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Famine Demography

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FAMINE DEMOGRAPHY

Cormac Ó Gráda

Note: this is Chapter 4 FAMINE: A SHORT HISTORY, forthcoming

FAMINE DEMOGRAPHY

The decrease in the normal growth of population after a period of deficient harvests is not so much a measure of mortality as a demonstration of the normal effect of the fertility of nature on the fertility of man.

A. Loveday, *History of Indian Famines* (1914)

4.1. *Hierarchies of Suffering*

Who dies during famines? Karl Marx's quip in *Das Kapital* that the Great Irish Famine killed 'poor devils only' holds for all famines: mortality has always varied inversely with socio-economic status, but especially so during famines. In Ireland, the first to die were destitute vagrants who lacked family support to fall back on, and who were at greatest risk from the elements and from disease. Labourers were more likely to succumb than farmers, and substantial farmers were more likely to survive than smallholders. In China in 1959-61 it was said that those who died were 'the old people, infants, some young people, the honest, and the stupid'. Those with 'with bad class backgrounds' were also more at risk. It was said too that the honest and the gullible died because one had to 'be tricky' and 'to steal' in order to survive. In Bangladesh in the mid-1970s there was a strong class gradient to mortality. Excess

mortality in one rural area of that country among the poor more than doubled, while among the rich it rose by a quarter.¹

In environments with high loads of infectious diseases, even the wealthier classes were at increased risk from disease during famines. Maxim Gorky worried constantly about the impact of the Russian famine of 1918-22 on the 'intellectual forces'. In Ireland in the 1840s and in Finland in the 1860s mortality was higher among the medical profession than in the population as a whole. Paramedics and relief workers also faced serious risks: nearly half the staff of the North Dublin Union workhouse contracted famine fever during the Irish famine, and half of those died of it. One implication is that the rich had more reason to care for the poor in the past. The preamble to a Venetian decree in 1528 noted that a failure to relieve the poor would 'import disease of the kind...which no human remedy has been able to extinguish'. The fear was bubonic plague, carried by the rats that were likely to follow in the wake of rural migrants, and typhus, then a relatively recent import from Cyprus. Because the better-off are better equipped to shield themselves against infection, famines today may be *even more* class-specific than in the past.²

Malthus held that overpopulation caused famine. This chapter is about the reverse causation, from famine to population. It focuses in turn on measuring aggregate mortality (Section 4.2) and its incidence by age and gender (Section 4.3); on the impact of famine on the birth rate (Section 4.4); on the causes of famine deaths (Section 4.5); and on possible long-term health effects (Section 4.6).

¹ Leonard 1994; Razzaque 1989.

² Ó Gráda 1999: 94-95; Pullan 1963-64: 159; Iliffe 1987: 257.

4.2. *How many died?*

Excess mortality, or at least the threat of excess mortality, is a defining feature of famine. The death toll, or the excess death rate relative to some non-crisis norm, is the single most popular measure of a famine's gravity. For most historical famines, however, establishing excess mortality is impossible. In the absence of any hard evidence, it is not possible to take literally claims such as that during the Ch'in-Han transition in China (c. 209-203BC) famine killed eighty to ninety per cent of the population in some areas; or that in 967AD a flood in Egypt caused a protracted famine that left 600,000 dead; or that the great Bengali famine of 1770 killed one-third of the population; or that East Prussia 'lost forty-one per cent of its population to starvation and disease in 1708-11'; or that Persia lost two-fifths of its people to a genocidal famine in 1917-19.³ Such claims are usually rhetorical, sure signs of a major disaster but poor guides to actual mortality.

