

How Sen's Theory Can Cause Famines

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How Sen's Theory Can Cause Famines

SUMMARY

The 1998 Nobel Prize in Economics has gone to Amartya Sen, Master of Trinity College, Cambridge, mainly for his work on famine. The factual basis for this work has been challenged.

The Classical Economists

It is glaringly obvious that in a famine the people who die are the ones who do not have the money to buy food. The Classical economists responded with a demand side approach that concentrated on giving the people at risk money, food handouts, food for work etc. in the belief that this increased effective demand, and the market would then ensure that enough food was made available. This proved disastrous in the Irish famine and in a string of Indian famines. It was replaced with a two pronged approach: go vernment must import enough food to feed the people then use handouts etc. to ensure that nobody starved.

Entitlement Approach

Amartya Sen revived the Classical approach under the name of the Entitlement Approach, and he argued strongly against supply side actions. He went further. Where the Classical economists had believed that it was possible but not common for a famine to occur when there was plenty of food, because of speculation or inflation for instance, Sen stated that it was usual for this to be the case, and that in the odd occasion when there was a decline in food supply, maldistribution worsened the situation.

Sen's theory

In his book *Poverty and Famines*, and in many other books and papers Sen claims that most famines are not caused by sudden declines in food availability due to droughts, floods etc. He claims that, on the contrary, they happen when there is plenty of food available, but one part of the population suddenly eats a lot more than normal, because of a wartime boom or inflation for instance. As a result there is less food available for the rest of the population, so the poor starve

Implications for policy

If this is the cause of a famine, it is formally possible to control the famine by reversing the change in distribution. This can be done by seizing traders' stocks, imposing rationing and giving free food to the poor. If Sen is right and this redistribution is the normal cause of famine, organizations like Oxfam are largely redundant.

Believed only because of Sen's evidence

This idea was widely accepted only because Sen produced a lot of evidence to show that this is exactly what happened in the Bengal famine of 1943 in particular. As long ago as 1985 it was shown in the academic press that his facts were incorrect, and were contradicted by the facts in his sources.

How much people would have to eat

Sen argues that there was no sudden decline in food availability in 1943, and that the war boom caused the famine. There were 100,000 new war workers, who were well paid, and they and their families ate so much extra food that there was not enough left to go round, and there was a famine. These people were quarter to one half per cent of Bengal's 61 million population. Their extra consumption is supposed to have caused a famine in which 40 million people went hungry, 10 to 15 million people suffered very seriously indeed, and two to four million people died. A few minutes' work with a calculator shows that to achieve this, each of the workers, and their family members, would have had to eat 60 times as much food as in a normal year.

Another amount

Elsewhere, Sen extends this argument, saying that the wartime boom meant that the people of Calcutta ate so much rice in 1943 (but not in 1942 or 1944) that rice was moved from the countryside to feed them. As a result there was a major famine in the country areas. Again, a few minutes work with a calculator is enough to show that they would have had to eat more than three times the normal amount of food to create this shortage.

They did not eat this

Needless to say, the facts show that they did not eat this much. There are very accurate statistics on consumption because of wartime controls, and these show that the people of Calcutta ate less than usual during the famine year.

Food did not move towards the city

Nor is Sen correct in saying that food moved from the country areas into Calcutta. As in previous years, Calcutta got all its grain from outside Bengal. True, there were small imports from the country immediately after harvest, but this never amounted to more than two and a half days' supply for the districts. By the time the famine was in full flow, this and more had been shipped back to the districts. If Sen was right about the cause of the famine, this extra supply shipped to country areas would have stopped the famine there: it did not.

Incorrect figures

Sen states *"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 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."* This has been a hugely influential statement.

Again, a little work with a calculator shows that even if the income change had taken place (it did not), the lucky half would have eaten very little more, only 1.8% of total more (according to consumption surveys of the time). This would have had no noticeable effect, if, as Sen says, there was plenty of food available.

Contradicted by the facts

But it cannot possibly be true. It implies that 10% of the 61 million population doubled their income. A maximum of one million of Calcutta's population was in the very poor category (according to consumption surveys), so five million of them must have migrated from the countryside to Calcutta in 1942, to make Calcutta the biggest city in the world for this year only. The people must have moved to Calcutta in the months preceding the famine, and then have suddenly disappeared the moment the next main crop was harvested. This did not happen - wartime rationing means that we have accurate figures on population. Calcutta increased in size by 300,000 to 500,000 between 1939 and 1943. Sen's figures are more than twelve times the true figures.

Contradicted by the facts

Nor was there any way in which the extra 1.8% could be taken away from the poorest part of the population. The effect would have been spread over the market as a whole. In Bengal we know that 66% of the population went hungry, not just the poorest 10% as Sen states.

Contradicted by the facts

Nor is it at all likely that war workers were recruited exclusively from the very poor. Many of them were farmers and manual workers who normally consumed more calories than the industrial workers, according to contemporary consumption surveys.

Boom famine not possible

At this stage, a few more minutes' work with a calculator shows that a major boom famine is impossible in this type of economy.

Was there a shortage?

Sen's statement that 1943 food availability was "at least 11% higher than in 1941 when there was nothing remotely like a famine" was essential for his argument. Several economists have used exactly the same data to show that, on the contrary, food availability was the lowest in at least 15 years, and probably 11% *lower* than in 1941. The latest analysis, by Dr Goswami of the Indian Statistical Institute, dissects Sen's analysis in great detail and confirms that Sen was wrong.

Unreliable statistics

It is surprising though that Sen should have placed so much reliance on one set of statistics, crop forecasts, which was damned as totally unreliable by contemporary analysts, including Professor Mahalanobis, one of the founding fathers of agricultural statistics. The figures were wild guesses, arbitrarily adjusted by successive layers of bureaucrats. They must be some of the worst statistics ever produced. Giving strong weight to such bad statistics, and little weight to more reliable evidence totally invalidates

his results.

The Classical economists said it before

Sen has got most publicity for pointing out that some occupational groups were particularly hard hit. This is merely stating what everybody has always known. It is fundamental to the Classical approach and it had been a commonplace in Bengal since 1873 at least that it is an inevitable *result* of a famine. In no sense can it be construed as an *explanation* of the famine.

Sen blames the Government's diagnosis

The main thrust of Sen's work is that if the government had had his diagnosis of the cause of the famine, they would have controlled it or prevented it entirely. He says that the main reason that the famine was not recognized and not dealt with properly was "*the result largely of erroneous theories of famine causation [held by the Bengal Government] rather than mistakes about facts dealing with food availability*" He says that they were obsessed with the view that the famine was caused by major shortages, not by a war boom.

But the Government's diagnosis was the same as Sen's

The facts are quite different. The Bengal Government had exactly the same diagnosis of the cause of famine as Sen. They carried out a programme of seizing traders' stocks, rationing to reduce consumption in Calcutta, distribution to the affected areas, and free food for those people who could not buy it. They imported more than enough to feed Calcutta. If the government - and Sen - had been correct, the famine would have stopped.

Their actions had no effect

In fact, their actions had virtually no effect: the famine raged unabated. The famine was caused by severe shortages, and could only have been tackled by very large imports. The amount they imported for the 55 million country people was only six days' supply - enough for propaganda pictures but not much else.

Theory as a cause of famine

This is just one case of a famine being caused or aggravated by a government using the diagnosis Sen recommends.

No one has denied Sen's misstatements

Neither Sen nor anyone else has made any attempt to show that the criticisms of his facts which are presented here are in any way incorrect. It is very worrying that Sen made these mistakes in the first place. It is alarming that he did not withdraw his publications as soon as the errors were pointed out in 1985.

What is a valid response?

The only possible challenge to these criticisms is to produce detailed evidence with page references to show that Sen was correct and the criticisms are wrong. So far nobody has attempted to do so. It is easy to find people who do not think that Sen misstated his evidence, but I have not heard of anyone who has checked his work and the criticisms of

it against the sources he uses and who will still defend him.

Main Misstatements and misquotations

Main misstatements

Throughout the discussion Sen misstates the facts as given in his sources and presents hypotheses which are contradicted by the facts in his sources. Four 'big misstatements' are as follows:

- ▶ The Bengal Government did not have the 'FAD' view he attributes to them, nor the estimate of available supply: on the contrary they had exactly the same diagnosis of the causes of famine and the same estimate of available supply as Sen did. They acted appropriately with measures that had proved successful when there was a first degree shortage in 1928, 1936, 1941 and 1942. Sen would agree with these measures. In 1943 these remedies did not work.
- ▶ Rice did not move from the countryside to Calcutta, as Sen states. It moved in the other direction. This invalidates his thesis.
- ▶ It is not possible to derive Sen's production estimates from his sources.
- ▶ There is no evidence that half the poorest section doubled their income, still less that this would have had as much as one per cent impact on total demand.

In addition, 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, Mukkerjee and Ghosh's statistics for instance. The evidence presented is selective. Taken together they cast the gravest doubt on his rigour and reliability.

Points that refute his whole thesis

Points which refute whole thesis

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 any one 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 +/- 50%, and the difference between them (which Sen relies on) is only accurate to +/- 3000%.

- Sen's assumption of zero carryover conflicts with all available evidence.
- Sen's production and import figures do not prove his point that there was more food available in 1943 than in 1941, 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 at least a second degree 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 effect proves the misdiagnosis, and my prediction of the effect of the misdiagnosis.

Refutations of individual hypotheses

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. Inflation occurred in most other countries during the war, without producing a famine.
- 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. If anything, it kept rice in the rural areas which suffered most from the famine.
- Sen's hypothesis and facts on the rice denial policy are contradicted by his sources. If anything, the policy increased total supply.

1 INTRODUCTION

The problem of famines and food shortages is one of the most acute facing agricultural economists. Since the mid 1970s Amartya Sen's approach to the economics of famine has become influential. He has argued at some length that a major cause of famines 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 be argued that his theory and analysis are wrong and that there are inconsistencies between the arguments he presents. Furthermore, the implications of his theory are contradicted by the facts given in the sources he uses. There are also ubiquitous and systematic inconsistencies between the facts he gives and the facts given in his sources.

This monograph will concentrate on Sen's analysis of the Bengal famine of 1943, as 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 monograph is purely a refutation

The analysis is presented purely as a refutation of Sen. It is not a complete analysis of the Bengal famine. It would take a book to do justice to so important and so complex a subject, and the book would not overlap with Sen's analysis to any degree. The analysis will not cover the practical problems of administration, physical distribution or rationing, though they were important in the Bengal famine. Nor will it consider 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.

Normal economic language

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

2 THREE CAUSES OF FAMINE

1. Fall in supply

Both Sen and the economists who worked in the mainstream tradition accept that famine can arise in one of three ways. The first is when there is a fall in the aggregate food supply of a country or region. This may happen because of drought, flood, plant disease (the potato blight), pests (the plague of locusts), blockade, post-harvest losses, or disruption of production by migration, epidemic or war. Problems with storage or transport or the manipulation of stocks by speculators can mean periods of famine even in a year in which there are adequate supplies.

2. Rise in demand

The second way is an increase in aggregate demand. This may arise from immigration, an influx of refugees or an invading army. It has happened that foreign buyers or an occupying army have been able to export the food supply. A change in farmers' willingness to sell may be best treated under this heading, as a change in reservation demand.

3. Change in distribution

Third, a change in the distribution of what food is available between people in different occupations may bring about a famine when there is no food shortage. For example, hyper-inflation, unemployment or enclosures have left some people without the means to buy food. Changes in income distribution may mean that some people eat more, leaving less for the others.

These changes should not be confused with changes in geographical distribution because of transport failures etc. which would come under a fall in supply. Nor should these changes be confused with the maldistribution that exists to a greater or lesser extent in every society, which may cause chronic malnutrition among the poor, but which does not cause famine. It is a truism that the world could feed itself, so all famines are due to a change in relative distribution, if the famine area is defined sufficiently widely. To do this ignores reality: there are political, social, physical and economic constraints to redistribution which cannot be assumed away.

The Classical Economists

The classical view on the cause of famine, expressed by Adam Smith (1776, ii p 26) for instance, is that, while all these causes are possible, in practice a shortage in supply was the cause of all the famines in the two hundred years before he wrote. The modern mainstream view has been less extreme. It has been thought that shortage of supply is the most usual reason, but that other factors do, on occasion, cause famines.

Demand changes in a famine

The classical economists were emphatic that even if a famine is caused by a change in supply alone, there will be evidence, during the course of the famine, of a change in demand and a change in distribution. For example, a shortfall brought about by a flood will change demand, both reservation demand and people's expectations. It will also change the relative purchasing power of different socio-economic groups and will provide a strong incentive for speculation. In fact, the sudden shock to the system can be expected to bring to a head all those agrarian and social problems that have been festering below the surface for decades. These are effects of the supply change, not the cause of the famine.

Classical economists were not laissez faire

Contrary to the statements of commentators like Devereux (1993) and Ravallion (1997), the English classical economists did not take a laissez-faire approach to famine. Adam Smith set out the view of the English classical economists famines were nearly always caused by a decline in food availability per head, arising from a fall in supply or an increase in the number of mouths to feed. Government should deal with this by increasing effective demand, so that the free market would import the necessary food. This could be done by Poor Law Relief, gifts of food or money to the poor and by food for work programmes.

How they dealt with the Irish famine

This view was put into practice during the Irish famine of 1845-1849, when potato blight reduced the amount of food available per head (Woodham-Smith 1962, 1991). The British Government introduced a work programme to give people without incomes the cash to buy food. However, it took several months for a price signal to result in imports from America, and in the meantime, the only effect was higher prices, and higher profits for speculators. People who had enough money to buy food at normal prices sold their assets to survive, impoverishing themselves to the extent that many died when the potato crop failed a second or third time. The Government gave money for free food and soup kitchens, but high prices meant that most of this money went to speculators. Government decreed that the Irish landlords should pay massive poor law rates to finance additional relief, but the money obtained was a drop in the ocean. The economists then concluded that since all the demand side measures had failed, nothing could be done. The only way to prevent future famines was to reduce demand, by "letting nature take its course". "I have always felt a certain horror of political economists," said Benjamin Jowett, the celebrated Master of Balliol, 'since I heard one of them say that he feared the famine of 1848 in Ireland would not kill more than a million people, and that would scarcely be enough to do much good.' The political economist in question was Nassau Senior, one

of the Government's advisers on economic affairs." (Woodham-Smith 1991 pp 375-6). He need not have worried: 2.5 million people died out of a population of 8 million.

The necessary resources were made available to stop the famine

The Irish famine could have been stopped without spending any more than was spent over the period. Government could have banned grain exports and imported large quantities - in fact it imported less than 1 kg per head over the whole period and it actively encouraged exports. The amount available would then have been enough to keep the whole population alive. Prices would have been within the reach of those people not directly affected by the crop failure, and grain could have been supplied cheaply for charity - there were enormous charitable donations from Britain and the USA as well as Poor Law relief. Also important is the fact that people could have worked on their farms producing food, instead of being forced to work on relief schemes or to live in the workhouse.

The policy failed elsewhere

Similar failures were noted when this demand side theory was put into practice in a series of Indian famines. Effective demand was increased, but traders did not bring in enough food soon enough. The main effect of government intervention was an immediate rise in food prices. For this reason the classical approach was replaced by one taking into account both supply and demand. Government must import enough food to feed the population, then take demand side measures to ensure that everybody had access to the food.

The Entitlement Approach

The entitlement approach is the same as the classical approach

A variant of the English classical approach is the entitlement approach, popularized by Sen (1976, 1977, 1980, 1980b, 1981, 1981 b, 1984) and now seen to be the dominant and correct approach in reviews by Devereux (1993) and Ravallion (1997). Like the classical economists they concentrate almost entirely on the demand side, though they do not present it in any greater breadth or depth than for example Hunter (1873), Frere (1874) and Mahalanobis, Mukkerjee, and Ghosh (1946), nor do the prescriptions go much further than the Bengal Famine Code (1897).

It says though that most famines occur when there is no food decline

The main novelty of this approach is that it asserts that *most* famines occur when there is no sudden decline in total food availability. For example, a boom or inflation may mean that some people eat a lot more food than before, so there is not enough to go round for the others and some die. In all famines some people continue to eat well, and the starving may be excused for thinking that they were starving because the rich were eating more than usual. In the Central European hyper inflations of the 1920s and 1930s people were seen to die because they did not have the cash to buy food, so the inflation theory of famine became popular. It influenced the Government of Bengal in 1943 when they chose to believe that inflation and speculation caused the famine. The theory appeared sporadically in textbooks, but was introduced to the wider economic literature by Sen.

Similarly, the possibility that speculation often caused famines was always popular, though dismissed by Adam Smith, but was introduced to the wider economic literature by Sen (It is shown in the appendix that this is theoretically impossible in the sort of economies for which it is postulated).

The mythical FAD approach

The entitlement school asserts its difference from its predecessors by saying that they adopt the Food Availability Decline (FAD) approach, which states that all famines are caused by declines in absolute availability (not in availability per head) and which ignores the demand side. It then makes a violent attack on the FAD approach (e.g. Sen, Devereux). The FAD approach does not appear in the literature, and is wholly mythical. The entitlement theorists are so eager to distance themselves from the FAD approach that they tend to avoid looking at availability at all - indeed Sen is highly critical of the Bengal Government because they wanted to determine the degree of shortage while a famine was raging. (*"The government's thinking on the nature of the food problem, which 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."*) (Sen, 1977, p 53.) One result of this is that in their discussions there is a confusion between a famine caused by a redistribution of available food between groups, and the uneven impact of shortages on different groups, which is seen in any famine, however caused. The fact that some occupation groups starve while others hardly suffer is taken as evidence that the famine is caused by redistribution (e.g. a boom famine) rather than by a reduction in supply, which is a non sequitur.

Sen uses FAD in many senses

The discussion is confused by the fact that Sen uses FAD in many different senses, sometimes to define the mythical people who believe that only supply factors should be taken into account in famines, sometimes to define those who believe that all famines are caused by an absolute decline in food ability, sometimes to describe people who believe that food availability decline could have contributed to a particular famine, and sometimes, very confusingly, to describe all his predecessors, not least those who held a demand oriented classical view.

Sen's facts have been challenged

The entitlement approach is based very largely on Sen's and others analysis of five famines, in which, it is asserted, speculation and redistribution (i.e. a boom famine) were the causes. The factual base of these analyses has been widely challenged. Sen's data has been criticized in some detail by Goswami (1990), T. Dyson and A. Maharatna (1991), T. Dyson (1991, 1996), Basu (1984, 1986), Kumar (1990). Dyson concludes ". . . while they are far from being complete explanations, FADS were probably involved in all five of Sen's famines." Dyson, T. (1996). Seaman and Holt (1980) while not mentioning Sen, explode one of his cases: "*In the Ethiopian case dealt with in this paper, the inevitability of a massive food shortage in the Wollo Province was known to the Imperial Ethiopian Government from a detailed qualitative crop survey completed in November 1972. The government was reluctant to declare an emergency until March 1973. Bu*

when international relief was called forward in April, it took until November for big food shipments to begin to arrive.”

Sen believes speculation and inflation cause most famines

Sen disagrees strongly with both the classical and the modern traditions on one thing. Since the mid 1970s he has argued at length that many or most famines are caused by a subsection of the third type, by a change in people's ability to buy an adequate supply of food. He is scathing about those people who argue that a reduced supply is the reason, and particularly about those who believe that it was a major cause of the Bengal famine of 1943 (Sen 1976, 1977, 1979, 1980a, 1981a, 1981b, 1984). He calls their view the Food Availability Decline (FAD) view.

The disagreement is on frequency of different causes.

Sen is not setting out a new cause

It should be noted that Sen is not proposing a new explanation for famine. The classical economists have always accepted that famines could be caused by redistribution, hoarding, speculation or inflation even when there was no fall in aggregate supply. The mainstream view was that while these were possible causes, they very seldom were important in practice, and indeed that famines had been caused or aggravated by administrators who thought they were important in instances where they were not. Sen's novelty is saying that, on the contrary they were usually or nearly always the proximate causes.

Sen's credibility depends on his facts

Sen's explanation is so surprising that it would not have been given any credence at all if he had not presented a wealth of data about real famines to support it. He presents examples of five famines to show this. The Bengal Famine is the one he gives most space to, as it is the one for which most information is available. His work stands or falls on the data he presents.

This monograph challenges Sen's facts and his theory.

The Agricultural Economics Approach

A market under extreme conditions

The traditional view of agricultural economists was that a famine situation was an agricultural market under extreme conditions, a complex market which should be analysed using the full power of agricultural economics and covering all the aspects usually covered in a market analysis. It should not be analysed using a separate theory which only applied to famine. It was believed that a famine occurred when there was a sudden, localized decline in food availability per head leading to a shortage over a discrete period of time. This might be due to factors like crop failure, a blockade, or lack of money to import. Equally it might be due to a sudden change in demand arising from an influx of refugees or an invading army, or to a rise in the export price (as when a high world price caused the export parity price to rise above what Bengal peasants could pay (Hunter, 1873)).

The fall in supply per head could be caused by a combination of factors: often there is a progressive decline in food security over some years until an apparently small reduction in crop size is the last straw. After the famine has struck the availability per head can continue to change even before the next crop is harvested because of exports, imports or fast or slow consumption of stock. This approach considers both supply and demand at all times, and is concerned with market period, short run and medium run supply and demand.

Some groups hit particularly hard

Whatever the cause of famine, it has always been obvious that some groups are hit particularly hard - often landless labourers and small artisans. They do not have the cash or assets to exchange for food; the market for their assets is so on glutted; and their normal clients spend all the money they have on food, rather than on employing them. The classic studies are those of Hunter (1873) and Mahalanobis, Mukkerjee and Ghosh (1946). Accordingly, free food distribution, food for work, etc. have always been standard famine relief practices. These effects are, of course, extreme examples of the normal responses to a price change, with different market segments having different elasticities. From the 1920s household budget surveys and consumer price indices were universally introduced to monitor the effect of price changes.

Long term effects

This approach recognizes that the land sales, sales of assets, indebtedness, etc. have long term effect on the agricultural economy, which may be worse than the famine itself. The Book of Genesis describes how state stocks amassed by Joseph on behalf of the Pharaoh were used to force the people to sell their land and even themselves.

While the theoretical possibility of inflation and speculation causing famine has been accepted for most of this century at least, they have very seldom been presented by agricultural economists as causes of famine.

3 WHY DOES IT MATTER?

The disagreement is important

The disagreement between Sen and mainstream economists is not of mere academic interest. It strongly influences the action a government will take to prevent famine and the action it will take if a famine occurs. Millions of lives depend on it.

Food security is irrelevant if Sen is right

This monograph 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 shortages.

Impact of Sen's theory

It will be argued throughout this monograph that Sen's theory of the causation of famines, and the analysis he considers appropriate to it, will lead to a misdiagnosis of the cause of famine, the degree of famine and the appropriate action to deal with the famine. It will lead to millions of deaths.

Sen was wrong even with the benefit of hindsight

It would be easy enough to show that economists in the threatened country are likely to misdiagnose the problem and the appropriate solution using Sen's analysis, so causing famine. They are not highly-trained theoretical economists. They have limited resources and extremely unreliable statistics; they are working under extreme time pressure and political pressure; and they have an awesome responsibility.

Instead, I propose to show that Sen himself has consistently reached the wrong conclusion, and moreover that the bias has been one that would lead to famine. His books and papers were not subject to the time constraint that face 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 far better placed than the people in the field to make a diagnosis, yet he was wrong.

