33,36,38-9,52,55. If they had held the FAD view, their logic would have been as follows: 'There is widespread hunger and starvation. The FAD approach recognizes only one reason for this, shortage of food. Therefore we must import one and a half million tons of rice.' Surprisingly, in support of his claim that the Bengal government was obsessed by the FAD approach, Sen gives two pages of evidence showing just the opposite: that the Bengal government was firmly convinced that there was adequate food available, and that the hunger was due to changes in distribution (Sen, *op cit*, Ref 2, 1977, pp 53-54; 1981, pp 80-82). If they had held the FAD view, as Sen states, their logic would have resulted in their thinking they must import one and a half million tons of rice. Whether their analysis was right or wrong, their response would have saved three million lives.

⁷² Sen, *op en*, Ref 2, p 53.

effect proves the misdiagnosis, and my prediction of the effect of the misdiagnosis.

- There are repeated misstatements and misquotations from his sources - on the 'indifferent crop', on his conservative figures, on the number of people covered by relief schemes, on the actions of the government of Bengal, on the Famine Commission's support for his statements about speculation and hoarding, on the rice denial policy, on the size of other famines and on Mahalanobis, Mukherjee and Ghosh's statistics for instance. In addition, the evidence presented is selective. Taken together they cast the gravest doubt on his rigour and reliability.

The following points taken individually do not disprove the theory as a whole, but only individual hypotheses:

- On inflation: Sen presents no theoretical explanation of an improbable hypothesis; the evidence he does present is incorrect; and other evidence indicates a shortage. Government procurement plus a shortage is the best explanation of the enormous price rises.
- On speculation: Sen presents no theoretical explanation; his thesis conflicts with accepted theory; and his thesis conflicts with the evidence. The evidence plus accepted theory suggests a shortage.
- On hoarding: Sen presents no theoretical model and the facts are against him.
- Changes in purchasing power are more likely to be the effect rather than the cause of the famine.
- Imports were unnecessary under Sen's thesis.
- The boat denial policy did not reduce aggregate supply of rice. Failures in regional distribution are irrelevant to Sen's thesis.
- Sen's hypothesis and facts on the rice denial policy are contradicted by his sources. If anything, the policy increased total supply.

It has not been the aim of this paper to appraise Sen's entitlement theory. It should be noted, however, that even in the hands of its originator it is apparently incapable of detecting the many contradictions in the model presented or the many factual errors. Modern marketing theory, on the other hand, exposes the errors and contradictions immediately.

Conclusion

The only way to be sure of curing a famine, however caused, is to import

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more food. Any analysis is dangerous if, like Sen's, it underestimates the degree of shortage - it will lead to inadequate relief measures and to a worsening of the famine.

The appropriate method of examining a famine has nothing to do with the opposing dogmas of the FAD approach (if such an approach ever existed) and Sen's entitlement theory. The approach normally used in examining price policy and marketing is rigorous and has an enormous explanatory power. A complex model is built up to take into account all institutional factors and other factors relevant to the market. Such a model has the advantage that factual inaccuracies are immediately revealed as inconsistencies. It also has the advantage of taking into account the agrarian problems, the price policies and the marketing systems that are all too often the underlying cause of the famine, and that strongly influence the course of the famine.

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