In the absence of civil registers and periodic censuses, the tolls of the vast majority of historical famines can only be guessed at. In the case of the well-known great European famine of the 1310s, for example, 'an urban collapse of 5-10 per cent in 1316, the worst year of the famine in terms of harvest shortfalls', with lower mortality in rural areas, is the best that can be made of the very limited quantitative evidence. Similarly, only the crudest guesses are possible for the Irish famine of 1740-41, which may have matched or exceeded the famine of the 1840s in relative mortality terms: the paucity of direct evidence has prompted inferences based on hearth-tax data. Estimates of the toll exacted by a famine in south-western Madagascar in 1931

³ Yates 1990: 168; Jones 1981: 51; Majd 2003: 1.

range from the 500-800 deaths suggested by one colonial administrator to the 32,000 loss from a combination of migration and mortality suggested by another.⁴

Sometimes, the inferences derived from incomplete data are politically controversial. At the height of the Great Irish Famine of the 1840s opposition leader Lord George Bentinck accused the authorities of 'holding the truth down' about the human cost of the famine, and predicted a time 'when we shall know what the amount of mortality has been', and people could judge 'at its proper value [the government's] management of affairs in Ireland'. The government of the day refused to regard the number of deaths as a measure of policy failure and deemed it impossible to estimate excess mortality. In the House of Commons Prime Minister Lord John Russell fended off demands for a body count with the remark that 'a man found dead in the fields would probably be mentioned in the police returns as having died of starvation'. There have been many estimates since of excess mortality in the 1840s, with 'revisionist' scholars casting doubt on its likely toll of about one million dead, and hard-line nationalists deeming that number too low. Estimates necessarily hinge on assumptions about non-crisis birth and death rates, the decline in births during the famine, and net emigration.⁵

At the height of the Great Bengali Famine it was a similar story. Leopold Amery, Secretary of State for India, claimed in the British House of Commons that the weekly death toll was about one thousand, though 'it might be higher'. This amounted to virtual denial of a catastrophe whose real weekly toll was closer to forty thousand at the time. Later Amery mentioned an estimate of eight thousand as the

⁴ Lucas 1930: 369; Jordan 1996: 148; Dickson 1997; Kaufman 2000.

⁵ Mokyr 1980b:241-51; Boyle and Ó Gráda 1986.

number of famine-related deaths in Calcutta between mid-August and mid-October. Subsequent estimates of total mortality in Bengal range from 0.8 million to 3.8 million; the true figure was over two million.⁶

In the absence of hard data, mortality gets talked up or down. In Vietnam those who questioned the original figure of two million as the toll of the famine of 1945 were classed with those who ignored 'the crimes of French colonialism and Japanese fascism'. North Korea in the 1990s offers another example. An appalling toll of three million in the wake of a famine beginning in 1995, or ten per cent of the entire population, was regularly cited in the foreign press. Such a figure would make the North Korean famine a devastating one in relative terms – in Ireland in the 1840s one-eighth of the population perished. However, it seems to be a politically-charged extrapolation based on refugee reports from North Korea's atypical northeastern provinces. The most plausible guess at excess mortality is closer to half a million – serious, to be sure, but less likely to make the headlines. This does not prevent journalist Jasper Becker from linking the figure of three million deaths to Kim Jong-Il's 'lavish lifestyle' and 'long-range missiles which landed in the Sea of Japan in 1998'.⁷

Estimates of excess famine mortality in the Soviet Union in the early 1930s and in China in 1959-61 are even more controversial. The Soviet famine of 1931-33 is nowadays reckoned to have cost up to six million lives, while the demographic impact of the Chinese famine remains uncertain. The Chinese authorities at first

⁶ *Hansard*, vol. 392, col. 1078 (14th October 1943); vol. 393, col. 352 (28th October 1943); Sen 1981: 195-196; Maharatna 1996: Table 4.1.

⁷ Smith 2004; Lee 2005; Noland 2007; Becker, 'Dictators: the depths of evil', *New Statesman*, 4 Sept. 2006.

concealed and then denied the crisis, but forty million deaths is the figure given in *The Guinness Book of Records*, and one very hostile source lends credence to 'even larger figures of fifty and sixty million deaths...cited at internal meetings of senior Party officials'.⁸ The evidential basis for such claims is flimsy.

Two much-cited estimates published in the 1980s suggested a toll of thirty million, while more recent estimates range from 18 to 23 million; the outcome depends on assumptions made about non-crisis vital rates. Thus, the trend in the aggregate death rate for 1950-69, as reported in official Chinese data released in the early 1980s, implies an estimated cumulative excess death rate of 23 per thousand in 1959-61. Assuming a population of 650 million on the eve of the famine, that would mean a toll of 15 million lives lost to famine.⁹ Such a figure would still make the Great Leap famine, which is discussed in greater detail in Chapter 8 below, the biggest in history in absolute terms.