Misdiagnosis worsens the famine

In the next sub-section it will be shown that the effects of misdiagnosing a famine as a Sen-type famine are serious. The result will be that government will take action which may be totally ineffective or which may worsen the situation. Making the opposite mistake and misdiagnosing a Sen-type famine as a Food Availability Decline (FAD) famine does not matter. The action taken will ameliorate the famine.

3.1 Food Availability

Degrees of food shortage

Unlike Sen, I consider that one cannot discuss famines without constantly taking into account aggregate food supply. For this reason I should like to distinguish several degrees of food shortage. The definitions are in terms of the amount of food available in relation to nutritional requirements. They are in no way related to market supply and demand.

NO SHORTAGE. If there is plenty of food to go round, a famine can only result from a major change in distribution.

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. The population has insufficient food for long-term survival. Rationing would leave everyone hungry and suffering from deficiency diseases, but surviving until the next harvest, though there would be some excess mortality among the sick, weak and old. In the absence of rationing, there will be widespread starvation.

THIRD DEGREE SHORTAGE. Insufficient food for survival. Starvation is inevitable without imports. If there were no imports and everyone were given a bare survival ration, food would run out before the next harvest, and the whole population would die. Historically, populations have avoided this fate by leaving the young, the old and the weak to die, so that the able-bodied adults might survive. In Bengal in 1943, the young, the old and the poor were left to die, wives and families were abandoned, children were sold into prostitution, and useless consumers were murdered (see for example Famine Commission, 1945a; Rajan, 1944; K.C.Ghosh, 1944). Usually a population will resort to emigration, war or cannibalism before accepting annihilation. No doubt the human race has survived only because our ancestors made such decisions.

Limitation on application of Sen's theory

A critical limitation of the application of Sen's theory is that a famine can only be caused by a change in distribution when there is no shortage, or, just possibly, when there is a first degree shortage. With a second or third degree shortage, there is a famine situation even with normal distribution. Indeed, with a third degree shortage, changes in distribution are needed if anybody at all is to survive.

3.2 Changes in the Degree of Shortage

Mismanagement can change degree of shortage

The degree of shortage, the food availability per head per day, does not remain constant from one harvest to another. Imports can improve the situation. So can migration, though at an enormous social cost. Mismanagement can easily worsen things. For example, if a government does not impose any rationing when there is a first-degree shortage, so much

food may be consumed at the beginning of the year that a second-degree shortage is created. If it issues the rations appropriate to a first-degree shortage when there is in fact a second degree shortage, then later in the year there will be a third degree shortage, with insufficient food for survival. Mass starvation will follow.

Government policy increases shortage

Again, if government decides that the famine is the result of hoarding by merchants (and such complaints are made during every shortage), it might force them to release enough grain onto the market to keep supplies and prices at the normal level. If supplies were in fact 25 % below average, the result would be that the food supplies would be exhausted three months before the next crop.

3.3 The Effect of Misdiagnosis

Traditional response to famine

The view of economists from the classical economists onwards (and the view of many earlier economists), is that all famines should be dealt with by issuing food to the poor, by relief works with payment in food, and by loans to prevent the impoverishment of farmers and artisans (Appendix I gives details of the provisions of the Bengal Famine Code). Market intervention (i.e. price control, control of stocks, seizure of stocks, prohibition of exports etc.) is also normal.

The post-classical economists said that *in addition* government should import so that there was enough food in the region to feed everyone.

Rationing as a solution

Rationing is taken to be a possible complete solution for first and second degree shortages, though the practical problems are such that it would be unsafe to rely on it. There are major problems deriving from poor administration, corruption, political interference or difficulties with physical distribution. There may not be sufficient maldistribution for 'fair shares' to produce much improvement; in Bengal in 1933, for instance, only 22% of the population were well nourished (Famine Commission, 1945 p6) and since the middle classes ate considerably less rice (and more protective foods) than the average, rationing of rice, the staple food, would not have had much effect on the proportion of people who were well-nourished. Rationing is more likely to be effective in reducing aggregate consumption than in producing optimum allocation.

When imports are needed

Imports are essential for a third degree shortage and, in practice, for most second-degree shortages.

Sen disagrees

Sen disagrees. As will be shown below, he states that it is wrong to concentrate attention on the degree of shortage when determining how to tackle a famine, and indeed that it is wrong to consider degree of shortage at all. It is formally possible to deal with a Sen-type famine, caused by changes in distribution alone, by the basic measures alone - issuing

food, relief works, loans and market intervention. Seizure of stocks and a formal rationing system may be needed. However, imports are not necessary: this is a logical corollary of his diagnosis. Misdiagnosis of a FAD famine with second or third degree shortage as a Sen-type famine means (a) no rationing at all or excessive rations, and (b) no imports. The result will be that no effective measures are taken and the situation is worsened.

Laypersons' solutions

Unfortunately, the uninformed laymen, whether politicians or administrators, are easily convinced that the high prices are due to something they think they understand, like speculation, inflation and hoarding, and something they can deal with by administrative action. They feel that they have acted decisively and usefully if they shoot a few speculators and seize their stocks for distribution. There is a reluctance to accept the horrifying responsibility of dealing with a third-degree shortage, and to accept that one is totally powerless in the face of forces beyond one's control.

4 THE BENGAL FAMINE

History of the Bengal famine of 1943

In 1943 Bengal suffered from a famine that resulted in perhaps 1.5 million deaths from hunger and the same number of deaths in the epidemics that hit a population weakened by hunger. The Commission of Inquiry that was appointed on the famine produced two remarkably detailed reports on the famine, the efforts that were made to control it, and the measures needed to prevent further famines (Famine Inquiry Commission - referred in future as FIC - 1945a, 1945b). The reports have been the main source of information for subsequent studies. They were highly critical of the Bengal Government, the Government of India, the Viceroy, the Imperial Government and the grain traders. Indeed only Wavell, who took over as Viceroy in October 1943, escaped with his reputation untarnished.

Why the report is considered to be honest

An indication of the quality of the report is that it accepted and documented nearly all the criticisms of the authorities made in the highly critical, highly political books on the famine written by Hindu and Muslim nationalists (e.g. Dutt, 1944; T.C.Ghosh, 1944; K.C.Ghosh, 1944; Rajan, 1944), and it added a good number of criticisms of its own. The Viceroy was only too well aware of the political embarrassment that would be caused by exposing the inefficiency of the administration (Wavell in Moon (1973) pp 36-7), and it was widely believed that the Indian Government tried to limit the damage by printing only a few copies on inferior paper (Aykroyd, 1974). The English editor of the Calcutta *Statesman*, who had done most to bring the famine to the notice of officialdom in Calcutta, Delhi, London and Washington (defying censorship and the wrath of the local officials to do so) commented "The Famine Commission's report is as complete, painstaking and balanced an account of what happened and why, as will ever be achievable." (Stevens, 1966).

The rice crops

Rice is the staple food of Bengal, accounting for 80-90% of the calories consumed. There are three rice crops. The 'aman' crop, harvested in November or December, provides 74 % of the rice supply, with the upland 'aus' crop harvested in August and September providing 24 % and the 'boro' crop harvested in February or March providing 3 %.

December 1940

In December 1940 there was a much reduced 'aman' crop, and, as a result, there were shortages and isolated outbreaks of famine in 1941, which were easily handled with relief measures and market intervention. (The graph shows how these events were related to price changes.)

December 1941 crop

In December 1941 the rice crop was well above average, but prices started high and rose throughout the following year.

When this poor winter crop was harvested, prices rose rapidly, doubling within a month in the country areas. By March 1943 there was hunger throughout Bengal, and from July to November, the famine was in full spate. Relief measures of the kind mentioned in Appendix I were introduced immediately in the area affected by the famine (FIC pp 32, 65, 66, 236). They were extended throughout the country as the famine hit. The measures were totally inadequate in most areas and were only really adequate in Calcutta.

Government thinks shortage is psychological

In December 1943 the Bengal Government thought that the shortage was mainly psychological. (See Appendix II for a detailed description of the actions of the Bengal Government through the famine.) They believed that there was no real shortage and that the price rises were caused by speculators. As a result, their main strategy throughout the famine was to “break the Calcutta market”, releasing imported, purchased or seized grain on the market in an attempt to frighten speculators and hoarders into selling off their surplus stocks. They had great difficulty in buying any rice in the country areas in the first quarter of 1943, even when officials were told that there was no limit on the price they could pay. They were able to buy only 23,000 tons out of a normal annual consumption of 9.6 million tons, and releasing this had no impact on market prices. A further 28,000 tons was imported in March, which, again, had no effect. In June and July a further 90,000 tons were imported, again with no effect on prices.

Propaganda drive

In April and May there was a propaganda drive to persuade speculators and hoarders to release their stocks, with no apparent effect.

Search for stockpiles

In June 1943 there was a house-to-house search for secret stockpiles, but it was found that there was very little in stock, not enough to last to the November harvest. It was around this time that the Bengal Government came to believe that there was in fact a serious shortage.

Imports to Bengal

Throughout the famine imports into Bengal were low. Initially, this was because the Bengal Government thought that the shortage was no more serious than that of 1941, and thought that it would be possible to manage with the food available. In the second quarter of 1943 it was thought that imports of 300,000 tons would be sufficient to cure the famine (This was the quantity eventually imported). From the middle of the year government began to believe that much bigger imports were needed. It was found though that other provinces refused to permit exports to Bengal. India as a whole had a first degree shortage and prices were rising, so any exports from a province would cause further price rises and would cause civil unrest. For a brief period in June and July, Bihar and Orissa permitted exports to Bengal (after much pressure from the Indian Government), but they stopped these when their own prices rose sharply. The Imperial Government would not provide grain or shipping.

The closing stages

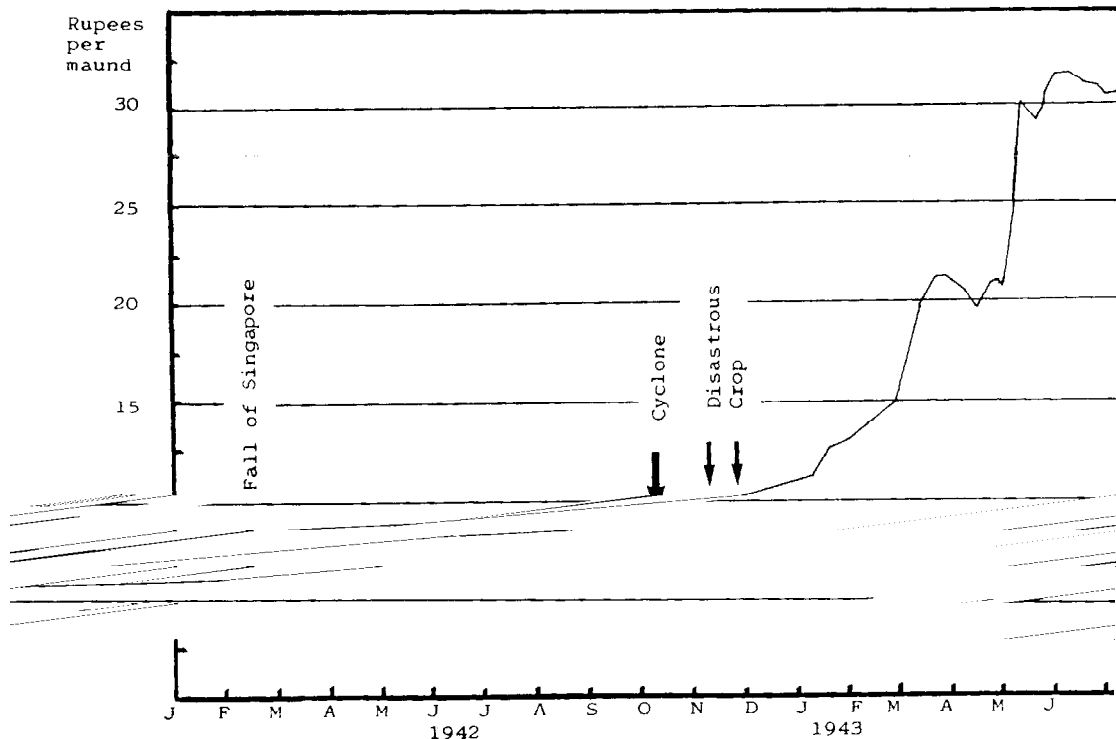


Figure 2 Wholesale price of coarse rice on the Calcutta market 1942 and 1943.

In November 1943 the new Viceroy, Wavell, increased exports to Bengal and sent in the army to improve the physical and organizational distribution of the grain. The September crop helped, but the famine did not end until an exceptionally good, though rather late, crop was harvested in December. However, epidemics now took over as the main killer, and as many people died between November 1943 and July 1944 as in the previous period.

How many died?

Sen says "possibly the biggest famine in 100 years"

It was estimated in the Famine Commission report that between one and two million people starved and the same number died from disease, giving a total of between two and four million deaths. Sen (1977 p 33) calls this famine "possibly the biggest famine in the last hundred years". However, Masfield (1963 pp 12-14), who he quotes on the history of famine, mentions half a dozen where the death toll was higher, nearly ten times greater than the official death toll in Bengal (which includes death by disease) in one case:

- India 1876/7 5 million
- China 1876/7 9 - 13 million
- Russia 1920-1 "Millions"
- China, Hunan 1929 2 million
- Russia 1932/3 3 - 10 million.

The Sahel Famine of the 1970s could be said to have had a smaller death toll, but only if redefined into many small famines. He does not mention the Chinese famine of the Great Leap Forward.

Sen contradicted by facts

Again, Sen's statement clearly conflicts with the facts in his source.

Sen's estimate of deaths criticized

Sen's own estimate of the mortality in the famine, 3 million deaths from starvation and disease, has been strongly criticized by T. Dyson and A. Maharatna (1991) and T. Dyson (1991). The first is highly critical of Sen's data and the way he dealt with the data, and suggests that he made a 50% overstatement of the true figures. The second shows that other aspects of Sen's demographic analysis of 1943-44 are wrong too.

Sen suppresses main source document

Very few people have had the opportunity to check Sen's work against its sources, and only a handful have done so - myself, my referees and a few researchers.

When Pergamon Press proposed to publish The Famine Commission Report as a classic and relevant account some years ago, Sen made a strong recommendation that the report was so flawed as not really to be worth putting out as a book. As a result it is still virtually impossible for most people to check his work.

Other sources must be collected from specialist libraries in London, Oxford and Cambridge for instance. It is time consuming and expensive to get it. Again, it is impossible for most of his readers to get hold of.

**I would be very pleased to assist readers in obtaining source documents.
bowbrick@prima.net [PB 1999]**

How many went hungry?

How many people were affected by the famine, apart from those who died? 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 (1944)). An independent estimate was made by Mahalanobis, Mukerjee and Ghosh (1946), 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 to 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.

Destitution

“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.”
(FIC p 67)

5 CAUSES OF THE FAMINE

Causes of the famine

There are several different versions of the causes of the famine. I will set them out here and examine them at length later.

5.1 The Famine Commission Version

Famine Commission blames short supply

The Famine Commission argues that the basic cause of the famine was a reduction in the food supply. This was due to the poor December 1942 crop, and to the fact that there was a reduced carry-over of supplies from previous years, resulting in at least a second-degree shortage, with insufficient rice available to keep the population healthy, no matter how it was distributed.

Gross mismanagement

Gross mismanagement of the crisis, particularly by the Bengal and Indian Governments, meant that nothing effective was done to alleviate it. They took only the action appropriate to a first-degree shortage. 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 in Calcutta at least. The government should have seized all grain stocks and should have taken over the whole grain trade. They should have imported grain. This brief summary does the Famine Commission an injustice. Their report is rich and closely argued and by no means as simplistic as I have suggested.

5.2 Professor Husain's Version

Husain said there was even less food

Professor Husain, a member of the Famine Commission, argued that the shortage was even worse than the rest of the Famine Commission believed. He argued that the carry-over of old stocks from 1942 to 1943 was very low indeed, so there was a third degree shortage, and serious famine was inevitable in the absence of major imports.

The grain trade agreed

The grain trade generally made the same assessment, both because of their knowledge of stock levels, and because they thought that the Department of Agriculture had over-estimated the December 1942 crop. They invested accordingly, and made a lot of money.

5.3 Sen's Version

Sen says there was plenty of food

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 Food Availability Decline

approach to famine analysis is inappropriate. He states that there was plenty of food available in Bengal in 1943, **at least** 9% more per capita than there had been in 1941, when there had been no famine, so the famine did not arise because of a decline in the availability of food. In particular he doubts that there was a reduced carry-over at the beginning of 1943, as the Famine Commission says.

Changed distribution of the food

Instead, he believes, the famine 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 got higher incomes and ate more, leaving little for the rest of the population. At the same time others did not have sufficient money to buy food.

Sen's "causal hypotheses"

He provides the following causal hypotheses (Sen 1977 pp 50, 51; 1981a pp 75-78), which will be considered in detail in a later section: Sen's 'causal hypotheses'

1. Demand factors related to inflation increased the price of rice 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 to 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. [Here and elsewhere his quotation marks appear to have purely rhetorical significance.]
7. The prohibition of export of cereals from other provinces.
8. The policy of removing boats from areas threatened with Japanese invasion (1980b p619).
9. The policy of removing excess grain stocks from areas threatened with Japanese invasion (1984 p461; 1980b p619; 1981b p441)

Impact of “causal hypotheses”

He sees the first six of these explanations as having the same result, concentrating purchasing power and food consumption on a small section of the population, so that there was insufficient food available for everyone else.

Sen blames famine on Government’s concern with food availability

Sen’s whole argument tends towards his conclusion that “*the failure to anticipate the Bengal famine . . . and indeed the inability even to recognize it when it came, can be traced largely to the government’s overriding concern with aggregate food availability statistics.*” (1984 p477) He suggests that if the problem had been analysed using his approach, the famine would not have occurred.

Sen’s explanations were current in 1943

It will be shown in some detail in this monograph that all Sen’s explanations were discussed in the source documents, notably the FIC. They were part of the popular explanation at the time. Furthermore much of the policy of the Bengal Government at the time was based on them, with disastrous consequences. It will also be pointed out that they were popular during the 1888 Orissa famine and as far back as Adam Smith at least. The inflation explanation for famines was very popular after the Central European hyper inflations of the 1930s, where they did appear to cause deaths. It was this very popularity that encouraged the Bengal Government to adopt it. The explanation appeared in economics textbooks in the 1950s. It even appeared in chess books of the time: a challenger to Lasker for the world championship later died of hunger in Austria during hyper inflation.

6 PROFESSOR SEN'S EXPLANATIONS EXAMINED

Theory must be consistent with *all* evidence

In this section Professor Sen's explanations for the Bengal Famine will be compared with those of the Famine Commission. In assessing the explanations it will be borne in mind that it is always possible to support a hypothesis or "explain" a single phenomenon with two or three pieces of selected evidence and a minimum of theory. Accordingly, the competing explanations will be examined here to see if they are in accord with all the facts in the sources, not just a select few. The different explanations given will be examined to see if they are compatible with each other, with the facts, and with economic theory.

6.1 Inflation

Inflation as a "causal hypothesis"

Sen's first causal hypothesis is that the famine was set off by factors related to wartime inflation, though the fullest and clearest statement I have been able to find in his works on the subject is

"The increase in the rice price in Phase I [January 1942 to March 1943] was 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 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" (1977 p50)

No explanation given

Sen does not explain how inflation could cause a famine: a famine is caused by people not having enough to eat. Printing more notes does not make people less able to pay high prices caused by inflation: it is the fact that they have more notes that pushes up the price. If the available stocks of rice cannot be sold at a high price, because not everyone has access to the newly-printed notes, the price will fall. If Sen is proposing a mechanism so different from normal economic theory, he should explain it in detail.

Not supported by sources

However the facts as presented in his sources give very little support for this. First, from the beginning of the war until the cyclone hit Bengal, the Working Class Cost of Living Index in Calcutta rose slightly less than that in Madras and Bombay. (Singh, 1965 pp 95-99). From October 1942, when the cyclone struck, it rose much faster (See Figure 3). Sen does not explain why this inflationary pattern should suddenly change and affect Bengal so much more seriously. Nor does he explain why the change

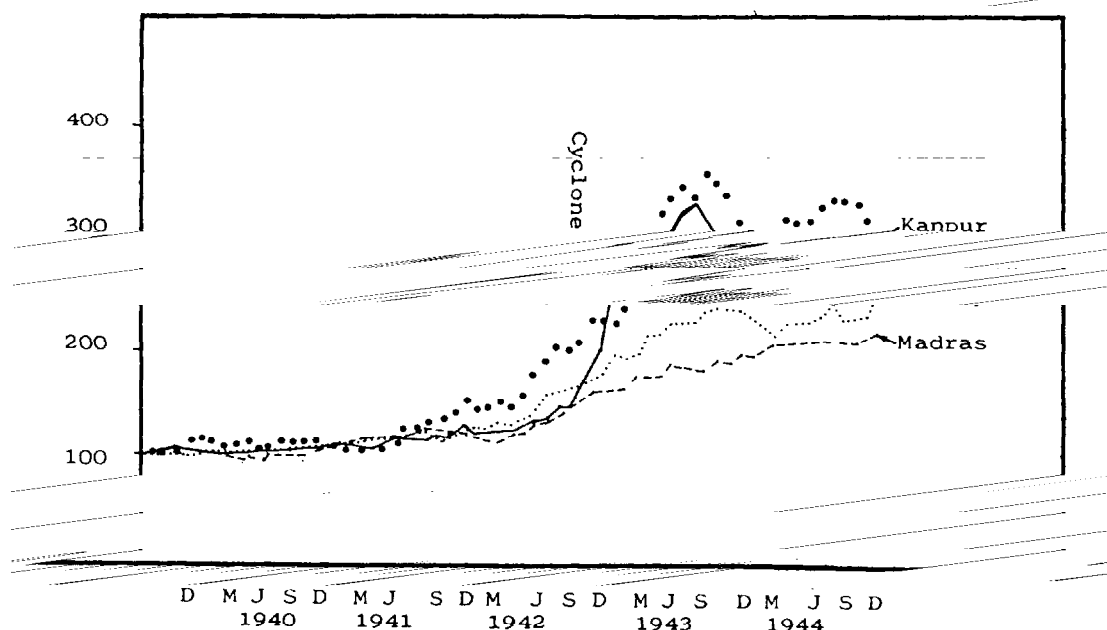


Figure 3 Working Class Cost of Living Indices in Kanpur, Calcutta, Bombay and Madras. August 1939 = 100
Source: Singh (1965)

should happen to coincide with the cyclone.

Sen is contradicted by his sources

Again, up to the cyclone, the rice price rise was not more acute in Bengal than elsewhere in India. Rice prices were higher elsewhere in India and there was a thriving export trade from Bengal (FIC pp 17, 18, 21, 22, 23, 28, 29). The United Provinces and the Central Provinces had crops that were poorer than even the crops of the previous year (FIC p17). This, together with the loss of Burma imports caused prices to rise, and would go some way to explain the price rises in Kanpur, which started before the cyclone (Figure 3).

Were price rises caused by inflation or shortage?

To some extent inflation caused rice prices to rise. However, it must be questioned how far the price rises even before the famine were caused by inflation, rather than by the shortages. The Government of India was, of course, obsessed by wartime inflation, but was particularly concerned with grain prices as being a cause of inflation rather than a result. The Famine Commission gave a detailed and convincing account of the factors causing the rise in the rice price during 1942. They included

- panic hoarding by farmers and consumers following the outbreak of war with Japan;
- a shortfall of rice in India as a whole as a result of the loss of the Burma rice;
- the loss of rice stocks in the cyclone;
- changed expectations after the cyclone; and

- the reduction in wheat imports by Calcutta.