However, that total is almost certainly too low, since the only way to reconcile the pre-1959 death rates behind this calculation and UN estimates of life expectancy in 1950-55 is to assume considerable under-registration of vital rates in the official data during and before the famine. Even allowing for a major decline in mortality after 1949, an official death rate of 11.4 per thousand in 1956-58 is not easily squared with a life expectancy at birth of about forty years in 1950-55. Attempts to estimate excess mortality with data that allow for under-registration produce considerably higher mortality tolls. Figure 4.1 compares the official data for 1953-70 with the

⁸ Becker 1996: 293.

⁹ Ó Gráda 2007.

reconstructions of demographer Sheng Luo. Note that both official data and Luo's reconstruction imply net population loss only in one year, 1960.

Though perhaps closer to the truth, none of these estimates should be taken as final. As Sinologist Carl Riskin has pointed out, the baseline child mortality assumed in one well-known re-estimate by Ashton *et al.* inflates the number of excess child deaths; it also yields an age-pattern of excess mortality atypical of famines generally. Demographer Judith Banister candidly points to the 'arbitrary estimation process' involved in her adjustments for under-registration, while Sheng Luo's analysis (see Figure 4.1) implies more excess deaths in 1961-62 than in 1960, which is hard to square with other evidence, and a trough in births in 1960 rather than 1961. Still, a toll of 25 million is as plausible as one of 15 million. Either way, the Great Leap famine still remains ahead of its nearest competitors.¹⁰

Nonetheless, a toll of even 25 million bears comparison with a much-cited estimate of excess mortality – a range from 9.5 million to 13 million¹¹ – during the Great North China Famine of 1876-78. That estimate refers to a time when the population of China was little more than one-half of its 1958 level, and when real GDP per head was higher than in the mid-1950s. In the late 1870s famine in India caused a further seven million deaths.¹² Note too that major famines were commonplace in China before 1949: the aggregate estimated mortality from Chinese famines between 1900 and 1949 was 10.5 million to 13.5 million.¹³

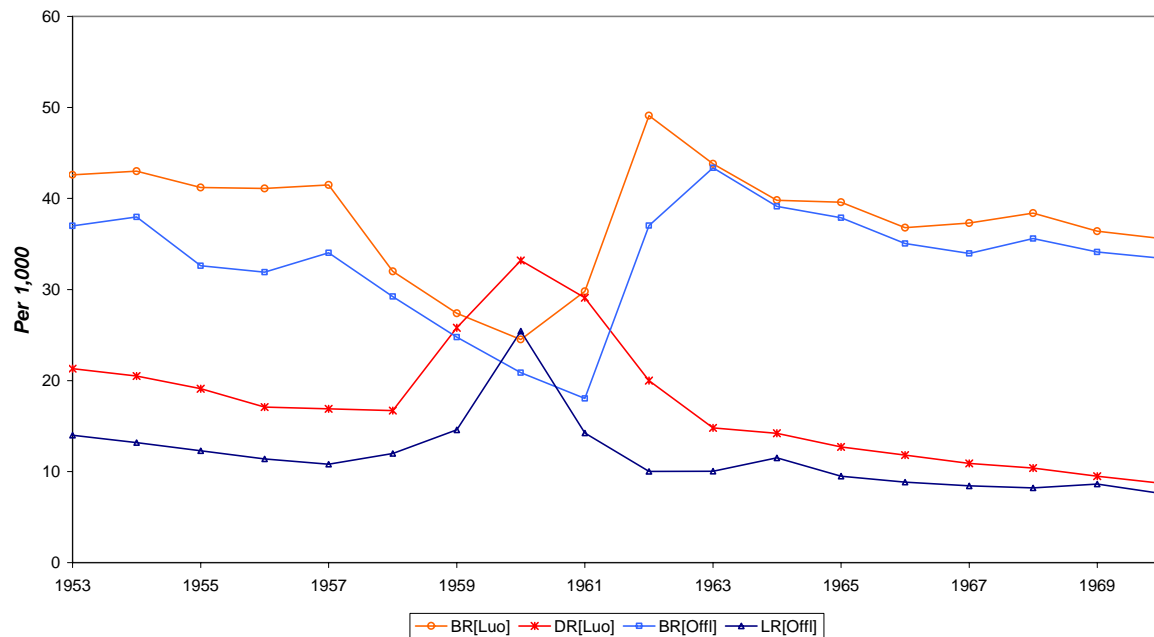
¹⁰ Banister 1987: 114-15; Ashton *et al.* 1984; Luo 1988 : 136-40 ; Riskin 1998 : 113-14.

¹¹ Compare Li 2006: 272; Edgerton-Tarpley 2008: ch. 1.

¹² For more on these famines see Davis 2001; Edgerton-Tarpley 2008.

¹³ Devereux 2000.

Fig. 4.1. Birth and Death Rates, 1953-1970: Official and Luo (1988)



There can be little doubt that modern famines are, relatively speaking, far less murderous than earlier ones. Although non-crisis death rates in Africa remain high, excess mortality from famine in recent decades has been low. In Stephen Devereux's recent listing of major twentieth-century famines only two – the war-famines of 1968-70 in Nigeria and 1983-85 in Ethiopia – are accorded tolls nearing one million. Both estimates probably exaggerate. In other well-known famines – in the Sahel in the early 1970s, in Darfur in the mid-1980s, in Sudan (Bahr el Ghazal) in 1998 – victims were far fewer. Other estimates in Devereux's list are also probably on the high side. That of 1.5 million to 2.0 million deaths in Cambodia in 1979 bears comparison with estimates by the CIA, which imply that 0.35 million, or six per cent of a population of less than six million, perished from famine. The figure of 1.5 million given for Bangladesh in 1974/5 also exaggerates the likely toll: if the excess mortality rate of

seven per thousand in Matlab *thana* is at all representative, then aggregate famine mortality in Bangladesh as a whole was about 0.5 million. The 2.8-3.5 million estimate for famine in North Korea in 1995-99, as noted above, is also much too high.¹⁴

4.3. Gender and Age

The husband has deserted the wife;
The maternal uncle has sold his niece in order to eat;
The mother-in-law bakes bread, the father-in-law eats it,
While the daughter-in-law counts minutely each mouthful swallowed

Indian famine song, c. 1900¹⁵

The sense that the horrors of famine fall disproportionately on women, highlighted in the above verse from nineteenth-century India, is often reflected today in the publicity campaigns of development aid agencies and in the writings of campaigning journalists. According to Agence France-Presse in 2003, 'despite international efforts to avert more suffering caused by food shortages in Ethiopia, women and children are still dying of malnutrition and diseases.' In Lietuhom in Southern Sudan in 1999 victims of famine were 'children, women, men at an average of six per day'. The 'principal victims' of famine in North Korea in the 1990s were deemed to be 'children, women and the elderly'. David Arnold's classic *Famine*:

¹⁴ <http://www.mekong.net/cambodia/demcat.htm>; Dyson 1991; Lee 2005; Noland 2007.

¹⁵ Cited in Sharma 2001: 114.

Social Crisis and Historical Change also 'feminizes' famine, arguing that its burden fell, and falls, 'with exceptional severity upon women'.¹⁶

Today the feminization of famine, by highlighting women as its main victims, is commonplace. Yet most of the evidence suggests that males are more likely to perish during famines than females. A sympathetic and close observer of the Irish famine noted in 1849:¹⁷

No one has yet...been able to explain why it is that men and boys sink sooner under famine than the other sex; still, so it is; go where you will, every officer will tell you, it is so. In the same workhouse, in which you will find the girls and women looking well, you will find the men and boys in a state of the lowest physical depression; equal care in every way being bestowed on both sexes.