Their explanation of how grain prices started to rise after the cyclone had destroyed 30 % of the crop and after interprovincial trade had been banned is completely convincing. It also explains why the famine was confined to Bengal and to those parts of Orissa hit by the cyclone.

Sen contradicted by his own figures

Sen himself quotes figures showing that the price of rice rose much faster than the price of fish, umbrellas, milk, haircuts etc. in spite of the fact that the supply of fish was much lower than usual. (1977 pp45, 46). Yet these goods were presumably equally hit by inflation.

Why only Bengal? Why only rice?

Sen makes no attempt to explain why the inflation should have affected Bengal alone. Nor does he provide any market mechanism to explain how the inflation was transmitted to the price of grain - one would have expected the impact to have been concentrated on scarce consumer goods. He does not explain how paying a good wage to a few hundred thousand factory workers would result in an inflationary price rise in the grain bought by 50 million people. He himself quotes evidence that this extra demand in the industrial sector was offset by a falling demand in the agricultural sector.

Falling demand in agricultural sector

“While in September 1942 the [agricultural] wage rate stood where it was in December 1941 and the price of rice stood only a little higher, a sudden upsurge of the rice price subsequently occurred, without a matching movement of the wage rate. In fact, while the price index of rice rose to 221 by November the wage rate actually fell in absolute terms - against the usual seasonal pattern” (1977 p43)

More inconsistencies

On page 51, again, he quotes the Famine Commission as saying that generally the agricultural labourers were not affected by inflation. He then talks of a decline in employment in the sector (p44). It is not clear from this how the inflationary pressure would be put onto food prices, with so few people affected. Finally, he does not explain why the inflationary effect should cease to apply on the harvesting of the December 1943 crop.

Famine Commission gives best explanation

It must be concluded that the Famine Commission provides by far the most satisfactory explanation of price rises both before and after the cyclone. No doubt inflation had some effect, but it was minuscule by comparison with the rises when the shortages began to bite (see Figures 1, 2 and 3).

Sen ignores effect on prices of Government purchases

A major reason for the rise in prices in 1943, which is not mentioned by Sen, is the purchasing of grain by the Bengal Government. They bought grain for relief, for public works and for “breaking the Calcutta market”. For part of the period they were bidding against the trade without much limit on price. The danger of this practice was

recognized explicitly by Malthus (1800) and by the Bengal Famine Code. It would not be disastrous if there was no real shortage or a first degree shortage - everyone would get food, though prices would rise. However, if there is a more serious shortage, it would lead to a never-ending price spiral, because there is just not enough food to go round, however much money is paid. This happens both if the money is given to the poor to buy grain, or if the government buys grain on their behalf. If the Famine Commission's belief that there was a shortage of grain is accepted, then this must certainly have happened. This another major disaster brought about by misdiagnosis of the cause of the famine.

Most of the world had wartime inflation, but no famine

In 1943, in the middle of the Second World War, there were inflationary pressures in most countries and throughout India. If Sen was right, they would all have suffered famine.

Again and again Sen's explanation is contradicted by the facts in his sources.

6.2 Speculation

Sen blames speculation

Sen places speculation after inflation 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 1943 (1977 p50; 1981 p76). There is an enormous literature on speculation, hoarding and storage dating back to Adam Smith at least. It is agreed on one thing: that the uninformed layman's criticisms of speculation are unfounded.

He does not explain how or why

Yet Sen does not provide a model to show why the uninformed layman's criticisms should be correct in this instance.

Sen misquotes his source

Instead, he quotes the Famine Commission in his support, though in fact the Famine Commission describes a speculation which happened at another time, and which, moreover, was a form of speculation which could not have caused the famine.

Normal Speculation

Normal speculation between harvests

By normal speculation I mean the situation where speculators (mainly grain traders) buy up the crop after harvest and sell it throughout the year, ending the year with the same carry over of trading stocks as they started. This takes place in all years, and in years of exceptional shortages it can produce very high profits. If the selling price is greater than the purchase price plus the storage cost, they make a profit (and my own observations in Africa and Asia confirms the theoretical prediction that they often

make a loss). There is evidence that this took place, and enormous profits were made. The poor could not afford to buy the rice and many died. The question is whether this was a cause of famine as Sen suggests, or even exacerbated it.

Famine Commission saw normal speculation not Sen's speculation

The Famine Commission was concerned with this kind of speculation. As public servants in wartime, they were concerned about speculation and profiteering and its effects on price levels generally. As human beings, they were concerned that Government's failure to introduce famine relief on a sufficiently large scale had condemned to death those people who could not afford to pay the high prices. They pay a great deal of attention to the fact that traders and large farmers bought up the crop at the beginning of the season and made enormous profits out of selling it, bit by bit, at famine prices (and, of course, the fact that after they liquidated their stocks, prices still continued to rise confirms that there was a shortage). It meant that the people who starved were the poorest classes, such as landless labourers and very small farmers, as well as those whose ability to purchase grain was altered by the famine, like small traders, suppliers of services and employees. Those who had goods to sell impoverished themselves to survive, and as a result there was a further concentration in land ownership (and Bengal is still suffering the after effects of this transfer of resources).

There is no reason to believe this increased the death rate

However, the fact that there was this enormous transfer of resources does not mean that speculation increased the death rate. If we accept the Famine Commission's view that there was at least a second-degree shortage, we accept that some people were certain to die, in the absence of large-scale imports. The high prices determined that it was the poor who died rather than the rich. Had the same quantity of food been sold at a price only 50% above the normal price, the same people would have died. There would not have been the same enormous transfer of property, though.

It may have reduced it

In fact, given that the Bengal Government was doing nothing which could relieve a second or third degree shortage, this speculation saved a lot of lives. If traders had not held on to stocks for a higher price, there would have been a worse catastrophe. If, at the beginning of the year, they had released the amount of grain the Bengal Government wanted released, the country would have completely run out of grain well before the harvest. In the absence of any effective government intervention, high prices are beneficial. They get everybody to reduce consumption, and to ration supplies through the season - and during the Bengal famine prices rose so high that virtually everyone had to restrict consumption.

Adam Smith concurs

“If by not raising the price high enough he discourages the consumption so little that the supply of the season is likely to fall short of the consumption of the season, he not only loses a part of the profit which he might otherwise have made, but he exposes the people to suffer before the end of the season, instead of the hardships of a dearth, the

dreadful horrors of a famine”(Adam Smith, 1776)”

Abnormal Speculation

Abnormal speculation destroys, exports or carries over food

Traders might conceivably reduce the amount of food available during the crisis period to increase the market price. They would have to reduce the total supply, by destroying some of the food, by exporting it, or by storing it and selling it after the end of the famine.

Nobody has suggested this happened

There has been no suggestion in the sources that this happened, and nor has Sen produced any argument to show that this happened. On the contrary, traders imported all they could as soon as they saw that the December 1942 crop had failed. They imported all they could for the three months when there was free trade between Bengal, Bihar and Orissa. They smuggled in whatever they could throughout the period. In addition, from September 1942 to October 1943 the trade was trying to get the Bengal Government to import more. Since there was no suggestion that speculators reduced the amount of grain on the market during the famine year, one cannot argue that speculation caused the famine.

Irrational for speculators to create a famine

Appendix 4 shows that it would have been totally irrational for traders to attempt to create a famine in this way, and that they would not have succeeded.

Appendix 4 shows in considerable detail that *if Sen's estimate of the amount available was correct*, then

- ▶ It was not possible to create a famine in 1943 by speculation.
- ▶ It would have been irrational for speculators to try and create a famine because
 - they would not have believed that the preconditions existed,
 - the financial and physical risks were enormous, and
 - the enterprise was unlikely to be profitable
- ▶ The evidence does not support the hypothesis that this abnormal speculation took place - it could scarcely be hidden
- ▶ It would be much more rational for speculators to attempt an abnormal speculation in a shortage year

Hoarding

Hoarding need not change consumption

Hoarding is usually taken to mean increased retentions by farmers and increased stockholding by consumers, rather than increased stockholding by traders. It is possible for both types of hoarding to occur without altering the supply of grain throughout the year: farmers rather than merchants hold the stocks and consumers try to buy early in the year rather than stagger their purchases over the year. Some market disruption will, of course, be observed. This hoarding would not cause famine.

Sen says stocks increased during 1943

It is possible, though, that farmers and consumers would hoard by increasing their stocks until they had a substantial surplus at the end of the year. This change in distribution would mean that there was less available for other people, so it could be taken as a cause of famine. This would only be so if the hoarding happened during the famine year; if it happened the year before it would mean that increased stocks were carried through into the famine year, so it would reduce the problem. Sen states that it did in fact happen during 1943.

Sen is contradicted by his sources

Sen's chronology conflicts with that of the Famine Commission. They point out that the entry of Japan into the war, and the fall of Singapore and Burma took place in 1941 and at the beginning of 1942. As early as May 1942, it was reported that "cultivators on the one hand were becoming very cautious and unwilling sellers, and speculators on the other hand were operating on a larger scale than in normal times and circumstances, with only one consequence, a steady rise in prices" (FIC p28). The bulk of the hoarding took place then.

Other evidence does not support Sen

It is difficult to accept Sen's statement that there were panic purchases between December 1942 and March 1943 and that there was panic hoarding from March to November 1943. Prices were then too high for any but the very wealthy to buy in excess of their own needs. Supplies on the market were low, well below normal levels (FIC p11). For example, imports by Calcutta in the first quarter of 1943 were half the normal level, and in the second quarter were still below normal (Table 1) - the figures are readily available in the Famine Commission report - so the purchases by consumers for hoarding were not higher than normal in Calcutta at any rate. There may have been increased retentions by farmers out of the December 1942 crop. It is unlikely though that people who had built up an emergency reserve in 1942 would have added to it in 1943.

In fact, hoarding may have increased supply in 1943

All in all, it is likely that increased hoarding, in the sense of purchasing or retaining more than one's needs until the next crop, was largely confined to 1942. It was then that there was a threat of invasion, it was then that the grain was available at a price that made hoarding possible. If this were so, it would largely explain the price rise

Table 1. Imports of grain to Calcutta 1943, compared with normal consumption and consumption under rationing.

		First quarter	Second quarter	Third quarter	Fourth quarter	Total 1943
Net imports of paddy and rice (a,b)	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	tons	12,487	36,063	17,902	20,164	86,616
Supplied through controlled shops and approved markets	tons	6,988	18,262	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.

during 1942, when there was a good crop. It cannot, however, explain the famine; on the contrary, it means that Bengal would have gone into 1943 with a higher than usual reserve supply in private hands.

How important was hoarding?

How important was hoarding? Who was in a position to hoard for personal consumption? Wage and salary earners, small traders and craftsmen lived from hand to mouth and would not be in a position to buy more than perhaps a week or two's extra grain. If they had accumulated it bit by bit over 1942, buying a little extra each month, they might have accumulated a month's supply - which would have been consumed early in the famine year. In 1943 high prices made any such accumulation impossible. Wealthy traders, professionals and large farmers could well have hoarded enough grain to last them to the end of the year, with a couple of bags over. Some medium-sized farmers could have done the same, but most farmers did not produce enough grain to live on, and relied on paid work to fill the gap. Many were so seriously indebted that the bulk of their crop went to moneylenders, traders or landlords immediately it was harvested, so they had to borrow money through the season to buy food. They were in no position to accumulate reserve stocks.

Not many people able to hold stocks

From the fact that only 20 % of the population was well-nourished in normal times, and that only perhaps 1 million out of 7.5 million farming families had enough land for subsistence (FIC p10), we can conclude that not many people were in a position to hold stocks of the order of a year's supplies, or to hold substantial emergency reserves. Very few can have been in a position to buy eleven months' supplies in December, enough to see them through to the autumn crop, with a bit in hand. If they had bought three or four months' supply at the beginning of the year - a major investment - it would have been exhausted well before the next crop was harvested. This is confirmed by the fact that two-thirds of the population was hit by the famine.

How much was hoarded?

The order of magnitude we are considering is that perhaps 10% of the population may have stored 10 % extra in 1942 - an increase in total demand of 1 %. In 1943 it is unlikely that as many as 5 % did, an increase in demand of ½ %. A case could be made for a much lower figure.

No support for Sen

This gives no support at all for Sen's hypothesis that hoarding substantially reallocated food supplies in any of the periods, January to March 1943, March to June 1943 or June to December 1943. If anything, it suggests that grain hoarded in previous periods would have been consumed in these periods, reducing demand.

Hoarding is a bogeyman

Hoarding, like speculation, is a bogeyman invoked by politicians in time of scarcity. Because they believe that there are large private hoards, and that there is plenty of food really, they take no effective action. The result is famine.

6.4 Uneven Expansion of Purchasing Power

Uneven expansion of income

Closely linked to the above hypotheses is Sen's causal hypothesis that the famine was caused by an uneven expansion of incomes and purchasing powers (Sen 1977 p 51; 1981 p77). It is set out most clearly as follows

Sen's hypothesis

"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 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"(Sen 1980b p618)

This change did not take place: If it had, it would have meant 1.8% more consumed, at most

This change in incomes did not in fact take place. However, it would be instructive to look at the implications of the model. If 10 % of the population increased their consumption from 14 oz. per day to 17 oz. per day, there would be 1.8 % more consumed in total (See FIC p204 for the consumption figures in five surveys in the years preceding the famine). Sen states that this 1.8 % would all come from one group, presumably those who died. This supply and demand response is quite unlike that normally assumed in economics, where the increased demand would affect the prices paid and the amount consumed by everybody. The effect described could arise from armed robbery, but not from the workings of the market. Sen's market mechanism is not explained, nor is it explained why two-thirds of the population should have been hit by famine as a result of a 1.8% increase in demand.

Model does not apply in famine year

Clearly, too, there would only have been the extra consumed in a non-famine year. Once supplies became scarce and prices rose to famine levels, this model no longer applies. If it had applied for the first two or three months of the season only, the impact would have been even less than a 1.8% shift.

Preferential supplies to the army etc.

Elsewhere, he states a somewhat more credible hypothesis, that the army, industries and commercial firms got preferential supplies of food. As a result, their employees ate more, leaving insufficient food for the rest of the population.

The evidence is against Sen: Sen's inconsistency

As far as the army is concerned, he is clearly wrong: the army, mainly wheat-eaters, consumed very little extra in relation to India's supplies, and the army in Bengal was supplied externally (FIC p18). Furthermore, the soldiers would have eaten even if they were not in the army. Indeed, elsewhere Sen himself accepts this (1976 p1279). The lack of consistency between his

statements in different publications reflects the fact that his statements are not based on the facts in his sources.

Sen's claim on supplies to Calcutta

Sen says that "almost the entire normal population of Calcutta [was] covered by distribution arrangements at subsidized prices" (Sen 1981 b p77).

This is untrue

This is untrue. There were indeed preferential supply schemes for the employees of industrial and commercial firms, but these never covered more than a million people out of six million in Greater Calcutta (FIC p30). These schemes, plus the controlled shops and approved markets, got 32% of the grain available in Calcutta in the first quarter of 1943, 43 % in the second quarter, 23 % in the third quarter and 18 % in the fourth (See Table 1. The figures are set out at length in the FIC pp219-233). In no sense can it be said that almost the whole population was covered.

Calcutta also went hungry

Nor can it be said that those who were covered were fully insulated against the famine:

"There were also many occasions when, owing to the shortage of atta and rice, reduced issues had to be made to the Chamber, to the participating employers' shops, and by the latter to their employees with consequent discontent and hardship" (FIC p63)

It will be noted too that the issue given (3.58 seers per employee per week) was totally inadequate for an employee with a family.

Sen implies that Calcutta residents ate six times as much as in normal years

It is difficult to square these facts with Sen's statement that one million employees ate so much extra because of the special issues of food that a famine hit the remaining 59 million people of Bengal. This would imply that each and every one of them ate six times as much rice as in normal years.

Impact of all Sen's hypotheses on inflation, purchasing power and preferential distribution

Sen can be interpreted as presenting a third possibility, that the people of Greater Calcutta, 6 million of them, ate so much more that there was not enough food to go round for the rest of the population. This is an all-embracing hypothesis. It includes the hypotheses above, that half of the very poor got a higher income and ate more, and that industrial workers ate more. It is the end result of all the other hypotheses, that inflation and high prices meant that one class ate more, leaving less for the rest. It includes the hypotheses that the preferential distribution of grain plus the disposal of public purchases and seizures on the Calcutta market meant that an unduly large proportion of total supplies ended up in Calcutta.

This implies that Greater Calcutta ate twice as much as before or since

Again, Sen appears to be asserting that six million people ate so much more in excess of their normal consumption that most of the remaining 54 million suffered from acute food shortages, and three million people died. This implies that each and every one of them ate twice their normal amount of food. Indeed, since many people in Calcutta had little or no increase in

income, and had no access to the special schemes, it implies that the others would have increased their consumption far more than this.

Sen implies people paid four to twenty times as much and still ate twice as much

However he is not just asserting that people were eating twice their usual ration, he is asserting that they were willing to pay from four to twenty times the normal price in order to get this extra food - only a fraction of normal consumption was available at special rates: the rest would have had to be bought at famine prices. The prices reported rose to Rs.60 to 80 per maund of rice containing 20% stones and 20 % dirt, according to the *Statesman* and a price as high as Rs.120 a maund was reached at the height of the famine. It will be noted too that industrial wages did not rise with inflation - the subsidized food was a substitute for wage rises.

He implies that they then switched back to normal

He implies further that people suddenly switched back to their normal demand functions as soon as the December 1943 crop was harvested, with wartime inflation no longer having the same effect.

The figures in Sen's sources contradict him

These hypotheses are ridiculous, and it might seem to be unnecessary to disprove them with figures. However, the figures are given in some detail by the Famine Commission, Sen's primary source. They are presented and analysed in Table 1. They give no support whatsoever for Sen's doubling of the grain consumption by Calcutta. They suggest a fall in consumption of 12% to 45%, depending on population estimates, to approximately the level of the 1944 ration (rationing was not introduced until 1944). Even if one makes the unlikely assumption that there was no transfer of grain from the Calcutta Trade Area to Greater Calcutta, if one ignores the unrecorded road traffic, and if one ignores the influx of soldiers, refugees and starving people from the countryside, one gets a picture of sharply reduced consumption, though at a level above that of rationing.

Industrial working classes actually ate less rice

Table 2, again from Sen's sources, gives further reason to doubt that a change in distribution of incomes of the type he describes would cause the swing in consumption he states happens. It suggests that the increase in incomes of the industrial working classes, as a result of war industries, would actually have led to a decrease in their rice consumption.

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 Food Grains Procurement Committee suggests a lower limit to average per capita consumption of 15 ounces per day and an upper limit of 17 ounces.

6.5 Inequalities in Distribution

Sen's argument

Sen argues that the famine was caused solely by changes in distribution. In order to demonstrate that this is so, he quotes evidence to show that

- the poor starved rather than the rich.
- in the course of the famine some people who had been moderately well off became impoverished and died

This is illogical

This evidence does not prove his point. The mainstream view is that all famines, however caused, will have these effects. Indeed both the classical and post classical economists who Sen criticizes, spent a lot of time analysing these distribution effects. I cannot accept Sen's statement that a famine can occur without such changes in distribution (1977 p35). A substantial fall in supply will inevitably change the relative amounts received by the different classes, even if it is only the change brought about by rationing.

Changes in distribution that may be caused by a shortage

Some of the changes in distribution that may arise from a shortage and that were cited by the Famine Commission, with its FAD view, are as follows. Most farmers in Bengal had a high yield and a high price because of the famine and so were better off. Even those with a reduced yield may have got a higher total revenue than usual. However, rural indebtedness meant that often the crop went to a moneylender or landlord who made all the profits. The indebted farmers had to buy back the food they had produced at the inflated price, and had to borrow money to do so. Those families who could not or did not buy their rice at the beginning of the season were unable to buy rice at the new price with the money they had. Consumers spent most of their income on food and could not afford other goods or services, so traders and suppliers of goods and services were impoverished. Many died.

Distribution changes

The introduction of famine relief schemes in rural areas and of rationing for some employees in urban areas meant a change in distribution not linked to market forces. At the same time, the collapse of traditional village charity during the famine because of the high price of foods altered other non-market distribution (as in the Irish famine where landlords reneged on their social and legal responsibilities for poor law relief once the need became abnormal. Rights vanished under the pressure of scarcity).

All examples compatible with FAD

All these examples are compatible with the Food Availability Decline (FAD) hypothesis which Sen so dislikes, so his argument falls down. Since the theoretical basis of his argument is wrong, the accuracy of his data on changes in distribution is irrelevant.

Sen's figures are wrong

However, his data are wrong. They are calculated from Table 4.2 and 7(A5) of Mahalanobis, Mukerjee and Ghosh (1946). Unfortunately Sen used tables of raw, unweighted data derived from a heavily stratified sample, rather than from the adjacent tables giving weighted results.

6.6 Selective Impact on Certain Groups**This is compatible with FAD**

Sen gives as a cause of the famine the fact that from March to November, the demand for crafts, services and “superior” foods fell, so that the people supplying them were plunged into destitution. As shown above, the Famine Commission showed how this effect would arise as a result of shortages. Their FAD analysis shows quite clearly why one group of people rather than another should have starved. There is however another question that should be answered - Why should anybody at all have starved? The Famine Commission explains this quite simply with the fall in aggregate food supply. As Sen does not accept that there was a shortfall in supply, he is stating that the redistribution caused shortages, not just that it aggravated the effects of shortages. The logic is not explained.

6.7 Failure to Import**Logical error by Sen**

Sen states that a contributory cause of the famine was the failure of the Bengal Government, the Indian Government and the Imperial Government to increase Bengal's imports. As this was a failure to increase supply rather than a reduction in supply, it cannot logically be called a *cause* of the famine.

Logical error by Sen

The Famine Commission was highly critical of government for failing to take the only action that could have relieved the serious shortage. As Sen does not accept that there was a serious shortage, he cannot logically take this view either. The most he can say is that, in failing to import, government failed to take one of the many courses of action which would have produced the desired effect.

Restriction on inter-provincial trade

One argument was put to the Famine Commission which suggested that the famine was caused by provincial governments preventing free trade in grain. Before the restrictions on exports the economic unit was the whole of India, afterwards each province was separate. Instead of the whole of India having a first-degree shortage, Bengal had a third-degree shortage. This argument is, of course, at variance with Sen's on most points. The Famine Commission is doubtful of such a sweeping assertion, and considers that it would have been politically unacceptable not to intervene in the grain trade.

6.8 Borderline between Two Price Regimes

This is the complete argument

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

"Finally, it is perhaps significant that the Bengal famine stood exactly at the borderline of two historical price regimes. Prices been more or less stationary for decades (the 1941 rice price was comparable to that in 1914), and the price rises 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 ."(1971b p51)

This applied to nearly everywhere in the world

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

6.9 Boat Denial Policy

Boat denial policy

Sen considers the boat denial policy to have been a cause of the famine (1984 p4611; 1980b p619). In May 1942 orders were issued for the removal of boats capable of carrying more than 10 passengers from the coastal areas of Bengal in order to deny them to the Japanese if they invaded. The Famine Commission was very critical of the Bengal Government for their operation of the scheme (FIC pp26, 27), as it reduced fish catches and made transport difficult, hampering relief measures. 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 FIC, Aykroyd, Wavell (in Moon 1973), and Mansergh 1973 p361) It slightly reduced the quantity of food available, and to this extent it was a *cause* of famine. The appalling mortality among fishermen must be put down to the fact that the compensation paid to them, while possibly adequate when given to them, was grossly inadequate once the prices rose.