Demographic evidence corroborates this claim, finding that although the life expectancy of men in non-crisis times exceeded that of women, males were more likely to succumb during famines than females. For example, in the wake of the disastrous famine that followed the eruption of Laki in 1784-85 the sex ratio of Iceland's population fell to 784 from a norm of about 850. In the six west Cork parishes surveyed in detail by a public official in late 1847 men were one-third more likely to succumb than women. During the Madras famine of 1876-78, when the ratio of male to female deaths was over 1.2 to 1, one Capt. D.G. Pitcher noted that in the

¹⁶ http://act-intl.org/news/dt_1997-99/dtsud499.html (Sudan); 'Ethiopian famine strains women, children', 21 August 2003 (AFP); Arnold 1989: 86.

¹⁷ Osborne 1850: 19.

Rohilkand Division 'the excess of deaths in men over women is a singular fact well known to the people themselves'.¹⁸

During the Leningrad blockade, it was a similar story. Males were much more likely to be admitted to hospital in a state of semi-starvation than females, and males were also much more likely to die than females. On the Greek island of Syros in 1941-2 the male death rate rose eightfold, while the female death rate rose only fivefold. The male disadvantage was widely noted at the time. Males aged 15-35 years were at particular risk.¹⁹ The patterns on Syros were replicated on Mykonos and in Athens/Piraeus. Finally, Chinese demographic data imply that in the seven Chinese provinces that lost population between 1957 and 1961 there were 725,000 fewer males and 366,000 fewer females by 1961, while in the rest of China both male and female populations rose by 1.5 million.

The evidence that females survive famine better than males is by now overwhelming. Indian anthropologist Tarakchandra Das offered his own explanation for an analogous outcome in Bengal in 1943-44: women, he believed, had easier access to public relief, while greater physical exertion, often in bad weather, told against the males. Das did not believe that women's control of the domestic food supply and their store of ornaments offered them a cushion against starvation; they were less at risk because their husbands 'will very generally rather starve than see their wives starve before them'.²⁰ Be that as it may, males accounted for over three-fifths of those who died after leaving home in Bengal in 1943-4.

¹⁸ Tomasson 1977: 420; Hickey 2002: 215-17; Das 1949: 93-95; Sami 2002; Macintyre 2002.

¹⁹ Hionidou 2006: 168 (Fig. 9.3b).

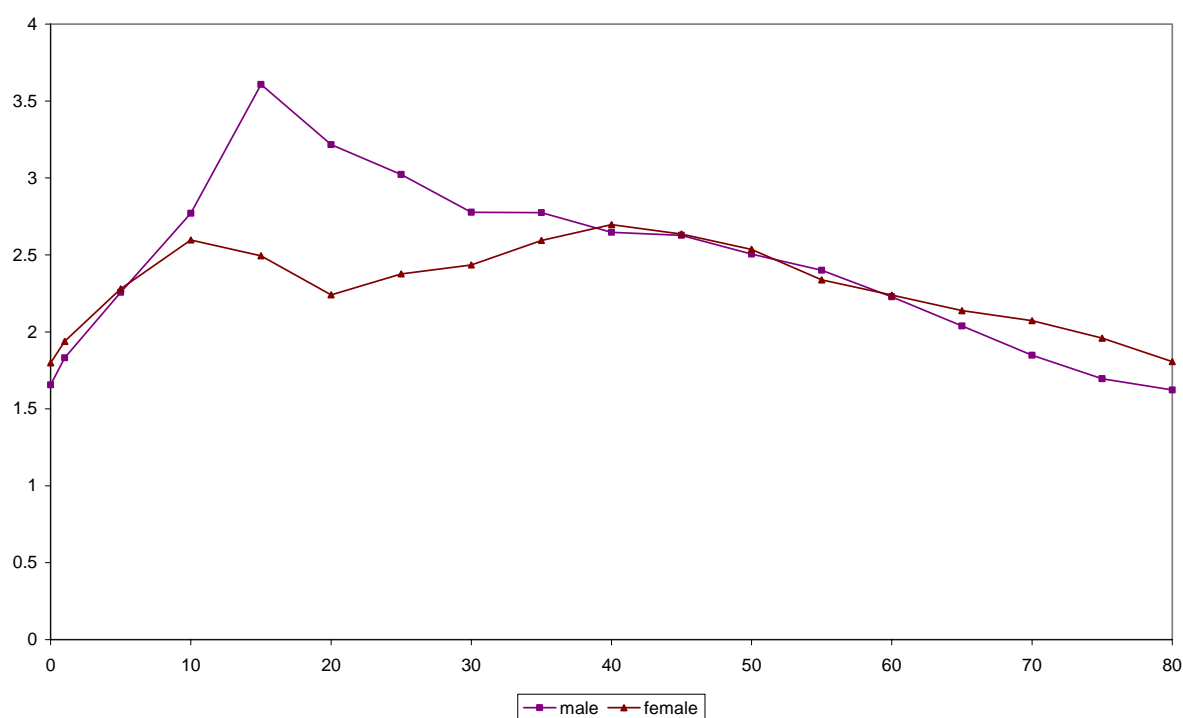
²⁰ Das 1949: 94-95.