Sen's inconsistency

In the matter of the Boat Denial Policy, as in so much else, Sen is inconsistent. See for

example Sen (1976 p1279) where he expresses the opposite view.

Logical error by Sen

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 the overfed towns was a good thing, it is difficult to see why he considers it to have been harmful.

6.10 Rice Denial Policy

Rice Denial Policy as a 'causal hypothesis'

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)." (Sen 1984 p 461)

"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." (Sen 1980b p619)

Sen's inconsistency

Curiously enough, elsewhere (e.g. Sen 1977 p45; 1981 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 p1279) he states that it did not contribute to the famine (though stating that it did result in a loss of food).

Sen's sources contradict him

However, if one refers to the original source, one gets a very different story, that a very small quantity of rice was moved from a surplus area to a deficit area, in a year with a record crop, and that this was done in May and June 1942, well before the cyclone. The rice denial policy implied

"the removal from the coastal districts of Midnapore, Bakarganj, and Khulna of the rice and paddy estimated to be in excess of local requirements until the end of the crop year. . . The quantity bought was not large - it did not exceed 40,000 ton.[less than 1/2% of the total]- and even allowing for errors in the estimated surplus, formed a relatively small proportion of the surplus supplies available in the districts concerned.

It is difficult to estimate the effect of these purchases on prices, but in view of the relatively small amount bought it was probably not great. But the purchases synchronized with a sharp upward movement in the price level and a general disturbance in market conditions which was occurring at about the same time in other parts of India. We shall refer to this rise in

prices later. There is no evidence to show that the purchases led anywhere to physical scarcity. But, on the other hand, they brought home to the people, in the most emphatic manner, the danger of invasion: they increased local nervousness and probably encouraged cultivators to hold on to their grain as an insurance against invasion and isolation (Famine Commission 1945a pp 25, 26)

'Denial' rice issued to public - as Sen recommends

"At this point [July 1942] the stocks of 'denial' rice proved most useful. A portion of these stocks was moved into Calcutta and distributed, partly through controlled shops to the general public, partly through issues to employers of industrial labour who had organized their own purchasing schemes, and partly through the Calcutta Corporation. To some extent this eased the situation." (Famine Commission 1945a p29)

Sen contradicted by his sources

Clearly, there are major factual discrepancies here between Sen and the source he cites. Furthermore, it will be noted that the policy carried out was exactly that which Sen recommends - public authorities buying surplus rice and distributing it to deficit areas.

The policy may have increased supplies

The denial rice was taken from the area which was later hit by the cyclone, which caused extensive damage to food stores. If it had not been removed, some at least would have been destroyed. To this, very small, extent the denial policy actually increased food supplies in Bengal.

6.11 Evaluation of Sen's Causal Hypotheses

Sen presents no economic model or explanation

Nowhere does Sen present a cohesive model designed to explain all the phenomena. There is no economic model in the normal sense. He does not have any model of the market or marketing system or the institutions involved. He presents instead isolated points, each intended to explain only a limited range of phenomena.

He presents no analysis

These points are not developed in any way. There is no attempt to show how inflation could have caused a rise in prices to famine level or how speculation could have caused starvation and high prices through the year. The moment any attempt is made to develop them, they run foul of demand theory - for example supply remains constant, demand plummets and prices rocket.

The facts refute the hypotheses

In addition, the moment any attempt is made to check these hypotheses against the facts, they are shown to be incorrect. It is necessary to show that the defence workers ate six times as much as usual or that the citizens of Calcutta ate twice as much as usual - and paid up to twenty times as much as the usual price for their food. The statistics in Sen's sources show a substantial fall in consumption instead. Time after time, it is seen that the facts in Sen's sources do not support the implications of his hypotheses. Time after time there is no mention

of those facts in the source documents which do not support his hypotheses. Time after time the facts in the source documents conflict with those that Sen gives. Time after time there is a conflict between the facts as cited by Sen, and the facts as given in the document he gives as a source for those facts.

Two statements basic to Sen's thesis

For this reason, in the next section I shall examine the factual accuracy of the two statements which are basic to his whole argument

1. that the Bengal Government adopted a Food Availability Decline approach in handling the famine.
2. that there was **at least** 9% more food per head in Bengal in 1943 than in 1941

7. WHAT THE BENGAL GOVERNMENT BELIEVED AND DID

Sen blames the famine on the theories of the Bengal Government

The main thrust of Sen's argument is that the overriding cause of the famine was the approach of the Bengal Government. He claims that they adopted the FAD approach, acting on the belief that the famine was caused by a sudden sharp decline in food availability. As a result, they failed to anticipate the famine; they failed to recognize it when it came; and there were disastrous policy failures in dealing with it.

“ The failure of the government to anticipate the famine and even to recognize it when it revealed itself, seems to have been the result largely of erroneous theories of famine causation, rather than mistakes about facts dealing with food availability”(Sen 1977 p55)

This is untrue in all respects

This is untrue in all respects, as is shown in Appendix II which gives a detailed description of the Bengal Governments actions.

The Bengal Government made the same assessment of food supplies as Sen

The sources are agreed that the Bengal Government made much the same assessment as Sen of food availability (until, in July or August, when the famine was reaching its peak, they started to realize that there was a major shortage). They believed that there was only a first-degree shortage. 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 (1977 pp 53,54; 1981 pp 80-82).

They also had the same theory of famine

They also had the same theory of famine causation, and of the appropriate way of dealing with the famine. They believed that lack of purchasing power rather than lack of food caused starvation. They believed that price control was necessary under wartime inflation to prevent certain groups getting more than their fair share. They believed in public relief schemes. They believed that a large supply of food had to be distributed through the public distribution system. They believed that some degree of rationing was desirable. They believed that speculation and hoarding were major causes of the famine. They attempted therefore to provide the population, and particularly the population of Calcutta, with the purchasing power necessary to obtain the food. They instituted public relief measures. They intervened on the market. Had they been right in their assessment of food supplies, and on the cause of the famine they might have been successful. However, they held the same views as Sen, and they acted accordingly. Millions of people died.

If the Government had had the theory Sen claims, they would have imported

If they had held the FAD view, as Sen states, their logic would have been as follows: “There is widespread hunger and even starvation. Under the FAD approach, the only possible reason is a shortage of food. Ergo, we must import one and a half million tons immediately.” Whether their analysis was right or wrong, their response would have saved millions of lives.

7.1 Monitoring the Shortage**Sen says Government should ignore supply**

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.”(Sen 1977 p53).

This is a recipe for disaster

I must disagree in the strongest possible terms. The effects of treating a serious food shortage as merely a change in distribution are horrendous. It would be criminal negligence to treat any famine as merely a first-degree shortage without constantly reconsidering the possibility that either initial estimates were wrong or the degree of shortage had changed. The negligence would put millions of lives at risk. This at least the Bengal Government was not guilty of.

8 WAS THERE A SHORTAGE?**Sen says there was no shortage**

Sen is emphatic that the shortage in food supply was not a cause of the famine. He says that there was at least 11 % more food available than in 1941 when there was no famine, and he ends by saying “It seems safe to conclude that the disastrous Bengal famine was not the reflection of a remarkable overall shortage of food grains in Bengal.” (1977 p42) The view of the Famine Commission, on the other hand, was that the food shortage was the major precipitating cause of the, famine, and other people, such as Professor Husain, himself a member of the Commission, thought that the Commission had underestimated the shortage.

Summary of section

In this section it will be shown that the data available were so bad that the Bengal Government were criminally negligent to base their decisions on it. Evidence will be presented which suggests that official estimates understated the degree of the shortage. Sen’s refusal to believe in reduced carry-over stocks will be examined. It will be concluded that the figures available cannot be used as meaningful evidence in favour of Sen’s hypothesis. It will be shown that Sen can be read as overstating the reliability of his data, and so, in effect, overstating the probable amount of grain available in 1943. It will be shown that Sen misrepresents the facts in his sources.

8.1 The Size of the Harvest

Decisions should allow for quality of data

In view of the catastrophic effects of underestimating the degree of shortage, decisions should not be based on the assumption that best guesses at production, stocks, consumption, etc. are correct. They should take into account the effects if these figures happen to be optimistic. It would be appalling irresponsibility rely on best guesses when deciding how much to import or what rations to issue. Accordingly I shall be examining here the reliability of the data on which the Bengal Government acted, and the data on which Sen bases his calculations.

The key information was the crop forecast

The key information for dealing with the famine was the estimate of the December 1942 crop. This was based on the **crop forecast**, not on a post-harvest estimate. It was based on subjective estimate of how a) yield, and b) area deviated from the norm. As the estimates were based on area planted it is not clear to what extent the forecast would have allowed for damage from disease, flooding and cyclone. There would have been a much bigger discrepancy than usual between planted acreage and harvested acreage, and both reporting error and failure to modify the estimates right up to harvest are probable.

Sen's source emphasizes the inaccuracy

Sen got his figures from the Famine Commission, which is at pains to state how unreliable they are:

Forecast methodology explained

“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 sq. miles (FIC 1945a p7)]) 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 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.” (FIC 1945b pp 44, 45)

There had been no attempt to measure accuracy or bias

No attempt ever appears to have been made to check these results against anything else, or to amend them in the light of experience, so nobody knew if they even indicated the direction of change. It would in any case have been difficult, as only a proportion of the crop was marketed, and as the marketing system was not monitored. The cyclones, tidal waves and disease outbreaks which caused so much damage in 1942 had never occurred before, previous

famines being due to drought in other areas of Bengal. As a result there was no experience on which to base estimates of their effect. It is just conceivable that the system might have given a rough indication of the percentage change in total production - but only if all areas of Bengal were equally affected by low rainfall etc. In 1942, however, areas were differentially affected, so there would have been major aggregation errors, if, for example the worst affected areas were high-yielding areas, densely populated areas or areas where the acreage was accurately known.

Even the normal procedure was not carried out

The collectors of statistics did not know the normal acreage or yield, 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. At the time parts of Bengal, notably those hit by the cyclone, were simmering on the verge of an insurrection, and the army was active, burning villages etc. Under these circumstances, it is doubtful whether the collection procedure was reliable.

Government had refused a sample survey

There was a sample survey of the commercially valuable Bengal jute crop, but not of the rice crop. *“Although by that time, owing to Japan's entry into the war, the food situation in Bengal had already become difficult, I failed completely to persuade the Government to extend the sample survey to cover the paddy crop in Bengal. The Bengal famine occurred in 1943. Since that year we have had the opportunity of carrying out a sample survey of both jute and rice crops throughout the province.”*(Mahalanobis, 1946 p333)

Lack of knowledge

The Governor of Bengal, in a document cited by Sen (no. 158 in Mansergh, 1973), talks of “the dubiety of all available statistics and therefore lack of accurate knowledge of what the real shortage is”.

Some ex-post adjustments were made

The Famine Commission changed the official Bengal Government acreage figures by 20% and adjusted the yield figures, because Mahalanobis's sample survey, conducted after the famine, produced very different figures to the official figures, figures which may well have been more accurate. Of course this did nothing to correct the aggregation bias.

Enormous discrepancies between sample surveys and other estimates

Desai (1953 p8) gives a useful review of the agricultural and other statistics of this period, and his rigorous use of them is an exemplary. He compares the official estimates and those obtained by scientific sample 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 52.6% above it in 1946. Since there was no sample survey of rice carried out in Bengal until after the famine, we have no real idea of the accuracy of the 1942 Department of Agriculture estimates, except the belief that the error was greater than 20%. There is no way of correcting it with hindsight. Desai's assessment may be compared with Sen's statement that “the Raj was, in fact, more or less

right in its estimate of overall food availability.” (Sen 1977 p53; 1981b p80)

Upward bias of subjective methods

As well as this error in area and aggregation procedure, an upward bias in subjective eye estimates of prospective yield of a growing crop may be expected. Mahalanobis (1946) talks of an upward bias even with controlled sampling methods on a mature crop, because enumerators tend to select the best fields and the best areas of damaged fields. Again, the bias would have been very different in a year of cyclone, tidal wave and disease damage like 1942.

Quality of data

We must also be concerned with the quality of the data entering the system. This was bad even in the better organized studies:-

Apathy of administrators

“ . . . 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.

Recording errors

“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.”(Mahalanobis, 1946)

Pressure to suppress or alter evidence

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

“ . . . the political pressure resulting in an inaccurate census, the hint of the virtual suppression of an unpalatable report”(Elphinstone commenting on Mahalanobis 1946 p 374)

“The average administrator in India expects the scientific or statistical technician to supply evidence or proof in favour of what the administrator thinks to be right, rather than to give independent advice on objective grounds. Intellectual dishonesty, to which Major Elphinstone has referred, would in such circumstances be an actual advantage in securing promotion in official posts. This is why I have never favoured the idea of the Statistical Institute being run as a Government department or under predominating Government control.” (Mahalanobis 1946)

Partial suppression of report

It was also strongly rumoured at the time that the Indian Government had deliberately printed only a few copies of the Famine Commission report, to limit the circulation of its criticisms (Aykroyd, 1974). They certainly suppressed the accompanying documents of evidence, after they had been typeset.

Supply estimates valueless

It must be concluded that the statistical basis of estimates of production is so bad that the Bengal Government was not in a position to say with any confidence whether the December 1942 crop was 11 % above the December 1940 crop or 20 % below it. By treating these best guesses as though they were perfectly accurate, they made famine inevitable.

8.1.1 Non-statistical evidence

Non-statistical evidence of a shortage

Even if we had reason to trust the statistics, we should not ignore the non-statistical evidence. A lot of 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 twenty years (FIC p33). 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.

Warnings to government

Bhatia (1967 p35), quoting from the unpublished evidence to the Famine Commission, states that public men and organizations had warned the government. Rajan (1944 p15) quotes a European member of the provincial assembly as saying

“as far back as September 1942, the European Group in the central Assembly had warned the Government of the trouble that lay ahead and had demanded that strong action be taken.”

Traders warned government

Sen himself quotes pressure from “a businessman much involved in rice trading” to increase imports by one million tons, as late as October 1943 (Sen 1977 p54, quoting from Document 174 in Mansergh, 1973 p390). This would of course have been against the businessman’s interests if he had large speculative stocks.

Failure of intervention to bring down prices

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 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 (FIC p52). This suggests that 91,000 tons was a very

large proportion of any surplus in Bihar and Orissa, but was a very small amount in relation to the Bengal deficit. Calcutta would consume only 21-24,000 tons of rice and 15,000 tons of wheat a month (FIC p203) The house-to-house search for stocks (see page 14) showed only that the stocks were much lower than expected.

8.1.2 Why the information was ignored

Why the evidence was ignored

Why, one may ask, did the Bengal Government ignore the evidence that there was a serious shortage? At this stage one can but guess.

Officials prefer statistics to other evidence

First, there is a type of official mind that will believe statistics in preference to any other evidence. They believed that the crop was adequate because the production statistics said so. They ignored the warnings of the trade and the failures of their intervention policy because there were no statistics on them. (This has happened elsewhere. For example van der Laan (1975), mentions the Sierra Leone Government in 1919 ignoring the traders' warnings of a shortage for six months until food riots broke out, apparently believing that price control was a substitute for imports.) They refused to consider carry-over because there were no statistics on it. When the famine persisted they did not question their statistics, but tried to find other explanations compatible with their statistics, producing the old bogeymen of speculators and hoarders.

Officials had prevented famine before

Second, the officials were very pleased with their success in preventing famines in 1928, 1936, 1941 and 1942, (though, as will be shown in the section on carry-over, the achievement was not as big as they thought - carry-over stocks were consumed to make up for the fall in production, so consumption did not fall dramatically). They were, perhaps, psychologically predisposed to see this as another task they could handle easily.

Speculators as scapegoats

Third, they were very keen to blame the famine on a conspiracy by hoarders and speculators, rather than on their own inadequacies, or on forces they did not understand, as politicians and officials always are - I have seen the same reaction in Europe, Africa and Asia.

Overworked officials

Fourth, the officials were certainly understaffed and overworked before the famine, because of the war. The famine stretched the administrative system past breaking point (Aykroyd, 1974).

Corruption

Finally, in 1985 we can perhaps discuss two points that the Famine Commission considered to be too hot to handle in 1945. First, corruption was rife. Everyone writing at the time commented that nearly every public servant who handled any famine relief managed to make a personal profit out of it, and the trading firms who were appointed government agents defrauded the government and cheated the people. The Indians writing at the time did not

hesitate to accuse the politicians, both Hindu and Muslim, of being involved. It would follow that most of the people who handled information and made decisions had a strong financial interest in the continuation of the famine.

Political prejudice

Secondly, Rajan (1944 p44) gives quotations which suggest that both right-wing British officials in the Government of India, and right-wing politicians in Britain were predisposed to accept any evidence that suggested that an elected Indian government, be it only a provincial government, with Indian administrators, was so corrupt and incompetent, and that the Indian businessmen were so greedy, that they could create a famine in the midst of plenty. As a result, they observed the constitutional niceties, and did not check the facts on the ground or overrule the Bengal Government. (Even when Wavell did intervene, he first had to persuade the local politicians to let him give them the extra resources). It is forty years too late to confirm these hypotheses, but experience elsewhere shows that they are only too likely to be true.

8.2 Carry-Over

Sen rejects all arguments on carry over - without evidence

Sen rests his argument that there was sufficient food to go round in 1943 on his belief that there was at least 9 % more food per head available than there had been in 1941. To reach this conclusion he rejects all the arguments of the Famine Commission on carry-over, though they were put at considerable length. Indeed, he makes the very serious allegation that

Sen says there were no variations in carry over

“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’”(1977 p75).

He provides no evidence to support his contention.

Famine Commission said carry over is normal

The Famine Commission argued that, both because of the need for normal stocks and because the rice is not palatable for some months after harvest, it was not normal to start eating the December crop until February or March. Some varieties of rice were kept for a year or two before consumption. (See Professor Husain’s minority report (FIC pp 179-199) and the Report on Rice Marketing (Government of India 1942)). In addition there would have been the normal commercial stocks. They argue that normally there was a three month carry-over of grain at the end of the year.

It is irrational to ignore variations in carryover

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 (1977 pp42, 55). Still less can I accept his assertion that variations in carry-over were mythical. I would find it difficult to believe that there is any country that does not aim at least a two-month carry-over of grain. I find it very

difficult indeed to believe that exactly the same amount is carried over after a famine year as after a series of bumper harvests.

All Sen's explanations are equally unquantified and unobserved

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 carry-over explanation, Sen gives only a sentence or two in support of his explanations.

Reduced carryover into 1942

The very poor crop of December 1940 meant that the people ran out of rice earlier than usual and started eating the crop of December 1941 as soon as it was harvested. It is difficult not to accept that there was a reduced carry-over from such a short crop. This means that the consumption of rice in 1941 was well above the "adjusted current supply of rice" quoted by Sen, while the consumption in the next year was well below it. (The "adjusted current supply" is the addition to stocks, not the supply available to the consumer.) This means that while "adjusted current supply" might have been 13 % higher in 1943 than in 1942, it does not follow that supply to the consumer or consumption were.

Sen says there was normal carryover into 1943

Sen says that even if this were so, which he denies, the December 1941 crop was so big that the trade would have restored their stocks to the normal carry-over levels by the beginning of 1943.

Sen's own figures destroy his case

I shall not recapitulate the arguments put forward by the Famine Commission and Professor Husain 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 3 is based on exactly the same figures that Sen uses (FIC p215), except that I have arbitrarily chosen a carry-over of two million tons at the beginning of 1941. The table shows that this large surplus changes into a deficit of nearly a third of a million tons by November 1943 - enough to explain the famine. All that has been necessary is to assume a level of consumption per head equal to the mean for the years 1928 to 1942. This figure is well below the mean for the first half of the century. A low population growth rate of 0.46% has been assumed: a higher deficit would have been noted with 1 %, the figure Sen used.

The deficit was worse

The deficit shown in Table 3 would have been much greater if allowance had been made for the unrecorded exports of rice by road and country-boat, during 1942, when rice prices were much higher elsewhere in India.

Goswami confirms that Sen is contradicted by figures in his sources

O. Goswami of the Indian Statistical Institute, writing in 1990, after my criticisms had been published, confirms my estimates, without apparently having read my papers. His paper takes the data in Sen's paper and other sources and, after a lot of meticulous calculations, comes to the same conclusion as I did on the size of the Bengal crop in 1943 compared to 1941.

“To conclude, even after accounting for wheat imports into Bengal, food availability in 1943 was less than in 1941, contradicting Sen’s finding that FAD could not have been very important, since food availability was greater in 1943 than in 1941 ‘and there was of course no famine in 1941’” (p457)

Goswami’s work is, itself, sufficient to refute Sen

This, by itself, is enough to invalidate Sen’s causal model. Some of the data used is different to mine, and to this extent it provides an independent test rather than just a confirmation. Sen did see a draft of the paper, presumably in 1988.

9 SEN'S USE OF THE STATISTICS

Sen treats guesses as being perfectly reliable - when it suits him

The Famine Commission recognized many of the weaknesses of the statistics, and strongly criticized the Bengal Government for basing their estimate of import requirements on them. The Famine Commission itself, writing after the event, could place rather more emphasis on the best guesses, and give somewhat less to what would happen if these were wrong. One would expect that Sen would be equally circumspect in using such unreliable statistics when he is advising people on tackling future famines. However, he bases his arguments on these guesses, which he uses as if they were **perfectly** accurate, drawing major conclusions from a few percentage points difference. In particular, he bases most of his argument not on an unreliable production forecast, but on the difference between two unreliable forecasts. This is quite unacceptable: the data do not support the conclusions.

Sen repeatedly misstates the accuracy of his statistics

Sen also claims much greater reliability for his statistics than is justified, to be giving conservative figures rather than best guesses - and with such inaccurate statistics this amounts to a mis-statement of 30% or more. He bases his calculations, he says, on "a careful tally of 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" (Sen 1984 p461). Elsewhere (1977 p40), 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 . . ." 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 (see for example Sen 1977 pp53-4). Since these secondary sources are all based on the same primary source, 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.

Sen misquotes his source

Sen (1977) quotes Document no 265 p357 in Mansergh (1971) as stating that "*the rice crop in Bengal was recognized to be indifferent rather than exceptionally bad.*" In fact, the document stated, as early as 9th December 1942, 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. This is a particularly clear example of Sen's misrepresentation of the facts in his sources.

Sen misstates the reliability of his figures

In fact, the figures he gives are not in any sense conservative. The output figures are, as shown above, wildly 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 figures he uses the Famine Commission guesses, and not a conservative figure. (Note that

Table 3. Stocks of rice in Bengal, 1939-1943

(Thousand tons)

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

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 adjustment to allow for unrecorded wheat imports, an alteration of a fraction of one per cent 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.

10 THE FOOD AVAILABILITY DECLINE APPROACH

Sen's inconsistency

Sen denounces the Food Availability Decline (FAD) approach in no uncertain terms. At times he is denouncing an unbelievably narrow approach which I am quite certain no economist ever held. At other times he is denouncing a more balanced view, like that of the Famine Commission. At others, he is denouncing the view of the Bengal Government, which was virtually the same as his own. However, I do not think it would be unfair to say that through most of his writings he considers the approach of the Famine Commission to be typical of the approach he condemns.

Quality of the Famine Commission Report

In my opinion the Famine Commission wrote an excellent report. They sought the truth rather than evidence in favour of their hypotheses. They entered into their study with no preconceived ideas as to whether it was a FAD or a distribution famine and they reached a conclusion that was not in accordance with the official view. The report was written forty years ago by non-economists, so it is to be expected that we should think that their economic analysis was naive or even wrong in parts. In view of this it is surprising that they should have made few major errors and that they should have been broadly correct in their conclusions. Certainly their analysis had more depth than Sen's. In spite of the deficiencies of their market analysis, I would not be ashamed to have written such a report.

Implications of Sen's attack on the Famine Commission

It is very disturbing, therefore, that Sen should have attacked the report in terms that would persuade inexperienced economists that it is foolish or even immoral to examine the problem in the way the Famine Commission did. It is even more disturbing that they should be led to think that it is foolish or immoral to diagnose a famine as being due to a decline in food availability. This can only lead to failure to take the appropriate action, as a result of which millions will die.

Intemperate attacks

The following quotations from Sen's works confirm that he has condemned the FAD approach in terms which could not be described as dispassionate.

“The view that famines are caused by food availability decline - the FAD view - was questioned on the grounds of cogency in the first chapter of this monograph” [It was not.] (1981 p154).

“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.” (1981 p154)

“A food-centred view tells us rather little about starvation.” (1981 p154)

“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 . . .” (1981 p 156)

“The FAD approach applied to the food availability for the population of an entire country is a gross approach, lacking in relevant discrimination.” (1981 p157) [cf. Sen’s analysis of the problems of Bengal, a province of 60 million people, as a single unit, and his rejection of Alamgir’s (1980) district by district approach (1981 p63).]

“The empirical studies brought out several distinct ways in which famines can develop - defying the stereotyped uniformity of food availability decline (FAD).” (1981 p162)

“The FAD approach has led to disastrous policy failures in the past. [Sen’s footnote:] The failure to *anticipate* the Bengal famine, which killed about three million people . . . and indeed the inability even to recognize it when it came, can be traced largely to the government’s overriding concern with aggregate food availability statistics.” (1984 p477)

“Like a Phoenix, the FAD theory arose rejuvenated from the ashes, and it can be found today chirping in the current literature on the food crisis of the world, even making occasional references to the Bengal Famine, ‘when floods destroyed the rice crop, costing some two million to 4 million lives’” (1981 p83)

“If the FAD approach to famines were to seek refuge in some comforting bosom, it probably couldn’t do better in the modern world than choose the Sahelian famine: the food availability did go down, and - yes - there was a famine!” (1981 p118)

“As we move away from the gross factual statements to a bit more detailed information, the FAD analysis starts limping straightway.” (1981 p119)

“Second, the rationale of the FAD approach, concentrating as it does on aggregate supply, rests in ignoring distributional changes” (1981 pl 19)

“Thus, despite superficial plausibility, the FAD approach . . .” (1981 p120)

“The limitations of the food availability approach - its cluelessness - come out sharply” (1984 p 452, 1981 p434)

Sen misstates coverage of Famine Commission

It will also be noted that the above quotations say that the FAD approach ignores phenomena and explanations which are in fact covered in depth by the Famine Commission report and others which Sen describes as FAD. Sen states, for instance, that the FAD approach avoids dealing with the change in relative purchasing power and the impoverishment of people of some classes and occupations, and ignores the fact that, for example, “a sharp decline in the relative price of a commodity *vis a vis* food can jeopardize the ability to survive of the people who live by selling that commodity”. In fact, a look at his sources will show that the FAD approach recognizes these phenomena and pays a great deal of attention to them, and, indeed, he gets all his examples from sources that adopt the FAD approach.

Sen's examples were in the Famine Commission report

The Famine Commission, for instance, while taking an essentially FAD approach to the famine, gave a lot of attention to the hardship caused by redistribution. They present all the examples given by Sen and they analyse the distribution shifts in far more detail than he does. In most cases the shifts can only be explained by a large change in supply or demand, and elsewhere this is a possible explanation. In no case can the phenomenon be explained only by Sen's hypothesis, and Sen makes no attempt to show that it can.

FAD approaches emphasised free food, and distribution

The Bengal Famine Code is the only book I know of which states unequivocally that all famines are caused by shortages (and, even so, this appears to be not so much a matter of belief as a reaction against those officials who took no effective action in the famine of 1886, believing it to be a Sen-type famine). Its uncompromising FAD approach involved making food available, issuing ration books and giving people food or the means to buy food. It laid down special measures to protect artisans, weavers and manufacturers, recognizing that the swing in purchasing power could destroy their markets. It laid down measures to prevent farmers from impoverishing themselves. It even laid down special treatment for “respectable” men who became destitute. Changes in distribution were seen as among the biggest problems arising out of a Food Availability Decline famine. (See Appendix I for details of the Bengal Famine Code.)

Sen misstates the facts

It must be concluded therefore that Sen is incorrect in his claim that the FAD approach avoids these matters

“Similarly, a sharp decline in the relative price of a commodity vis a vis food can jeopardize the ability to survive of the people who live by selling that commodity. This is especially so when the people involved are close to the subsistence level already and when they possess very few saleable assets. It seems reasonable to argue that in an exchange economy these considerations must be relevant to the development of famines, since it is through the exchange system that food for survival is acquired by most people. The FAD approach avoids this central feature of an exchange economy.”(Sen 1977 p35)

It most certainly does not, as Sen's sources make very clear indeed.

11 CONCLUSION

The only certain way to cure a famine

The only way to be sure of curing a famine, however caused, is to import more food. Any analysis of a famine that underestimates the degree of a shortage is very dangerous. It means that market intervention and relief measures will be used when imports are urgently needed. It means that no rationing or mild rationing will be imposed when severe rationing is urgently needed. The result will be a worsening of the degree of shortage, making famine inevitable.

Sen, and the Bengal Government reached the wrong conclusions

It has been shown here that Sen's analysis of the Bengal famine led to the wrong conclusions. It led, in fact to the conclusions reached by the Bengal Government. The Bengal Government acted on these conclusions, and three million people died.

Sen's hypotheses have been refuted

Sen's hypotheses collapse as soon as the implications are examined. His main hypothesis is that the famine was caused by inflation and by increased earnings to industrial workers, resulting in their buying more food so that there was less food available for others. This collapses when it is realized that it implies their eating two to six times as much rice as normally, and paying four to twenty times the normal price to do so - when the statistics show a decline in consumption. He uses the old bogeymen of speculators and hoarders, but does not explain how they could have caused a reduction in supply. Again, the evidence did not support his hypotheses. Some of his hypotheses, like the failure of the Imperial, Indian and Bengal Governments to increase exports to Bengal, conflict with his overriding hypothesis that there was no shortage. Elsewhere, he confuses the results of the famine with its causes.

Sen's misstatements and misquotations

Throughout the examination of the hypotheses it was found that the facts given in Sen's sources conflicted with those implied by his hypotheses. Sometimes the facts he cited conflicted with those given in his source. Sometimes, as with the 'denial' rice and with subsidized distribution in Calcutta, there was a clear contradiction between what he said the Famine Commission said, and what it did in fact say.

Sen's misstatements and misuse of statistics

His two overriding hypotheses were, first, that the Bengal Government adopted a FAD approach and, second, that there was at least 11 % more food available in 1943 than in 1941. An examination of his sources shows the clearest possible evidence that the Bengal Government, like Sen, thought that there was adequate food and blamed the famine on inflation, speculation and hoarding. The statistics on food availability are shown to be so bad that it is not possible to say with any confidence that there was any more food produced in 1941 than in 1943, much less that there was more food (including stocks) available for consumption. Certainly the statistics cannot be used as Sen uses them. However, even if one were to assume that Sen's figures were correct, they would suggest a major shortfall in supplies in late 1943 - just when the famine was at its peak. Sen seriously overstates the accuracy of his figures, in effect overstating available supply.

It is concluded that Sen's theoretical explanation of the Bengal Famine is wholly without foundation. What is more, the facts are almost all against him.

Rigorous economic analysis as an alternative approach

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 that it takes 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.

Play safe, because of a scarcity of time and good economists

However, this approach takes time and not a little skill. If the models are not established before the famine starts, it is unlikely that sound models can be built up in time to influence decisions. If snap decisions are to be made, the FAD approach is the safest: "There is hunger. This must be due to a food shortage. Therefore we must import." It may give the wrong diagnosis, but nevertheless it will save lives.

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APPENDIX ONE: FAMINE RELIEF MEASURES

Food is useless if people cannot buy it

It is not enough to issue ration books if there is no food. It is not enough to import food or to stock distribution depots if people cannot afford to buy the food. In all famines prices rise, so the poor cannot buy food and they starve, while other people sell all their possessions to buy food impoverishing themselves. For this reason classical famine relief measures typically include provisions like the following, which were laid down in the Bengal Famine Code and which were applied in Bengal in 1941, 1942 and 1943. (See Bengal Famine Code (1895), Famine Commission (1945a p69). See also K.C. Ghost (1944) for similar relief measures being used in Bombay in 1629-30.)

Classical famine relief measures

1. Gratuitous relief - supply of gruel, uncooked foodgrains and cash as public assistance to those with no money and unable to work.
2. Wages in kind or cash paid for work on famine relief work such as building roads, dams or canals. The work required was according to the physical condition of the recipient, and he was paid by the day, not according to his output. Non-manual jobs were provided for "respectable men" who suffered from the famine and appropriate jobs were given to artisans.
3. Agricultural loans to prevent small farmers from impoverishing themselves and selling up their land, animals or equipment. These were earmarked for
 - maintenance (in kind or cash)
 - purchase of cattle (in cash)
 - agricultural operations (in kind or cash)
4. Loans to artisans, as their businesses suffer when their customers have to spend their income on foods alone. They also find it difficult to buy raw materials.
5. Loans to weavers for raw materials, and subsidized prices for their product.
6. Sale of foodgrains at subsidized prices to the poor, in order to protect those who had allowed for normal prices.

Money given instead of grain

It will be noted that money was given rather than grain in order to reduce the costs of administering distribution to isolated recipients. This might be appropriate in a purely redistributive, Sen-type, famine. However the possible effects on prices even in a first-degree shortage are worrying, and in a second-degree shortage one might expect a dramatic rise in prices with no improvement in distribution.

APPENDIX TWO: ACTION BY THE GOVERNMENT

The Bengal Government had a similar approach to Sen

The following detailed description of the Bengal Government's actions confirms that it adopted an approach very similar to Sen's. They believed that there was only a first-degree shortage. They believed that lack of purchasing power rather than lack of food caused starvation. They believed that price control was necessary under wartime inflation to prevent certain groups from getting more than their fair share. They believed in public relief schemes. They believed that a large supply of food had to be distributed through the public distribution system. They believed that some degree of rationing was desirable. They believed that speculation and hoarding were major causes of the famine. They attempted therefore to provide the population, and particularly the population of Calcutta, with the purchasing power necessary to obtain the food. They instituted public relief measures. They intervened on the market. Had they been right in their assessment of food supplies, and on the cause of the famine, they might have been successful. Instead, millions of people died.

They believed distribution was the cause

The Bengal Government was convinced that famines were caused mainly by changes in distribution, and that they could control such famines by market intervention. They had experience to support this belief.

Relief measures had worked in the past

"In the course of the 15 years preceding 1943, there were three years (1928, 1936 and 1941) in which the supply obtained from the 'aman' crop reaped in the previous year, was seriously short because of the partial failure of that crop from natural causes. During these years, distress prevailed in many parts of the province and relief measures on a considerable scale had to be organized. When, however, purchasing power was provided by these measures, the necessary supplies became available for purchase, and no deaths from starvation occurred." (FIC p13)

Price control, ban on exports, seizing stocks

When the Government saw that the price of rice was rising in 1942, it felt it should act. In June it fixed a maximum price for rice on the Calcutta market, but prices had already exceeded this level by the time it was implemented on 1st July. As a result, merchants diverted supplies to the high priced markets elsewhere in India (FIC p29). The Government reacted by stopping exports, except under permit, from 16th July, and by seizing and distributing stocks. A week later they raised maximum prices by one rupee. It still had little effect. Then the "denial" rice was put on the market, and the district officers were ordered not to enforce price control. Commercial firms and state bodies set up organizations for distributing subsidized rice to employees. At the same time, good rain in September and October improved expectations for the December crop. The combined effect was to stabilize prices, though at a rather high level. (FIC p30). The Government were reinforced in their belief that market intervention could prevent a shortage from getting out of hand.

Anti-inflationary price control

All this time, as throughout the war, the Bengal Government and the Indian Government were concentrating on anti-inflationary price control, both for the normal reasons, and because they feared that price rises and shortages would lead to an outbreak of political violence. The price control was instituted in the firm belief that there were adequate stocks.

Government thought there was no real shortage

On October 16th there was a cyclone. The trade saw the implications and started buying. Prices doubled in the country areas between 18th November and 7th December. In December 1942 the Civil Supplies Department of Bengal saw the shortage as mainly psychological (FIC p33). In December too, at the India Food Conference it was considered uncertain whether Bengal needed supplies - it had experienced poor crops before and yet had imported relatively small quantities.

Relief measures

After the cyclone there was an immediate shortage in the cyclone-hit areas, and Government introduced relief measures on the lines set out in Appendix I. As destitution started in other areas, relief started there too. It started in January 1943 in Chittagong, and soon after in Tipperah, Faridipur and Dacca. It is not suggested that the relief efforts were adequate, but they would have been, had there been only a first-degree shortage.

Main objective was providing purchasing power

The government saw its basic role in relief as providing purchasing power to those who had lost it

“It is in such circumstances that relief measures are undertaken by Government. The essential feature of these measures is, not the direct provision of supplies, but the provision of purchasing power to the affected population, mainly in the form of wages paid to labourers employed on relief works, and to a lesser extent in the form of loans and gratuitous payments. It is assumed that once the purchasing power has been provided the necessary supplies will become available for purchase.”(FIC p12)

This led to a price spiral

It will be noted that if there is any substantial shortage of supply, this policy leads merely to an uncontrollable price spiral, with government and individuals bidding against each other for non-existent grain.

Stocks were requisitioned

When there was a shortage in Calcutta, on 27th December, Government requisitioned stocks and sold them through controlled shops. They considered the shortage to be purely a symptom of panic by distributors.

Government blamed speculation

The Government firmly believed that there was no shortage, but prices continued to rise at the beginning of 1943. It diagnosed a shortage due to speculation and acted accordingly.

“The Bengal Government decided that steps must be taken to reduce the price level. The key

to the situation was the Calcutta market, because prices in that market govern prices throughout the province. They, therefore, visualized the remedy in the first instance, as one of checking speculation and restoring healthy conditions on the Calcutta market. The process was later described as 'breaking the Calcutta market' . . . experience had shown that the use of the 'denial' stocks had helped check the rise in prices."(FIC p36)

It is unnecessary to point out the weaknesses in their logic: had they analysed the situation correctly there would have been no famine.

Government could not buy food on the open market

In order to "break the market", Government aimed to buy 7400 tons of rice. In fact, it only managed to buy 2800 tons - even though "District Officers were informed that, if necessary, requisitioning was to be resorted to until the quota fixed for the district was procured". The scheme was replaced by another one aiming at buying 22,000 tons a month at government prices. In spite of embargoes preventing anyone but the Government agents exporting from the district, only 2,200 tons were purchased between 10th and 17th January, and the scheme was abandoned (FIC p36). A Food Grains Purchasing Officer was then allowed to buy direct from the trade, but he managed to get only 3000 tons between 18th February and 11th March (FIC pp 36-8). The fact that such tiny quantities, out of 9.6 million tons annual consumption, were considered adequate to "break the market" confirms that the Government did not believe that there was any real shortage. All that was necessary was to panic speculators into disposing of their stocks. The fact that it was not possible for the government to buy even the small quantities they wanted suggests that there was a major shortage of supply.

Calcutta had little rice

The supply situation for Calcutta was desperate: the city received only half its normal supply in the first quarter of the year. The Bengal Government considered it impractical to seize surplus stocks by force, as they would have wished, and decontrolled the market instead. They did it with reluctance because they believed that

Government decontrolled the market

". . . decontrol, particularly if it were not possible to acquire stocks sufficient to enable a moderating effect to be produced on prices, might result in prices rising to a level where widespread famine would be inevitable."(FIC pp 38-39)

They were fully in agreement with Sen on this.

Distribution in Calcutta

In order to mitigate the effects on Calcutta, the area most at risk because it was at the end of the distribution chain, the Government increased distribution of subsidized grain through employers' organizations, approved markets etc.

Very little could be bought by Government

District Officers were told to purchase without limit of price any rice and paddy offered to them in the first three days up to a limit of 20,000 maunds. They bought 17,000 tons between 12th and 31st March, but only 18,000 tons up to the end of August (FIC p39). Again, one is

struck by the small quantities considered and the difficulty in purchasing it.

Imports could not break the market

On 10th March it was proposed that 60,000 tons should be obtained from neighbouring states "to break the Calcutta market". Only 28,000 tons were obtained and "the supplies were not sufficient to achieve the primary object of "breaking the Calcutta market" (FIC p43)

Imports had little effect on prices

During June and July there was free trade between Bengal, Bihar and Orissa. 90,000 tons were purchased and moved into Bengal (38,000 tons by Government agents), but "the effect on prices in Bengal was negligible." (FIC p52). Again, this suggests that the quantity obtained was tiny in relation to the true shortage.

Propaganda drive

In April and May there was "a propaganda drive for the purpose of convincing the people that the supply position did not justify the high prices prevailing". It was hoped that this propaganda, coinciding with the arrival of imports, would induce a freer flow of stocks into the market and bring down prices. It was intended that this would induce speculators and hoarders to release their stocks. These objectives were not achieved, possibly because there were no excess stocks to release.

Search for stocks

In June 1943 there was the Food Drive which aimed at locating surplus stocks and "to organize distribution of local surpluses as loans or by sales to those who were in need of food grains" (FIC p55). In fact it was found that there was very little in stock (see page 14).

Re-control

In August the Government re-controlled the market.

'Chief factor morale'

As late as 19th October 1943, when the famine was at its peak, Wavell noted in his journal "On the food situation Linlithgow [The Viceroy] says chief factor morale." (Moon, 1973 p34).

Many more would have died if the intervention had been successful

It should never be forgotten that if the Bengal Government had been successful in its market intervention, the death toll would have been much higher. If they had forced traders to sell off their stocks until market prices fell to the 1942 controlled price, if they had seized and distributed hoarded grain, if they had persuaded farmers and hoarders to sell their stocks, then Bengal would have run out of food completely.

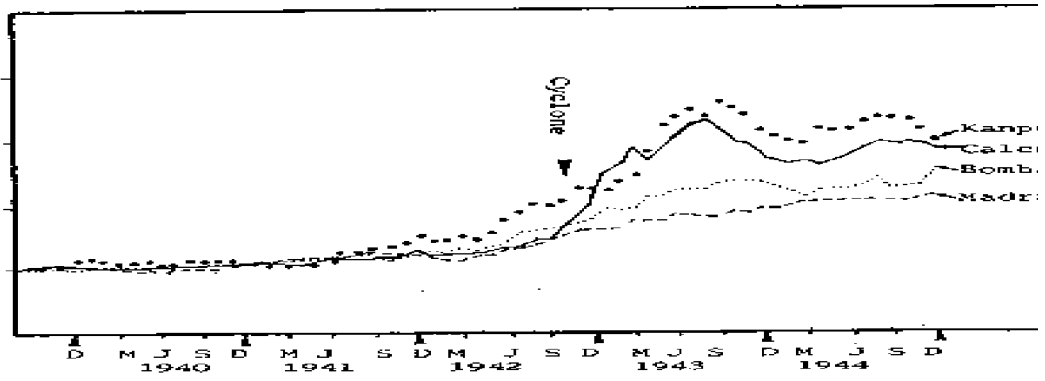


Figure 3 Working Class Cost of Living Indices in Kanpur, Calcutta, Bombay and Madras. August 1939 = 100
Source: Singh (1965)

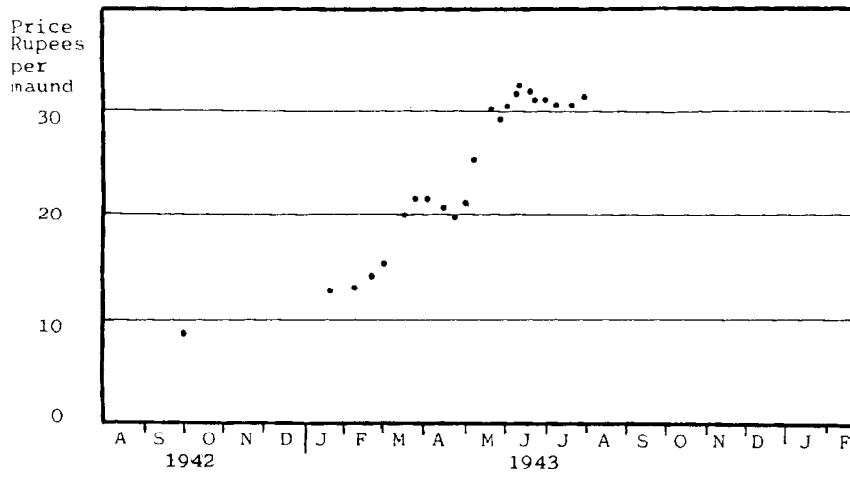


Figure 4 Wholesale Price of rice on the Calcutta market. Source FIC

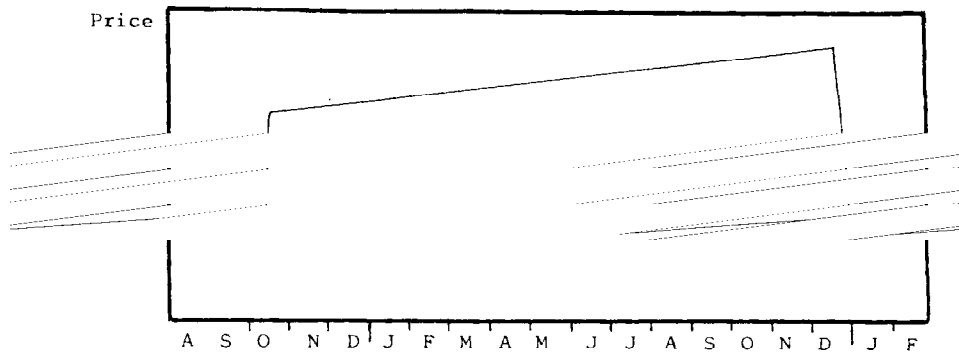


Figure 5: Expected price with normal storage during a shortage.

APPENDIX THREE: THE IMPACT OF SPECULATION ON PRICES

Rice prices during the famine

Figure 4 shows how rice prices moved during the period of the famine. They started to rise as soon as the cyclone hit. They rose during the year with the speed of the rise being related to government action on price controls, imports, grain purchases etc. as detailed in Appendix 2. They did not fall until the new crop was harvested in December 1943. Even then the prices remained firm, well above the 1942 level, and supplies remained tight in spite of the excellent harvest.

How prices would move with a shortage

Figure 5 shows how prices would have moved had there been normal storage, assuming that there was perfect information, and assuming, contrary to Sen, that there was indeed a major crop failure. Speculators would have bought up the available crop the moment the news of the cyclone became known. They would then have released stocks throughout the season, reducing the supply slightly towards the end of the season so that the increased price covered the storage cost. The price would have fallen when the new crop arrived. The 1944 price would have been no higher than the 1943 price because supplies were good. In drawing these curves it seemed reasonable to ignore the fact that a monopolist would have had a somewhat different optimum supply when demand was not of constant elasticity.