The most plausible explanation for this female mortality advantage – which is usually the reverse of non-famine patterns – is physiological. Females store a much higher proportion of body fat and a lower proportion of muscle – an encumbrance in famine conditions – than males. The gender advantage is not confined to humans: there is a good deal of research showing that other male mammals also suffer disproportionately in times of food shortage. Among Siberian deer, for example, the harsh winter of 1976-77 ‘produced a particularly high mortality differential between stags and hinds’. In this instance, dimorphism works to the female’s relative advantage. The evidence is still too thin to say how the female advantage has changed over time. However, there is some presumption that the more important is literal starvation rather than infectious disease as the cause of death, the greater the female advantage. This would imply that during World War II women were at proportionately less risk in, say, Leningrad and Greece than in Bengal or Vietnam. The reduction in the birth rate, described above, is also likely to have increased female survival changes.

As far as mortality by age is concerned the evidence is mixed. Most famine victims have always been young children and those beyond middle age, but the greatest proportional increases in death rates have tended to be at ages where mortality is relatively low in normal times. A famine in the Puglian community of Orsara in 1764 increased infant mortality by three-quarters, while the death rate of those aged 1-7 years rose sevenfold, and that of all other age-groups rose four to fivefold. In Berar in 1900 infant mortality doubled but mortality among 10-14 year-olds trebled. In Finland infant mortality doubled in 1868, and the death rate of the

over-65s trebled, while that of 10-24 year olds quadrupled, and that of 25-44 year-olds quintupled. In rural Bengal in 1943 the pattern was similar to that in Berar or the USSR. The interesting differences between rural and urban Bengal was a reflection of the age-distribution of migrants from the countryside, the main victims in urban areas. Figures 4.2(a)-4.2(e), which provide more data on death rates in the above cases, highlight the generality of famine gender gap but show that over-generalisation about age is not warranted.²¹

Figure 4.2a. USSR 1922



²¹ Figure 4.2a, derived from Adamets 2002: 332-3, uses 1924 as a 'normal year.'