Sen says speculation put up prices without reducing supply within the year

Sen states that there was no shortage in supply and this implies prices like those in Figure 6, had there been normal storage. He states, though, that there was not normal storage, but something called speculation which put up prices without reducing supply (He explicitly rejects change in carryover; neither he nor anyone else has suggested that speculators destroyed their stocks or exported them; he ridicules the idea that there was a reduced crop.) This is not the speculation discussed in economic theory.

This is contradicted by prices

If Sen's speculation is to be in any way compatible with economic theory, it implies that speculators released only small quantities at one period of the year, and released large quantities at others. This would, however, have brought about a price curve like that of Figure 7. Prices would have been high when releases were low and would have been rock bottom when the remaining stocks were released at the end of the year. The price curve actually observed was completely different to this. First, it rose throughout the year, rather than falling, as Sen's theory implies. Second, it was above the normal price throughout the year.

This would not have increased profits

In addition it may be noted that this strategy would not have increased total revenue, given that there were constant elasticity demand curves. In fact the speculators made vast fortunes out of their speculation. Some increased revenue could have been obtained had there been a monopolist facing some linear demand curves, but there has been no suggestion that this was

the case.

Nor did prices fall next year

If enormous stocks had been carried forward into 1944, which Sen explicitly denies, prices would have collapsed then, especially as there had been a record crop. In fact, supplies remained tight and prices firm in 1944.

Unrealistic assumption of a constant market demand

These models have assumed a constant market demand. This is not in accordance with normal economic theory. Nor, in my opinion, is it compatible with Sen's emphasis on lack of purchasing power as a cause of the famine, though he makes no mention, explicit or implicit, of such a fall in aggregate demand in the Bengal famine. It seems to me that demand must have fallen as people came to the end of their limited resources, and that it is impossible to talk of starvation being caused by limited purchasing power without taking this into account. It might be expected that aggregate demand would fall as the very poor finished their resources and died. It would fall as the less poor came to the end of their resources, having sold off their clothes, their doors, the roofs over their heads. It would fall as the landed peasants exhausted the money from mortgaging their land. This shift in aggregate demand would have pushed down prices in the second half of 1943. This would have happened even if constant supplies had been released over the year, but under the Sen hypothesis which implies larger supplies then, it would have meant that prices fell to zero and stayed there. Figure 8 shows the price changes implied.

Hypothesis refuted by actual amount spent

Sen's hypothesis of limited purchasing power is also contradicted by the evidence of the enormous amount that was in fact spent on rice in 1943 and the enormous profits made.

Explanations for the observed price shifts

This monograph is a refutation, not an alternative explanation. As has been emphasized previously, it is not the purpose of this monograph to do anything but disprove Sen's explanation of the Bengal famine. It is not necessary, or indeed desirable, that I should present an alternative explanation. However, in this section I present some hypotheses that would explain the price shifts actually observed. None of them are compatible with Sen's hypotheses. I make no attempt to assess the relative importance of the hypotheses; this would be impossible, as they all work in the same direction, and there is no way of knowing which were important and which are merely theoretical possibilities. Many of the hypotheses refer to clearly-documented policies and facts, on Government propaganda and purchasing policies for example. Others, on shifts in demand and expectations, are largely speculative - and one could not imagine shifts in demand curves being closely monitored in any famine.

The hypotheses are independent

The hypotheses are not mutually dependent, except only that they all rely on the assumption that there was a shortage in supply, which Sen denies.

Factors Affecting Supply

Most of the crop was marketed immediately after harvest

The most obvious explanation for the rise in price throughout the season is that most of the crop was put on the market in the earlier part of the year, and that supplies became shorter throughout the year, pushing up prices. This was taken for granted by most observers at the time.

Government Action

Government acted to prevent constant supply over the season.

One reason for this uneven release of rice onto the market was government action of the following kinds

- 1 Government put pressure on the trade to disgorge their stocks, so they released more than they would have wished at the beginning of the season.
- 2 Government propaganda encouraged private people to release their stocks in the national interest.
- 3 Government propaganda falsely said that there was no real shortage. Even if this was only half believed, it would have led speculators and hoarders to release more at the beginning of the season.
- 4 Government purchased and distributed large quantities at the beginning of the season.
- 5 After the excellent December 1944 crop was harvested, and the famine was over, government publicized the fact that there were plentiful supplies, in order to drive down prices. It was reported at the time that this had the opposite effect. The population had learnt in 1943 that government's assurances on this were false, and were alarmed by them, rather than being reassured.
- 6 Government imposed price control, encouraging people to buy, and consume, more grain at the beginning of the year.

These aspects of Government policy would have had favourable effects *if* they had increased imports to make up the shortfall later in the year.

Action by Speculators

Speculators would sell early as they expected imports

Speculators could be expected to plan for a slight fall in supplies over the year, so that prices would rise enough to cover their storage costs (including interest and risk). However, they assumed, not unreasonably, that Government would be importing large quantities of food as soon as possible. It would pay them, therefore, to release the bulk of their stocks early in the year. Since these imports did not materialize, total supplies fell through the year. Had

speculators realized that very little was to be imported, they would have released less at the beginning of the year, and would have made higher profits).

Shifting expectations

Shifting expectations would cause a shift in supply functions. In normal years, supply is largely a one-off decision made after harvest and modified by assessments of changes in import and export possibilities, which, in normal years again, are marginal. In 1943, though, speculators reacted to changes in information throughout the season. The most obvious was the realization that there were not to be major imports. Others, like price control, imports from neighbouring provinces etc., have been detailed in Appendix 2. Not only did these changes have to be taken into account, but they had to be taken into account throughout the season, with an ever-decreasing time before the next harvest. Even the next harvest was not a fixed point in time: a late harvest caused the famine to last longer in some years, so people did not know in November whether they needed one month's supply or two months' to survive until the harvest.

Supply by Farmers

Changes in supply by farmers had a limited effect

Changes in the supply by farmers appears to have had only a limited effect in causing the rise in prices. The supply by farmers (and the reservation demand) was, no doubt, affected by the famine. As has been explained earlier, changes in the retentions by peasants are not likely to have had any effect in causing the famine.

Farmers' retentions were significant the following year

It was said at the time though, that the failure of the September 1943 crop to break the famine was due to the fact that peasants were so frightened by the effect of the famine that they retained enough to keep themselves and their families alive even if the next crop were to fail. I have seen no evidence put forward to support this assertion, and it must be looked at with caution, since, as we have seen, officials everywhere are inclined to blame every shortage on hoarding. In this case, it is indeed possible that the terror of famine would have overcome the attractions of a very high price (especially among those who observed the fate of those who sold off their stocks for a high price in early 1943). It is possible, too, that this terror would have overcome to some extent the institutional constraints, that much of the crop belonged to the moneylenders and landlords rather than the producers, though, again, I have seen no evidence to confirm this.

There cannot have been all the postulated changes in supply function

It was suggested at the time that a switch in the supply function of this sort meant that producers (whether peasants or landlords) kept back much of the December 1943 crop, leaving supplies tight in spite of a large supply. It is difficult to believe the suggestion that a substantial switch in the supply function occurred in all of the following

1. after Japan entered the war (FIC), **and**
2. about the time of the cyclone (Sen), and

3. at the beginning of 1943 (Sen) **and**
4. after the September 1943 crop (Sen?, Wavell, Mansergh), **and**
5. after the December 1943 crop.

If **all** these changes had occurred the farmers would have been net buyers by 1944.

Changes in Demand Functions

Changes in demand

The price changes recorded could have been caused by changes in the demand function even if there had been a constant supply throughout the season - though obviously a combination of supply and demand changes is more likely.

Market Demand

Aggregate demand fell with death and destitution

It has been pointed out above that in the limited-purchasing-power model, which I think must be accepted if one accepts Sen, the aggregate purchasing power would fall off as the poor died and as other people impoverished themselves. This would have caused a fall in the price, rather than the rise actually observed. In the previous section some supply factors which might have outweighed this effect have been mentioned. Below are set out some demand factors which would also have tended to outweigh it.

The subsistence multiplier

The most powerful explanation is the effect of the subsistence sector on the market, an effect commonly seen in subsistence economies. If the subsistence sector normally produces a surplus of 10%, the marketed surplus will fall to zero if there is a 10% fall in yields and will double if there is a 10% rise in yields. Government believed at the time that some six million tons were marketed out of a total crop of 90 million in India. Such figures can be little more than guesses. They also depend enormously on definitions, where, for example one draws the line between trade within the subsistence sector and trade from the subsistence sector, or agricultural sector, to consumers, and whether sales to village consumers and deficit producers are included.

Levels of consumption

However, this effect is modified by changes in levels of consumption. Between surplus and deficit there is a range of subsistence where no food is bought or sold by subsistence producers. At the highest, people eat well, and, in some cultures, use part of the crop for ritual purposes or for alcohol. At the lowest, the family eats a bare survival ration once a day and eats up its accumulated reserves. Below this level, people have to buy in food if they are to survive. The very poor December 1942 crop meant that people switched early to survival

rations, but had to come onto the market for supplies at varying stages through the year. The effect was an enormous increase in market demand towards the end of the year, with possibly two to four times the normal number of people trying to buy food on the market. Even if there had been a constant supply on the market, even if there had been a rising supply on the market, supplies would have been inadequate, and prices would have risen sharply.

Changes in Individuals' Demand

Changes in perceptions of a fair price

It may also be argued that the famine brought about a switch in the demand of individuals. The demand functions before the famine were based on what would be a normal, reasonable, and therefore acceptable price. (The concepts set out in this section are commonplace in marketing.) People would refuse to be cheated. Decisions would be made on the assumption that alternative consumption goods and alternative foods were available. People would be influenced by the fact that they had some food in their larders, and their expectation that they would be able to buy food at a reasonable price if they waited a day or two or went to a different market. Most buyers, no doubt, never questioned that they would always be able to buy all they wanted at a reasonable price if they had the money. The decision would be similar in kind to that made by an Englishman who is asked to pay twice the normal price for a loaf because it is the last one in the shop.

Mass hysteria

Once there was famine, all this changed. People no longer had the same conception of what was a normal price, nor did they have the same objection to being cheated. One notices in a period of acute shortages a sort of mass hysteria, with people buying goods they do not want just because they are available, with people vying with each other to buy black market goods, and then boasting of the price they paid, taking a perverse pleasure in being cheated. This reaction may be confined to the richer section of the community, but it will affect total demand.

Lack of alternative foods

At the same time, there were no longer alternative foods on the market: if anything, wheat was scarcer than rice. People could no longer rely on the fact that they had food at home, nor could they rely on there being plenty of food available at a reasonable price if only they waited a few days or went to other markets.

Changed time horizon

Their whole time horizon changed. They were no longer planning this week's purchases; they were planning a strategy which would enable them to survive until the next harvest (a problem which was normally confined to the subsistence farmers). Food became not a consumer good in the market, but the only means of survival. Their strategy would have to be based on medium-term expectations and production.

Expectations

Some of the expectations are:

- expectation of time before the next harvest (with a three-week delay, as in December 1943, proving fatal to many),
- expectation of availability of food until then, including imports,
- expectation of timing and availability of government handouts and private charity
- expectation of future prices,
- expectations of future earnings (and, as we have seen, the famine reduced some people's earnings sharply and increased other people's profits enormously)
- expectation that this famine would be followed by a short crop, which would mean that they would not survive if they had no reserves at the end of the year.

Risk, uncertainty and cost

All these expectations must be assessed according to the degree of uncertainty and to the cost (usually death) if an error is made. Time preference is important: little weight will be given to the possibility of a famine next year if there is a risk of starvation next month. As the harvest approaches, there will be ever more rapid changes in what one is willing to spend in order to survive another week: at one time only a twentieth of one's worldly goods, but in the last week before the harvest all one's worldly goods.

Who survived?

In the famine, those who survived were the ones whose income, capital and savings bought them enough food to survive until the next harvest (death by disease cannot be planned against). Some people whose family income was below the margin were able to survive by selling, murdering or, most common, abandoning the useless mouths in the family. The apathy caused by hunger meant that robbery to survive was very rare indeed.

Famine-period demand curves

No long-term demand curve can involve people spending more than they earn on food, so the people of Bengal could not have spent as much on food if there had been another famine the following year. Clearly this means that there was a major shift in demand curves over the famine period.

The September 1943 Crop

Why did the September crop not break the famine?

The September 1943 crop produced enough to feed the country for three months, and there were only three months to go before the next crop. It may be asked why the famine did not stop when this crop was harvested, why the starvation lasted until December. At the time it

was thought by officials that it would break the famine as soon as it was harvested (Rutherford in Document no. 158 Mansergh (1973) pp361-3). When it did not do so, officials put it down to the fact that peasants would not release any of the crop. Later commentators either ignored the question, or skimmed over it. In fact it can be comfortably explained by the supply and demand hypotheses put forward above.

Localized production

The September crop was an upland rice crop. It was not produced in all areas of Bengal, and the people who grew it did not necessarily produce a crop in December. In normal years most of it was retained for consumption over the whole of the following year, and only the surplus was retained. That is to say, most of the producers relied on it for most of their food. No doubt some landlords, and even some farmers, calculated that they should retain only three month's supply, and market the rest at famine prices, hoping that they would be able to buy all they needed at a low price when the December 1943 crop was harvested. It would be asking too much to expect all subsistence farmers to make such a radical change in their strategy for survival in a single year. It would mean their taking a risk that they had never taken before. The risk would seem greater because they were surrounded by the famine victims. It would seem particularly grave because they had seen the fate of the farmers who had sold their stocks to cash in on the high prices of March, and had not been able to buy back the food they needed to live on at the higher prices of May and June.

Would there be a famine in 1944?

Possibly, too, there was some realization that if the December 1943 crop was only moderately bad, the famine would continue into 1944. There were already many subsistence farmers who had consumed their accumulated reserves and were selling their possessions to buy food. If the crop was low, these people would be buying food again in 1944 and prices would be high. This might mean that the farmers who harvested in September could not buy back the food they had sold.

It was difficult to market the rice

Even had the farmers wanted to sell their rice, there were difficulties. The marketing structure did not exist to buy all this rice from these areas, nor did the transport system - indeed, the boat denial policy had made the distribution impossible. Local charity obligations and the political and moral difficulties of exporting from a deficit area would have made it difficult to export. Certainly the local community would have been well-fed before any surplus was allowed out.

Demand was increasing just as the crop was harvested

Let us suppose that, in spite of these problems, these areas marketed 20% of their crop instead of 10%. The increased supply would have come on the market as more and more of the subsistence producers were being forced onto the market to survive. The supply may have doubled, but the number of people on the market increased more

Normal marketing period for the crop

One may question whether the marketed December crop was expected to last until September, and whether the September crop was expected to last only until the next December crop was harvested (with the delays described elsewhere). It is more likely that in some areas the December crop was marketed all the year, while in the areas where a September crop was grown this crop was marketed for much or most of the year. If this was so, it further limits the possibility that the September crop could have been expected to break the famine.

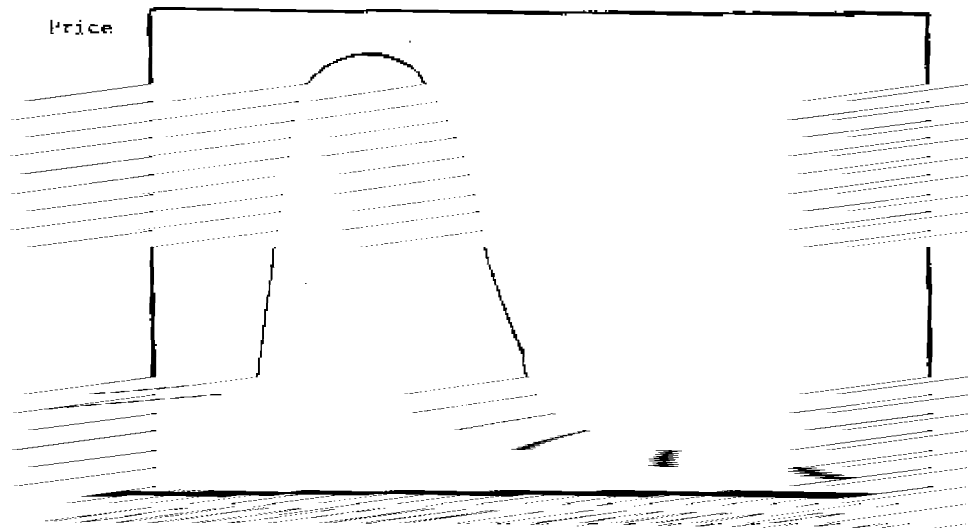


Figure 7: Expected price with Sen-type speculation and no shortage

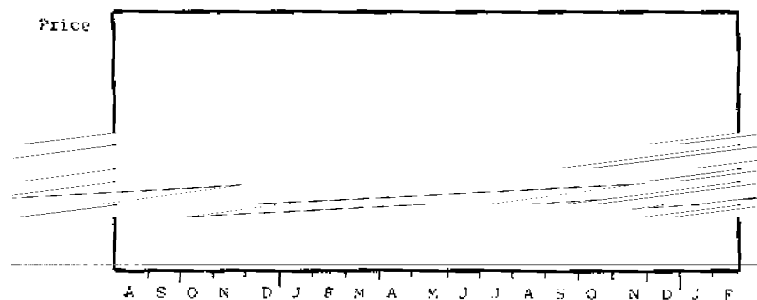


Figure 6: Expected price with normal storage and no shortage.

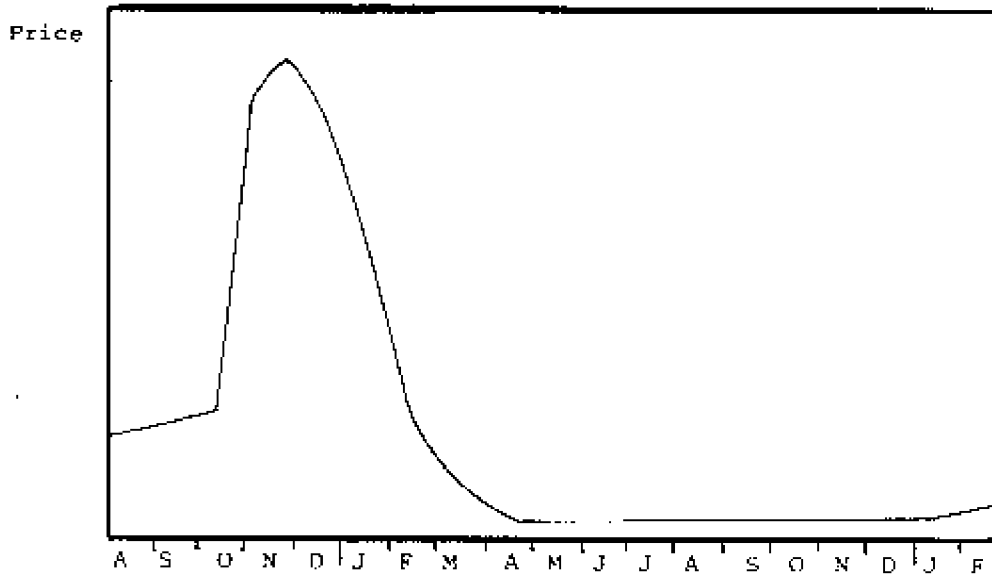


Figure 8: Expected price with Sen-type speculation, no shortage and limited purchasing power.

APPENDIX 4. CAN SPECULATION CAUSE FAMINES?

Summary

Is it possible for speculators to cause famines when there is plenty of food available? It is shown that it is only possible in some economies. Even when the preconditions exist, it is likely that rational speculators would not attempt it, because of the doubtful profitability, because of risk and because of doubt as to whether the preconditions exist. It would be very hard to hide the evidence if it did take place. It would be so much easier to make speculative profits when there is in fact a shortage, that rational speculators would only attempt it then. Dealing with a famine on the assumption that speculation caused it is likely to lead to disaster.

Can speculation cause famine?

When the first signs of famine appear, politicians, officials and some economists are likely to say that there is plenty of grain available, but speculators are keeping it off the market. They may persist with this explanation as things get worse, and spend all their time and energy trying to persuade, or force, speculators to release their stocks. If the famine has occurred because there is not enough grain to go round, this is disastrous. Because the effects are so serious, Government should not make this diagnosis unless all of the following conditions apply. First, it must be technically possible for speculation to cause a famine in this economy. Second, it must be rational for speculators to cause a famine. Third, there must be hard evidence that speculators are in fact causing a famine.

Assumptions on the rice economy

Assumptions approximate to Bengal

The assumptions for this analysis approximate to the facts of Bengal in 1943. Let us take the example of a least-developed economy consuming 100x tonnes of rice a year in a 'minimum no shortage' situation, when everybody has enough food for long-term survival, and the poorest people have only just enough. 90% of the population is in the rural sector. Rice is produced by owner-occupiers and tenants. Most of these do not end up with enough for subsistence and have to do paid work to survive. Wages are mainly paid out of the rice accumulated by landlords. In a 'minimum no shortage' year the agricultural sector produces a surplus, 10% of the total, which goes to feed the urban sector. Rice is the only food crop. By assumption, if the total supply rises by 10% everybody increases consumption slightly, and there is still 10% of the crop going to the urban sector.

Assumptions on the market

Most of the rice going to the urban sector, 60%, is handled by commercial grain traders in a normal year when the production is 110x to 110x tonnes. The remainder may be marketed by farmers, landlords, lorry drivers acting as occasional traders, or by firms like textile manufacturers or jute traders whose management decides to make a small speculation from time to time. A considerable amount is supplied direct from the rural sector to relations in the cities.

Rice not for human consumption

It is also assumed that none of the crop goes for animal feed, manufacturing, brewing etc. These normally provide some buffer against famine. *[There has been no analysis of this for Bengal in 1943]*

A cartel is formed

It is assumed that the leading commercial rice traders form a tight cartel and operate together for the good of the cartel. It is not possible to get farmers, landlords, consumers or non-grain businesses to join this cartel: they would each act in their own best interest, buying or selling whenever they like. It is in each individual's interest to act as a 'free rider' letting the cartel bear the expense of withdrawing grain from the market, while they sell everything they can at the highest price possible. Those of the commercial traders who form the cartel normally handle 6% of the total. For simplicity it is assumed initially that all commercial grain traders join the cartel. *[There is no suggestion in the literature that grain traders formed a cartel in 1943, still less that all grain traders joined it].*

Can famine be created in a surplus year?

Conditions for a famine to be created

The question to be asked is whether speculation can cause a famine in a year where supply is 110x tonnes, 10% above the 'minimum no shortage' supply. For a famine to occur, there must be a fall in the quantity of rice consumed to the famine level, with the remaining rice being removed by the speculators. It is assumed that the famine level is 80% of minimum normal supply, or 80x tonnes. At this level there is a first degree shortage, with sufficient rice to provide a barely adequate diet for everyone, provided there is rationing, or else there is a second degree shortage where there is insufficient food for long term survival even with rationing. Since this country does not have a large, incorruptible, bureaucracy, there is no rationing. As a result the poor are particularly badly hit, and many die of starvation, including many farmers. *[The case taken is not an extreme case. Sen argues that there was at least 11% more available in 1943 than in 1941 when there was more than minimum no shortage supply. He is so emphatic that this is a conservative estimate that we must take it that he believes that there was at least 20% or 30% more than minimum normal supply.]*

30x tonnes must be destroyed, exported or carried over

In order to create the famine, the cartel must withdraw 30x tonnes from the market, to bring the total consumed down to 80x tonnes. They must also buy enough of what is left to have some chance of making a profit from selling it, say another 10x tonnes, making their total purchases 40x tonnes. With the figures assumed so far, this means that they buy virtually all that leaves the farm. This includes grain paid in rent to landowners, which would normally be used to pay for the labour of landless labourers and deficit producers. Indeed, it may require that some farmers sell part of their minimum subsistence stocks.

Preconditions for the famine

Preconditions are

1. Closed economy

The famine can occur if and only if there is a closed economy, otherwise traders from neighbouring countries would soon fill the gap and make all the profits arising from speculators withdrawing rice from the market. The closed economy could arise from transport problems, currency restrictions or physical restraint by neighbouring governments. If there is an open economy, the presumption is that the famine is being caused by something other than speculation. The fact that there may be a delay of a couple of months before rice arrives makes the period in which speculators make a profit so short that the enterprise becomes unprofitable, a point which is discussed below. *[In practice, at the beginning of 1943 Bengal was an open economy in the sense that imports from the rest of India were possible, though imports from elsewhere were difficult, and imports from traditional suppliers were impossible. By the time the famine was under way, it would be reasonable to treat it as a closed economy.]*

2. The cartel can buy all marketed grain

The famine can occur if and only if there is some price at which the cartel can buy all this grain. It is necessary to assume that there is no 'copycat' speculation, where people who observe the grain traders buying, decide to speculate themselves. Commercial traders outside the cartel do not try to speculate, but rather sell to cartel members. There are no non-rice traders buying to secure supplies for their staff or customers. Consumers do not buy for their own security. Landlords are willing to sell all their stocks, knowing that it reduces the food supply in the neighbourhood. Farmers are willing to sell something out of their subsistence stocks. This does suggest that traders are able to persuade sellers that it is a short-term shortage, and that prices will fall later. *[The people who were talking of speculation were also talking of hoarding - private speculation, and Sen has hoarding as a 'causal hypothesis'. There is also a suggestion of widespread speculation once it became clear that there would be a shortage. Whether or not it was possible, at some price, for speculators to buy all this grain, every source, and Sen, agrees that they did not. Both these factors would indicate that it was not possible to create the famine by speculation.]*

3. The cartel must have credit

For the famine to occur, the cartel must be able to raise enough money. Buying this amount of grain can only be done by paying a very high price, probably more than 50% over the normal price. The cartel must buy 40x tonnes instead of its usual 6x tonnes and pay 50% extra. This means 10 times the normal outlay. In a country with a rudimentary banking system, where the grain trade is a significant part of total trade, this will cause problems. Commercial banks are not likely to finance such a speculative, politically dangerous and indeed unethical venture. These problems are particularly serious in a country in which there has been a wartime manufacturing boom. *[No evidence is available now on whether the money was raised, but it would certainly have been difficult.]*

4. The cartel must be able to store, export or destroy all purchases

For the famine to occur, traders must be able to store, export or destroy the surplus. Traders

who normally need storage for a maximum of 6x tonnes (less if they take delivery over a season) now have to store 40x tonnes. The grain must be stored well away from landlords and farmers who may have second thoughts about their sale. There is no surplus of storage space in the rural areas of such economies. Similarly, in least developed countries there is not much warehouse space in urban areas - especially if there is a manufacturing boom. Outdoor storage would leave the grain in the sight of the starving, and would probably lead to looting or confiscation. Keeping it in the back rooms of a lot of small businesses scattered round the city, in lots of 50 bags or so may be feasible, but would be expensive and risky. What is required is a large warehouse, outside the residential areas (in case of riot), and easy to protect. *[It would certainly have been extremely difficult, if not impossible in Bengal in 1943 during a wartime manufacturing boom.]*

5. All purchases must be transported to the city within two months

Transport from the rural areas is a constraint. 40x tonnes must be moved in a month or two, instead of 10x tonnes over the whole of a season. Few least developed countries have this infrastructure. *[Bengal in wartime had exceptional problems. The 'boat denial policy' removed the traditional means of moving the grain. Rail movements were difficult as Congress was sabotaging railways. Petrol rationing would have been a constraint in those areas accessible by road. The military would also have removed some civilian vehicles. For these reasons, it is virtually impossible that the transport could have been provided.]*

The Rational Speculator

Would the cartel be acting rationally?

Next, government should decide whether the rational speculator would in fact buy this quantity of grain in the expectation of making a profit. It should be asked whether the speculators could rationally accept that the preconditions applied, whether the risks to the speculators would be acceptable and whether the enterprise would be profitable.

Belief that the Preconditions Exist

Speculators must believe the economy is closed

For the famine to occur, it is necessary that the speculators believe that there is a closed economy and that it will stay closed throughout the famine period. They will not risk their money if they think that there will be a sudden influx of grain. Even if the imports only reduce the shortage, the fall in price may make the speculation unprofitable. The fact that there is in fact a closed economy does not mean that rational speculators buying after the harvest believed that it would be closed later in the season. If rational speculators would not have believed that the economy was closed government should not act on the presumption that they did. *[In Bengal in 1943 there was indeed a closed economy at the height of the famine. However, speculators could not have forecast that neighbouring states would have a tight food situation and would not supply Bengal. Still less could they forecast that the Punjab, the main grain producing area, would refuse to supply Bengal. Transport difficulties due to sabotage and wartime demands on the system may also have been underestimated. Government's belief that speculation was causing the famine implied that they thought*

speculators were acting irrationally.]

Speculators must believe they can buy all marketed grain

For a famine to occur, it is not only necessary that speculators can buy all this grain. It is necessary that speculators believe that they can, both when they launch their campaign, and as the campaign continues. In addition, they must believe that they can buy the rice at an average price which is not enormously above the normal price, say 50% over the normal price. If the price paid is a scarcity price, there will not be sufficient margin between buying and selling to justify the speculation. Once the cartel believes this, it is likely to stop purchasing, knowing that its members have already lost a great deal of money. *[Whatever their belief initially, it soon became clear that consumers and others were buying extra stocks of grain. If they had been trying to withdraw 30x tonnes from the market, they would have had second thoughts. If, as Sen argues, the true availability was well over 11%, say 20% or 30%, speculators would certainly have stopped buying when they found they could not control all the marketed grain.]*

The cartel must believe credit will be available

Again, for the famine to occur, the cartel must believe that it will get the money, and that the banks will continue to support them until they can start paying back. If the bankers get cold feet, because of the political repercussions, say, the enterprise fails. *[There is no reason to believe that rational speculators in Bengal would have believed this unlikely scenario]*

The cartel must believe stores are available

The cartel must believe that the necessary storage will be made available. It will be secure and affordable. *[There is no reason to believe that rational speculators in Bengal would have believed this unlikely scenario]*

The cartel must believe transport is available

The cartel must believe that it will be able to obtain the transport to move the rice from the production area and, if necessary, export it, all before the prices rise. *[There is no reason to believe that rational speculators in Bengal would have believed this. The boat denial policy, petrol rationing and military control of transport made this extremely unlikely]*

Profitability

Speculators must expect to make a profit, even allowing for destruction etc.

If the cartel was to make a profit from the speculation, it would have to get a total revenue from the disposal of the 40x tonnes greater than the cost of purchasing it, even though only 10x tonnes are sold at famine prices. The cost of storage, bribes, transport from the producing areas and, most of all, risk would have to be taken into account. *[While the figures used here are based on a 10% surplus over minimum no shortage supply, Sen states that there was certainly a higher surplus, and we may interpret his repeated statements that his figures were conservative as saying that he believes that there was 20% or 30% or more surplus. If the breakeven prices are high with 10% surplus, they are absurd with 20% or 30% surplus.]*

It is difficult to make a profit destroying the surplus

The option of destroying the 30x tonnes surplus, or letting it rot, is not attractive. If they are to break even the net selling price (ignoring marketing costs) must be four times the purchase cost. This ignores the bribes, transport and risk. The purchase price, itself, was, perhaps, 50% higher than the normal, so consumers are being asked to pay at least six times the normal price *on average* throughout the famine. It is questionable whether an average level this high could be assured from this degree of shortage, with this level of purchasing power, though some sales could well be at much higher prices. This calculation ignores the bribes, transport and risk, which could bring the break-even price as high as ten times the normal price. *[There has been no suggestion in the literature or by Sen that the surplus was destroyed.]*

Riots and confiscation

If the starving people realized that grain was being destroyed one could expect riots followed by confiscation of stocks.

Breakeven price if the surplus is exported

The 30x tonnes may be exported instead. This may be done soon after harvest, but not after the famine begins to bite. Transport from the villages and shipping within the time limit are a constraint, especially in a country that does not usually export grain. In many countries an overvalued exchange rate makes export unattractive. It would be most surprising if the exporters recovered as much as half the inflated price they paid. If they did, they would have to charge a price 2.4 times the purchase cost and 3.7 times the normal purchase price for the remaining 10x tonnes to break even. Again, transport, risk, bribes, etc have to be taken into account, so a rational speculator would not act unless there was a considerably higher expected price. *[There has been no suggestion in the literature or by Sen that the surplus was exported. It would not have been at all easy in wartime.]*

Releasing stocks at end of season is less attractive

The option of the cartel's making its money at the beginning of the season, and then releasing the remaining stocks at the end of the season is even less attractive. If there was, say, a 6-month period of high prices instead of 9 months, prices would have to be raised accordingly to make the same revenue. The 30x tonnes are three months normal supply for the whole country, which, taken in addition to the remaining subsistence stocks, of perhaps 21x tonnes, would mean 70% more rice per month than in normal years. It is perhaps 18 months' supply for the non-farm population. The population would have very little money available to buy it with and prices would fall to glut prices. This makes the break even price for the 10x tons sold at famine prices absurdly high. *[There has been no suggestion in the literature or by Sen that the surplus was sold off at the end of the season. The fact that the prices remained at extreme famine level until the next crop confirms that it was not.]*

Carry over the surplus

The remaining option is to carry over the surplus 30x tonnes to the next year. If the next crop was again normal at 110x to 120x tonnes, then the total supply would be 140x to 150x tonnes and this alone would suggest a depressed price. However, the farmers and landlords would have plenty for their own use, and would only buy from out of the sector if it was very cheap.

The cartel would be sitting on 30x stocks when the city only wanted 10x. If the cartel tried to dispose of the stocks, the market would collapse completely. *[Sen explicitly denies that there was carryover. There was a very good crop after the famine, but in spite of this prices remained high until the end of the war. This confirms that there was no such carry over.]*

Practical problems of carryover

In practice, this option would be even less attractive. Storage of grain in non-purpose-built buildings means damage from rats, insect infestation, damp, contamination from whatever was stored there before, as well as theft, so losses of 30% could be incurred. The cartel would still be in a difficult financial situation, as they may not break even on the 10x tonnes sold at famine prices, and might expect to make their profit on the remaining 30x tonnes. This requires a lot of expensive credit. There is the risk that aid agencies will send the famine relief supplies too late to help the starving, but in time to oversupply the market in the following season.

Sen did not explain what happened to the surplus

[Sen has not in fact stated what happened to the grain withdrawn by speculators, or to the 11%, 20% or 30% surplus withdrawn from the market. His redistribution argument would account for only 1.8% increase in consumption, and even then only when prices remained normal.]

None of these are safe investments

None of these options offer the cartel a certain way of getting a price that would cover their costs. The risk to them is enormous. It would be irrational for them to attempt to create a famine by speculation.

Risks

Risks are the biggest costs

The biggest costs are risks. The speculators are operating in an environment where there is little hard knowledge, and where there are major political and economic risks.

Total ignorance of possible buying or selling prices

The first risks are on buying and selling prices. For a famine to occur, it is necessary that the cartel are firmly convinced that the prices will rise to levels high enough to cover their cost and give them a very substantial profit. In fact, traders have no solid grounds to believe that prices will rise to the levels hoped. They do not have any experience of past famines. There are many reasons that they will be sceptical of reports or rumours of price levels in past famines or elsewhere. They are well aware that in times of scarcity and high prices their weighted average return over the season is well below the peak price. They know that the press and rumour report the occasional extremely high black market price rather than the going price. Indeed, the traders themselves may have spread the rumours, in order to push up the price of their stocks. Traders talking to each other boast of their occasional good deals, rather than mentioning the average price. They know that retailers, officials and police take a proportion of scarcity rents as bribes. They know that they will be pressed to provide the

army, the police, politicians and officials, and even hospitals, at low prices. Finally, they know better than anybody that when there is even a normal scarcity, many of the population spend everything they have: they cannot pay more just because there is a full-blown famine. In famine situations the poor may use their doors, their corrugated iron roofs, their draught animals and even their children, to buy rice. This is not of much value to the cartel, who need money in the short term. It may mean that a considerable part of the profit goes to rural landlords who have money, and who will recover it by renting these goods in future years. It is necessary both that the speculators believe that they will make prices high enough for profitability, and that they are confident that they will. *[This applies to speculators in Bengal.]*

Ignorance of average purchase price

Similarly, they must have a belief that they can buy the grain at an average price which will leave them a substantial margin. The prices they pay at the margin, when they are trying to mop up all grain stored by others, will almost certainly be above the price that they can make a profit at, and may be very near the famine price. If it proves too expensive, some traders may drop out of the cartel, stopping the enterprise. *[Certainly Bengal speculators did not pay the price necessary to control all these stocks: some remained in the hands of landlords, consumers and other speculators.]*

The cartel may collapse

Throughout the enterprise there is a risk that the cartel will collapse. A group of traders who previously were in competition must be brought together and kept working together under tight control. They may be of different religious, racial or national groups. One very satisfactory end for each individual member of the cartel would be to bankrupt some or all other members of the cartel. *[There were Hindu-owned and Muslim-owned firms among the largest grain traders.]*

It pays each cartel member to cheat the others

During the purchasing period each must spend ten times the normal expenditure on purchasing. It would pay each member to buy less and let other cartel members buy more. Throughout the selling period, every cartel member would stand to make large profits if they could sell off most or all of their stocks while other members withheld their stocks from the market. The moment it is seen that one cartel member is breaking, there is little speculative profit to be made, and all the others may scramble to unload their own stocks. If there are four equal members and one unloaded the full 10x onto the market, the shortage would be considerably less severe (90% of minimum normal supplies) and the market price would fall from extreme famine levels - unless the other members increased their stocks, making it much less profitable for themselves.

Similarly, throughout the selling period each cartel member would be tempted to sell rather more than the agreed amount, to increase supplies.

Looting

There is a threat that the stocks will be looted by rioters, or stolen by the local mafia.

Government may seize stocks

Politicians will certainly blame the shortage on speculators: as they do whatever the cause of the famine. There will be at least lip service paid to the possibility of seizing and distributing speculative stocks. The 40x tonnes cannot be hidden, and the neighbours and the police will know where they are. At the least the cartel will have to pay big bribes. This may not be enough: if the famine threatens the regime, government may act, however much money powerful individuals may make in the short run. Confiscation of stocks and nationalization are real threats. *[The Bengal Government made repeated efforts to identify these enormous stores of grain, and carried out house to house searches. The stocks were not found. They could not have been hidden if they existed. Perhaps a lot of people were bought off, though there is no reason to believe this. It would in any case have been very expensive.]*

Cheap rice for the army and civil service

In most countries the cartel would have to permit supplies to the army and perhaps civil servants at a reduced price. There might also be price control, which would at least restrict the proportion of the supplies that could be sold at black market prices by the traders - even if their customers then resold at black market prices. *[Government purchased substantial amounts for the army and for workers in war industries.]*

Movement controls

In many countries there is a restriction on the movement of grain from one district to another, with the result that traders have to bribe the police at the district boundary. This may be nominally part of normal food policy, or part of a security check, or openly part of an extortion racket by the police. The effect of this, or an octroi, is that there is no way of keeping the movement of grain secret. One risk is that the level of bribes rises. Another is that movement controls will be imposed in earnest. It is a normal and legitimate government policy to restrict inter-district transfer of grain in a shortage situation, so that it can procure cheaply in surplus areas. If government notices the high prices and grain movements early enough, it can block movements of grain. This would cut either the rural or urban market from its grain supplies and prevent export. It would also leave large stocks where they were difficult to store and very difficult to protect. *[The existence of the octroi, plus wartime controls and security stops, plus the need to obtain rationed fuel and vehicles, means that it would be impossible to move the grain secretly. During a war, Government would have no hesitation in preventing exports or confiscating the grain. It would have been irrational for speculators to ignore this.]*

Imports could break the market

Imports by government, aid shipments, aid money and commercial shipments could also break the market. In each of these cases powerful politicians and officials would stand to make a lot of money. *[There were some imports, but these were tiny in relation to the true shortage, and had little effect. If the Punjab had released grain, which seemed the likely response at the beginning of the season, then the public sector grain supply would have broken the market and left the speculators bankrupt. It would have been irrational for speculators to ignore this. In fact, the grain traders did something which would have been wildly irrational if they had been trying to create a famine: from the beginning they begged Government to import grain because of the impending famine.]*

Lynchings

There is a possibility that speculators, their families and their communities will be attacked and possibly murdered, especially if they belong to a religious or racial minority. *[Bengal was a hotbed of political and inter-community violence. There were many political assassinations at the time. The police and army had to be brought in to protect traders from time to time.]*

Hiding the evidence

The evidence cannot be hidden

Any such speculation would produce evidence which could scarcely be missed by government and the local population at the time, some of which would be equally obvious to the economist looking at the historical record. The evidence includes:

Crop size

- ▶ evidence of crop size etc.; *[In Bengal there was clear evidence of major crop damage. There were no meaningful crop statistics, and so no reason to believe that crops were higher elsewhere in the state.]*

Stock levels

- ▶ stock levels several times as large as in normal years; *[Repeated searches by the Government did not find these, though they would have been impossible to hide.]*

Grain movements

- ▶ grain movements four times as high as usual immediately after harvest,. *[These would have been impossible, given the boat denial policy, petrol rationing, shortage of vehicles and sabotage of the railways.]*

Exports

- ▶ exports one third of total production from a country that does not usually export, *[There has been no suggestion in the sources, or by Sen, that there were exports. There was certainly no export by sea. If the grain had been exported to neighbouring states, their price would have fallen, and it would have been smuggled or shipped openly back to Bengal.]*

Borrowings

- ▶ large borrowings by grain traders, *[These would certainly have been noticed in wartime.]*

Prices

- ▶ a collapse of grain prices immediately before the next crop, *[Neither the sources nor Sen suggest this happened.]*

Next year's prices

- ▶ a collapse in the urban market price in the following year. *[In fact, in spite of the fact that there was an excellent crop at the end of the famine, prices remained firm until the*

end of the war.]

Other evidence

In addition there would be strong reason to believe that

- there was a closed economy, *[there was not at the time of purchase, but there was during the peak of the famine.]*
- that there was no ‘hoarding’ or informal speculation, *[The sources and Sen are agreed that there was some hoarding and informal speculation. For reasons I have set out, it is difficult to believe that there was any more hoarding than in previous years, or that there were massive hoards at the end of the famine, so the availability of grain was higher than the crop size would suggest.]*
- that there was no animal feed, brewing or manufacturing use for grain, *[A higher proportion of draught animals died than people.]*
- and that there was in fact a cartel. *[Surprisingly, there is no suggestion in the literature that there was a cartel. If there was a Type One or Type Two Shortage, it would be perfectly reasonable to expect independent speculators to act in much the same way, all buying as much as possible at the beginning of the season, and spreading out sales throughout the season to maximize profit. If there was a surplus, they would not act in concert unless there was a cartel.]*

Multi-crop economies

In a multi-crop economy, the effect of reducing the supplies of a single crop is limited. In a closed least developed economy prices of substitutes would also rise. If rice provided only half the calories, a 20% reduction in rice supplies would result in only a 10% reduction in calories, and it might be expected that there would be a lower rise in the price of rice than in economies where rice provided 80% of the calories.

There has been the assumption in all the analyses of the Bengal famine that rice was the only food, because there are no statistics for other food. In fact, there are many other foods, all of which would be hit equally by the cyclone. Most of them are not suitable for storage or speculation - vegetables, milk, eggs, meat for instance - so the speculation explanation is even less likely if they are taken into account.

Conclusion

Can speculation cause famine when there is plenty of grain available? It has been shown that it is only possible under some conditions. Even when it is possible, it is probably irrational for speculators to try and create a famine situation. Certainly it would be very difficult to hide the evidence.

It would be more rational to try and create a famine in a shortage year

It would certainly be a great deal easier and more profitable to create a famine when there is already a shortage. The cartel would not have to buy nearly as much, and would not have the problem of disposing of the surplus. Other speculators would not act as free riders to the same extent. It would be irrational for speculators to create a famine in a situation where there was a surplus, when they could do it more easily and more profitably by doing it in a shortage year. *[It would be irrational for Bengal traders to try and create a famine in a surplus year, when they could do it so much more easily and more profitably in a deficit year.]*

The conclusions are specific to the assumptions

The conclusions derive from the specific assumptions of the model, and it would be wise to substitute assumptions from the economy in question before drawing conclusions rather than to generalize. The factors taken into account do, however, apply in some measure to most economies threatened by famine.

It was neither possible nor rational to create a famine in Bengal, if there was a surplus

*[It was not possible to create a famine in Bengal in 1943 by speculation **if there was indeed a 11%, 20% or 30% surplus**. It would have been irrational in the extreme for speculators to attempt to create a famine - they did not believe that the preconditions existed, they could not expect it to be profitable, and the risks were enormous. The evidence refutes the hypothesis that a famine was created in this way.]*

It should always be remembered that whatever the cause of famine, the traditional remedy of importing food and distributing it free or on public works schemes will be effective. It is dangerous to rely on other remedies and other diagnoses without the hardest of evidence.

APPENDIX 5: ARE BOOM FAMINES POSSIBLE?

This appendix takes initial assumptions approximating to the condition in Bengal in 1943 and then assumes the high production level that Sen claims. It then asks whether it is even possible to have a boom famine under these conditions.

Initial assumptions

Assume an agriculture like Bengal's

Initially we take an economy where 90% of the population are agricultural producers. The remaining 10% of the population are urban, and all non-agricultural production is done in urban areas. There is a single urban area. Initially it will be assumed that there is no immigration or emigration, and that there are no imports or exports of food.

“Minimum-no-shortage food supply”

In a year in which there are 100x tonnes of food eaten, there is just enough food to go round, with no rationing and no starvation. Everybody gets enough to eat according to social norms, which does not imply that there is no malnutrition. It is assumed that nobody gets less than the minimum survival amount of food or, alternatively, that it is socially acceptable that a certain proportion of the population, say 5%, is slowly starving, and that as long as this level remains constant, there will be no outcry. This amount of food may be termed “the minimum-no-shortage supply of food”.

Degrees of shortage

It will be taken here that if the supply of food is between 90x tonnes of food and 100x tonnes of food, there is a First Degree Shortage, where there is sufficient food to provide a barely adequate diet for everyone, provided that there is rationing. If there is no rationing, some sections of the population will suffer from serious malnutrition or starvation. If there is 80x to 90x tonnes, there is a 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. If there is less than 80x tonnes, there is a Third Degree Shortage - there is insufficient food for long term survival. If everyone were given a bare survival ration, food would run out before the next harvest. Mass starvation is inevitable without imports. *These definitions of shortage are related to the nutrition of the population, and have no relation to market conditions.*

The “minimum-no-shortage” level may vary with income levels and consumption patterns. If it rises above the initial level defined here, then any level below the new level will be at least a First Degree Shortage.

Assume the food supply is as Sen claims

The question to be asked is whether in a year in which there is 10% more food than this, 110x tonnes, a famine can be caused by boom conditions. For the event to be classed as a famine, it will be required that at least half of the population goes short of food, with half of these going so seriously short of food that their survival is at risk, and with at least 2% of the total dying.

More serious famines than this have been blamed on booms. It is trivial to say that a small part of the population may be badly affected by the economic changes that take place in a boom, or that there may be a few more or less deaths by starvation as a result of changes in the economic status of some occupational groups.

This means that the impact of the boom will depend on the number of people whose finances improve and the amount of extra food that each eats.

How many people eat how much more?

How much more must city dwellers eat?

For the boom to cause a famine, therefore, it must cause some sections of the urban population to eat so much more food that the remaining population goes short. If the urban population ate twice as much as usual, 20x tonnes instead of the minimum-no-shortage amount of 10x, there would be a minimum no shortage supply of 90x tonnes for the rural population. If they ate up to three times as much, 30x tonnes, there would be a First Degree Shortage, in which, in principle, increased mortality could be prevented by seizing traders' stocks and distributing them by rationing and handouts. If they ate up to four times as much, 40x tonnes, there would be a Second Degree Shortage for the rural population, and only if they ate more than this would there be a Third Degree Shortage, with major starvation inevitable. This calculation is based on the assumption that the Third Degree Shortage situation has an average calorie consumption of less than 77% of the minimum no shortage level.

How much do very rich people eat?

In fact, the richest countries consume about 3600 calories per head per day, when there is no financial constraint on the number of calories consumed, and there is an inexhaustible supply of junk food and alcohol which provide calories without bulk. This is about 60-70% more than the minimum-no-shortage consumption of the type of country we are considering. It is unlikely that any boom will bring a significant proportion of the population to the stage where money is not a constraint to calorie consumption. Nor is it likely that people can physically consume the quantity of rice, cassava etc. to produce an *average* calorie consumption of 3600.

Variance of consumption

So far, the discussion has been in terms of averages, but there may be large inequalities in food consumption. In this economy it is assumed that only 20% of the population is very poor with barely sufficient to eat.

It is not necessary to model the situation where a small number of people have jobs in war industries, say, and they and their dependants increase their consumption to the extent that there is a famine. For ½ % of the population to have this effect, they would have to eat 60 times the normal amount, which is absurd.

Assume the boom benefits most city dwellers

Instead, I shall model some scenarios where the boom benefits more of the urban population. Generally, those who are already well fed are most likely to benefit from the boom. They will not want to increase their calorie consumption. Those who are already at average income levels will want to increase their calorie consumption but not by much. Manual workers may eat more calories than the middle classes do. Any of the very poor 20% who get jobs will want to increase their calorie consumption significantly. It is assumed that the urban population consists of 10% of the total population, made up of 2% who eat no more calories, 6% eating some more calories, 1% eating a great deal more calories, and 1% not benefiting at all.

Two Scenarios 3500 and 6000 calories

Two scenarios are presented in Tables 1 and 2. These compare the situation in the initial minimum no-shortage year, in a year when supplies are 10% higher than this, but there is no boom, and in a year when supplies are 10% higher but there is a boom. Scenario 1 has calorie consumption barely within the bounds of possibility and shows that consumption in the urban area might be 18% more in a boom year than in a non-boom year and 27% more than in the initial minimum no shortage year. The effect of this on supply for the rest of the population would be negligible, a reduction of 2% compared with a non-boom year. This amount is 8% *more* than in the initial minimum no-shortage year, and 18% more than a Second Degree Shortage supply level where famine can be expected.

6000 calories per day

Table 2 has the situation where the urban population, except some of the poorest, go on an eating binge, and eat 6000 calories per head per day, which is absurd. The result of this gluttony is that they eat more than twice as much food as in a non-boom year, and 2.24 times as much as in the initial minimum-no-shortage year. Even so, the total consumption in the rural area falls by only 11% compared with a non-boom year. The consumption is only 2% lower than the initial minimum no-shortage situation. There could be some distress, some increase in mortality rates, or government could introduce some form of rationing. Nothing like a famine would be observed.

Half the population urban

Scenario 3 has a situation where the urban population is half of the total - quite different from the Bengal situation. There is a substantial increase in urban consumption as a result of the boom, 13.7% more than the non-boom situation. Rural consumption falls by 13% compared with a non-boom year, but only by 1.1% compared with the initial minimum-no-shortage year. Again, there will be no famine.

Famines are not isolated hunger

Of course, it is possible to dream up a scenario where a few occupational groups bear the full brunt of any fall of food supply in rural areas. This scenario would result in some people starving, while the rest of the rural sector does rather well for itself. However, we are then talking of a very small number of people starving, not the widespread famine that Sen claims that the boom caused.

Scenario 1 for food consumption with and without a boom

	Million	Calories per head per day			Total calories per day (million)		
		IMNS year	IMNS +10%	with boom	IMNS year	I M N S with boom	+10%
Total Population	100	2635	2899	2899	263500	289850	289850
Urban							
Middle class	2	3000	3000	3000	6000	6000	6000
Average	6	2500	2750	3500	15000	16500	21000
Poor who get jobs	1	2000	2200	2750	2000	2200	2750
Other poor	1	2000	2200	2000	2000	2200	2000
Total urban	10	2500	2690	3175	25000	26900	31750
Rural	90	2650	2922	2870	238500	262950	258100
Middle classes	18	3000	3000	3000	54000	54000	54000
Average	54	2750	3136	3050	148500	169344	164700
Poor	18	2000	2200	2200	36000	39600	39600

Note: IMNS is initial minimum no shortage supply

Scenario 2 for food consumption with and without a boom

	Million	Calories per head per day			Total calories per day (million)		
		IMNS year	I M N S with boom	+10%	IMNS year	I M N S with boom	+10%
Total Population	100	2635	2899	2899	263500	289850	289850
Urban							
Middle class	2	3000	3000	6000	6000	6000	12000
Average	6	2500	2750	6000	15000	16500	36000
Poor who get jobs	1	2000	2200	6000	2000	2200	6000
Other poor	1	2000	2200	2000	2000	2200	2000
Total urban	10	2500	2690	5600	25000	26900	56000
Rural	90	2650	2922	2600	238500	262950	233850
Middle classes	18	3000	3000	3000	54000	54000	54000
Average	54	2750	3136	2700	148500	169344	145800
Poor	18	2000	2200	1900	36000	39600	34200

Note: IMNS is initial minimum no shortage supply

Scenario 3 for foodconsumption with and without a boom

	Million	Calories per head per day			Total calories per day (million)		
		IMNS year I	M N S with boom +10%		IMNS year I	M N S with boom +10%	
Total Population	100	2635	2899	2899	263500	289850	289850
Urban							
Middle class	10	3000	3000	3000	30000	30000	30000
Average	30	2700	2920	3500	81000	87600	105000
Poor who get jobs	5	2000	2200	2750	10000	11000	13750
Other poor	5	2000	2200	2000	10000	11000	10000
Total urban	50	2620	2792	3175	131000	139600	158750
Rural	50	2650	3010	2620	132500	150250	131100
Middle classes	10	3000	3000	3000	30000	30000	30000
Average	30	2750	3250	2700	82500	97500	81000
Poor	10	2000	2300	2000	20000	23000	20000

Note: IMNS is initial minimum no shortage supply

Boom famines are impossible under realistic assumptions

This section has shown that it is extremely difficult to create a realistic scenario under which a boom will cause a famine. Neither the assumption that all the urban population gorge themselves with food, nor the assumption that there is a very large urban population benefiting from the boom is sufficient.

Uniform distribution

Does uniform distribution of food affect the model?

A situation may be examined where consumption per head was uniform before the boom. In this case there is no First Degree Shortage situation, because rationing cannot improve distribution - either there is no shortage or there is a Second Degree Shortage. This assumption is relevant in considering an economy where the o

If, as a result of the boom, the 10% urban population eat twice as much as usual, which is absurd, there will be 90x tonnes left for the remainder, which is the initial minimum-no-shortage level. If consumption is any more than this, there will be a Second Degree Shortage. Because of the uniformity of distribution small shortages will manifest themselves as general hunger and a higher than normal mortality rather than as outbreaks of famine or the deaths of particular occupation groups.

Such an economy is certainly more at risk than one with unequal distribution of consumption,

but this is mainly because the average consumption level assumed is lower at the initial minimum-no-shortage level. The risk is because there are smaller amounts of food, and there is no improvement possible through rationing.

Proportion of people benefiting from the boom

In practice, most people would not benefit from the boom

The scenarios presented above are dependent on the assumption that 90% of the urban population benefit from the boom. One would normally expect that the army, police, civil service, local government officials, teachers, school children, prisoners, and hospital patients and most employees would not benefit at all from a boom, and indeed would be left behind by inflation. Other occupational groups would benefit indirectly, and with lags, if at all. It is quite likely that less than a third of the population benefits. This means that, where Scenario 2 for instance has the urban population more than doubling its consumption, the small proportion of the population benefiting directly would have to eat more than six times the normal amount of food, which is absurd.

Prices

Famine prices rise far more than boom incomes

It should be noted that the prices recorded in a famine might be from four to 20 times as high as normal prices. The implication is that people make so much money from the boom that not only do they eat many times more food but they pay many times as much. If the urban population only doubles its food consumption, it is spending from eight to sixty times as much on food, which is absurd.

Types of food

Most analyses only discuss grain

Discussions on famine tend to concentrate on grain, because statistics exist, and because famine relief tends to be grain. We may instead consider two classes of goods, inferior goods, including grain, potatoes, cassava, onions, palm oil or mustard oil and superior goods including meat, sugar, fats, fruit, vegetables and perhaps alcohol. It is significant that many of the inferior goods are produced by subsistence farmers or small farmers, and are harvested once a year. Many of the other foods are produced through the year. Some are processed or produced on estates, so the farmer has no control over final sale. It is also significant that it is possible to increase marketed supply of some superior foods in the short run between grain harvests: short-season vegetables and meat in particular. If the prices are high enough, meat and dairy animals, and even draught animals, will be sold off.

Superior foods

The middle classes may respond to a higher real income by switching to superior foods. To some extent they will have done this already. It may be that they would, if allowed, switch to imported luxury items, though it has been assumed here that there are no imports. They will not increase their calorie consumption.

The working class and the lower middle class may respond to a higher real income partly by increasing their calorie intake and partly by switching to more expensive foods. They may do this by reducing their intake of inferior foods. Most urban workers need fewer calories than manual workers or farmers.

The poor will respond to higher real income by increasing their calorie intake.

The rich eat more expensive food, not more food

The implication is that an increase in the spending power of the urban population will be felt largely as an increase in demand for superior foods. There may be a reduction in the amount of grain and other inferior food bought in urban areas. What happens then is that more of the superior foods are sold in the city, and less in the country. Prices are high, and with meat, fruit and vegetables, the high prices are received by the producers. Other superior goods such as canned and processed foods are sold in the city.

Since there is less inferior food sold in the city, there will be more sold in rural areas. Since rural workers do not benefit from the boom, they are not in a position to bid up the price of grain at the margin (though I suggest that some producers of superior goods will benefit).

Migration

What if the boom causes migration

Let us consider the situation where the boom causes the urban population to double from 10 million to 20 million. This means that industrial output more than doubles. The new workers are all going into industry, not administration etc., and they do not bring many dependants in the short run. The doubling of output takes place in a few months. Such booms are rare indeed.

Migration from other countries

If the workers and their dependants come from another country, their consumption is in addition to existing consumption. In principle, though, if food availability is 10% above the original minimum-no-shortage level, and the population is 10% higher, the country will be somewhere around the initial minimum-no-shortage level. Some rationing and special procurement may be necessary to avoid a First Degree Shortage. However, the food supply is still 10% higher than the Second Degree Shortage level, and starvation can be prevented by rationing and handouts. There may be pockets of distress, but nothing like a famine.

Migration from country areas

If the ten million workers and dependants come from the rural area, then there is no change in the number of mouths to feed. Manual workers moving to industrial jobs may actually reduce calorie consumption. By definition, there is 10% more food available than the initial minimum-no-shortage level, and 20% more than the Second Degree Shortage level. The long term effects of removing the workers from agriculture may be to reduce production, but the definitions exclude consideration of this situation.

The time factor

Long term changes are not boom famines

A medium to a long-term switch in the relative purchasing power of town and country frequently throws up food problems, and structural adjustment can make an economy much more prone to famine especially in the early years. These cannot be called boom famines.

The concept of a boom famine requires an extremely rapid build up of demand, while output and imports remain constant.

Procurement

Can the marketing system handle four times the usual amount?

The marketing system has to procure four times the normal amount of food, transport it and store it. How is the food procured?

Timing is of key importance here. For example, the onset of the boom may have been

1. very sudden, at harvest time.
2. very sudden, six months after harvest
3. fast, over a six month period, starting at harvest time
4. fast, over a six month period, starting six months from harvest.
5. over a one-year period, starting at harvest time
6. over a one-year period, starting six months after harvest

Procurement immediately after harvest

Difficulties in immediate procurement

One possibility is that the wholesalers and distributors might procure the whole quantity required - four times the usual amount - for the urban areas immediately after harvest in the normal way. The difference is that the quantity that will have to be bought, transported out of the production area and stored is several times higher than in non-boom years.

Quantities to be handled

In the previous appendix, I examine the quantities that speculators would have to buy to cause the famine (on the assumption that the surplus is to be exported, destroyed or kept in store, rather than being eaten by the workers benefiting from the boom). It is physically and financially difficult to manage such large purchases, and the transport and the storage space for them is not likely to exist.

As with speculation, it is unlikely to be practically possible to procure, store and distribute so much grain, and it would be irrational for speculators or wholesalers to attempt to do so.

Money needed and risk

It is difficult to imagine speculators buying four times the normal amount of grain at harvest, and paying a price well above the normal price for it. The payoff envisaged is that they will be able to sell all this grain to the urban sector, and that they will be able to charge famine prices for it. They have absolutely no evidence that such a situation ever existed in the past. They also know that a lot of the grain will have to go cheaply to the army, police, civil servants and politicians.

Market risk

If the wholesalers believe that the urban demand will suddenly be much higher, but the sellers do not (and the sellers will include landlords who cannot be assumed to be innocents), they will have to pay prices above the normal procurement prices, but below famine prices, to obtain this quantity. They will be buying more than three times the normal amount, at, say, 1.5 to 2.5 times the normal price. If their guess is wrong, and urban demand is not higher, they will certainly be bankrupted. Even if they were to guess right, government would probably take action which would bring the price down: it might seize stocks, impose rationing, import, or all three. The risk of bankruptcy is so high that it would be irrational to make this decision.

Suppliers may demand high prices

If both the buyers and sellers know that the urban demand is this much higher, prices will be at the famine level from the beginning of the season. Wholesalers have to lay out even higher sums of money, with little prospect of making big profits even if the demand is as they expect: large quantities will still have to be supplied to the public sector at a relatively low price. Again, a collapse in urban demand would bankrupt them, as would imports, rationing or the seizure of stocks.

Are traders irrational

It would be irrational for wholesalers to take these risks when very few famines are even claimed to be boom famines, and there has been no discussion even by economists of why the famine effects of booms arise suddenly then vanish as suddenly, in the middle of a long boom period.

Buying later in the season

Buying when sellers know that there is a famine

The alternative, where the extra consumption is not bought immediately after harvest, requires the odd situation that city dwellers eat say three times the normal amount of food until the purchased stocks are vanishing, then traders go back to the country to buy more. Procurement prices will rise very rapidly until farmers are receiving famine prices. The assumption is that the agricultural sector continues to sell even when they themselves are facing starvation. I have set out some scenarios, such as deficit producers giving their crop as rent to landlords who then sell to the city, where this may be possible.

Land tenure

Surplus producers

In a situation where all agricultural producers produce a surplus after paying costs and rent, a rural famine will not occur. Farmers have produced 10% more than normal, and may choose to consume some or all of the extra production. If they choose to sell it all, so that urban areas have twice the initial minimum no shortage supply, then the marginal farmers have enough for survival, and others have more than this level.

Surplus producers may sell their surplus but no more

If prices paid by city dwellers were sufficiently high, then those farmers who produced more than they needed for bare subsistence would be tempted to sell their surplus. (This implies subsistence for themselves, their dependants, their workers, and for their workers' dependants.) If every farmer did so, there would be adequate food for all the rural population, and no starvation or excess mortality. The amount that would be released in this way depends on the inequality of distribution in normal years. In Scenario 1, Table 1, the surplus of the rural sector would increase to 16% if the rural sector reduced the consumption of middle classes and average producers to 2500 calories.¹ That is to say the urban population can eat nearly three times as much without causing starvation or excess mortality in the rural sector.

If the urban sector wants more than this, the producers will refuse to sell. Unless there is forceable procurement at the point of a bayonet, there will be no famine.

Deficit producers

At the other extreme, we may take the position where all farmers are in deficit after paying costs and rent. They end up with less than 75% of the food they produce. In normal years they earn enough from casual labour and so on to bring them up to survival level.²

Here there will be a famine in any year that the landlords do not give the farmers back sufficient to survive on, by way of wages, loans, etc. This would happen if they sold all their stocks to the city, ignoring their social and tribal obligations to retain grain for their people.

The position may be significantly worse when there is a uniform distribution of consumption in the rural area, with consumption near the bare subsistence level.

Inflation

Inflation does not imply a boom

Inflation does not necessarily imply a boom, often the contrary. It is a commonplace that inflation can cause serious production problems and even famine in agricultures dependant on purchased inputs,³ but this is not the boom famine situation where changed consumption patterns cause famine.

Inflation hits the country at harvest time only

Inflation does not mean that all prices of all goods rise equally. In the rural areas there is an influx of money just after harvest, and from that period to the next harvest there may be no inflow of money. In a near-subsistence economy where farmers do not buy much from the urban sector, much of the revenue from the crop is spent immediately after harvest, before inflation has eroded its spending power. Within the sector the price of labour and food is set by supply and demand.

Supply and demand still set prices

The price of grain is set by supply and demand. Once the urban population have eaten their fill, the rest will be sold to rural producers, and the price will be set by supply and demand. The price is not set by the price that urban workers are willing to pay, any more than the British price of bread is set by the price that millionaires are willing to pay.

In many boom situations, the increased earnings will be spent on consumer goods and imported luxury foods rather than on increased food consumption. Wartime blockades produce the most likely exceptions,

Imports and stocks

If imports are possible, there should be no famine

If imports are possible, one must ask why traders or government would not import at normal prices, rather than paying high prices, famine prices even, for food. If they do import, there can be no famine. In most situations today donors would finance imports if necessary.

Food stocks mean boom famines even less likely

This model has assumed away some of the buffers against famine. It is normal for the grain trade to carry over stocks of perhaps one or two months' supply from one year to another. This means that in an emergency, supplies within a year can be increased by reducing stocks, effectively borrowing from the next year's supplies. Similarly, cassava crops can be harvested after only one or two years growth, rather than waiting four years for the maximum yield, so increasing supply in the current year at the expense of future years. It is possible to eat the maize crop as green maize rather than waiting until the grain is ripe. If these buffers were allowed for in the model, the amount of increased consumption necessary to cause the famine is much higher.

Another set of buffers is the grain used for animal feed, manufacturing and brewing. This can be diverted to human consumption, and will certainly be diverted if famine prices can be obtained for it.

Only in wartime or with a blockade, and in a zero stock situation, can supplies within a year be taken as fixed.

The dog that didn't bark

Booms seldom happen at the same time as famines

The weakness of the boom famine hypothesis is confirmed by the fact that many inflations occur without famines and many famines occur without booms, and there is no theory to explain why. It is not just that the examples sometimes produced are disputed. It is that many countries with very similar economies to those where the boom famines are supposed to have occurred had high inflation and even hyper inflation without causing famines, even when there was a very fragile food situation prior to the hyper inflation. Rather fewer of these economies have had an economic boom, but the question remains: why was there no famine?

If we examine the entitlement theorists' paradigm example of the Bengal famine of 1943 the questions become particularly pressing. No theory has been put forward to explain

- why a boom famine should have occurred in Bengal in 1943 but not in other years. In every year from 1939 to 1945 at least there was rapid inflation, a boom in war industries, (small) migration to the cities, hoarding and speculation. 1943 was no different in these respects. And of course it was the same Bengal with the same social and economic structure in each of these years.
- why a famine, described as a boom famine, should hit so suddenly, in a matter of three months. This implies an enormous and very rapid boom.
- why the famine should have started in exactly the months that it would have started if it had been caused by a crop failure. Coincidence, or wrong diagnosis?
- why the famine should have stopped when the next main rice crop was harvested. The wartime boom continued unabated, and the purchasing power of the urban workers was relatively much greater than before, as the rural population was destitute after the famine.
- why the evidence is that consumption in the urban areas was lower than in previous years, not higher.
- why the evidence is that less grain was shipped from the country to the urban areas than from the urban areas to the country (imported grain)

If, however, one accepts the overwhelming evidence that the Bengal rice crop of December 1942 was 30% below normal, an amount equivalent to 25% of the marketed surplus of India as a whole (See Famine Inquiry Commission 1945 a,b, Goswami 1990) these facts are explained.

The strength of a theory depends on what it forbids

The strength of a theory relies on what it forbids not what it explains (Popper, 1963). A theory that says that some circumstances may exist where a boom could cause a famine is of

little interest. It is not testable, because a great many booms do not cause a famine. It is no better than an astrological explanation. One that states that a boom will certainly cause a famine if certain conditions exist, but not otherwise, is of some interest and may be testable.

Conclusion

It has been shown that the hypothesis of a boom famine cannot be supported in the types of economy in which it could be expected to occur. It requires that the people benefiting from the boom eat at least three times as much as in the initial-no-shortage year, which is absurd. It requires that they spend eight to sixty times as much on food, which is absurd.

The procurement of this quantity of food meets transport, storage and financing constraints. It would be irrational for wholesalers to make an investment many times greater than their normal outlay, on the off chance that the boom makes the urban people eat many times as much as usual, and that they will continue to eat at this rate until all the wholesalers' purchases can be disposed of. It would be irrational for them to risk so much on the assumption that government will not intervene with imports, rationing or the seizure of stocks.

The main novel component of the entitlement approach is seen to be theoretically wrong, which is not surprising as its factual basis has been widely challenged. What remains is the English classical approach, which has proved so disastrous in practice.

Policy should never be influenced by the policy that food scarcities might be caused by a boom famine, since it is certain that no boom famine can occur in the type of economy for which it is normally postulated, and it is extremely unlikely that there will be a boom economy in any other economy. This is of practical importance, since an administrator who believes in the boom famine hypothesis might act decisively in a famine situation, seizing traders' stocks, imposing rationing and, perhaps, importing a little food. This would be effective if there was just a First Degree Shortage, or No Shortage. However, if there was a Second Degree or Third Degree Shortage, the results would be disastrous. Substantial imports - much larger than those that might be appropriate for a boom famine - are needed to prevent widespread starvation. The wrong theory can kill millions.

Notes

1. Incidentally, it shows that in an economy with unequal distribution of food, it is difficult to imagine a realistic distribution which is going to worsen things to any great extent, even though one may imagine many situations where one group is better off and another worse off. It may be relatively easy to imagine a uniform distribution where most people are better off.
2. I have ignored the effect of cash crops. To the extent that farmers retain their food production and pay rent in cash crops, the protection against famine will be greater than I have indicated.

3. For example, it means that farmers who sell their crop at harvest may not have enough cash to buy inputs at the price ruling at the next planting season. It means that their cash income at harvest will rapidly erode through the following months, until they are destitute perhaps six months after harvest. The situation may occur where farmers cannot buy the necessary inputs, or do not think it worth planting for so little income, and production falls drastically, possibly even causing a famine situation. The cumulative effect of this is serious enough, but it can hardly be called a boom famine.