Figure 4.2(b). RURAL BENGAL 1943-44

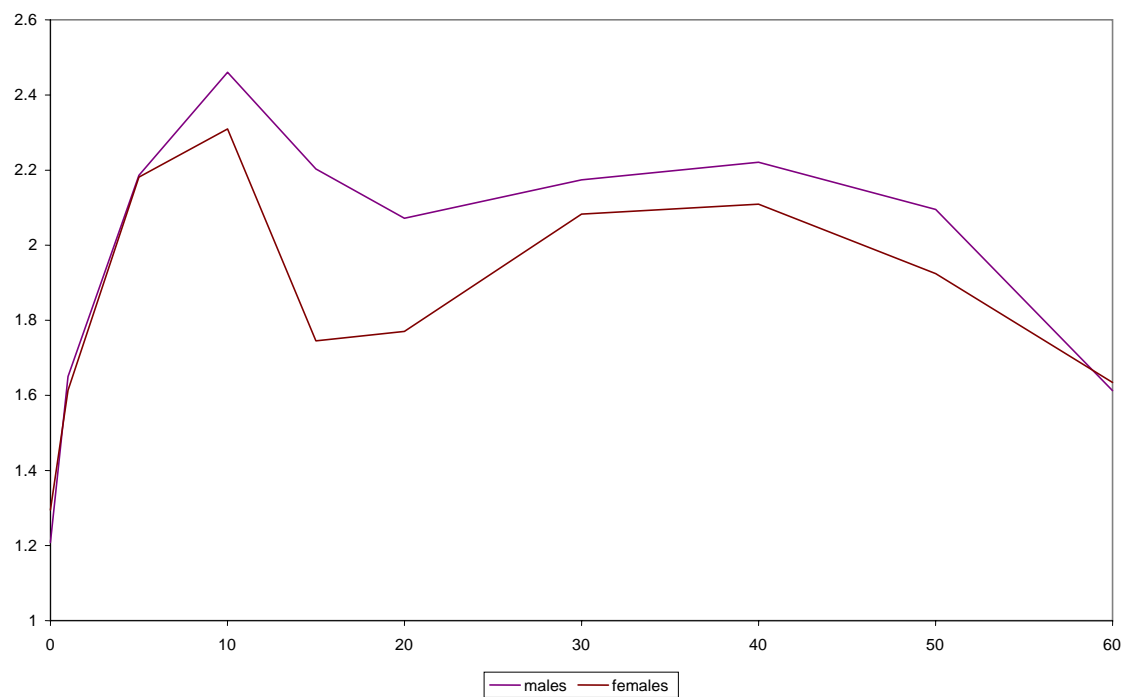


Figure 4.2[c]. URBAN BENGAL 1943-44

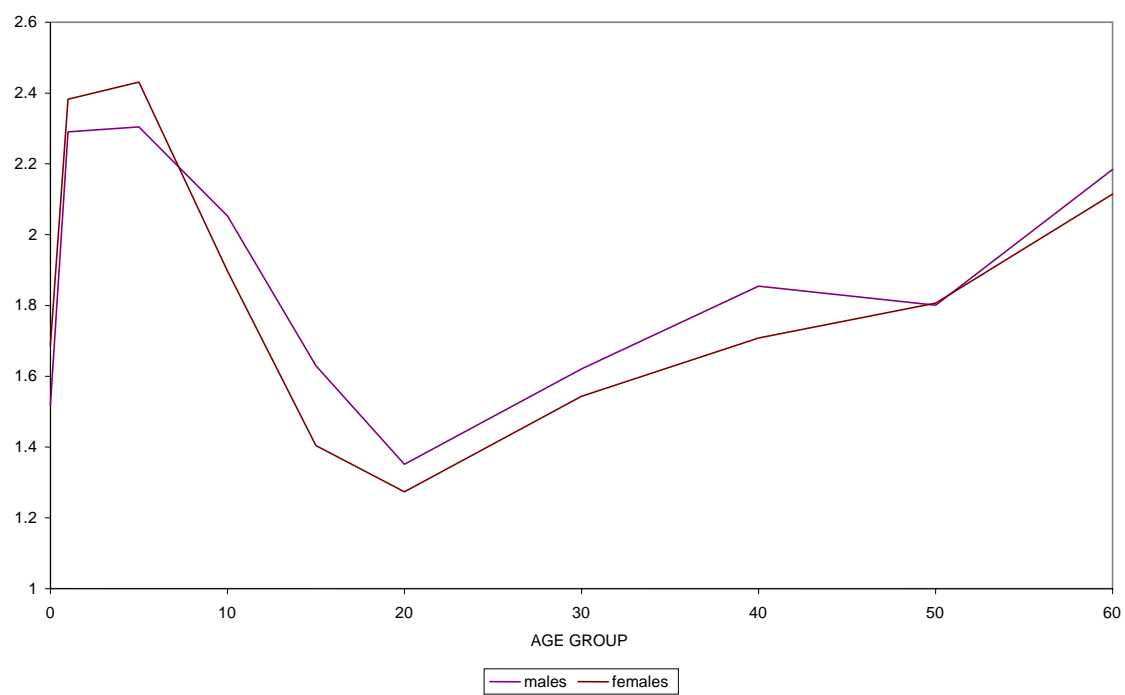


Figure 4.2[d]. BERAR 1900

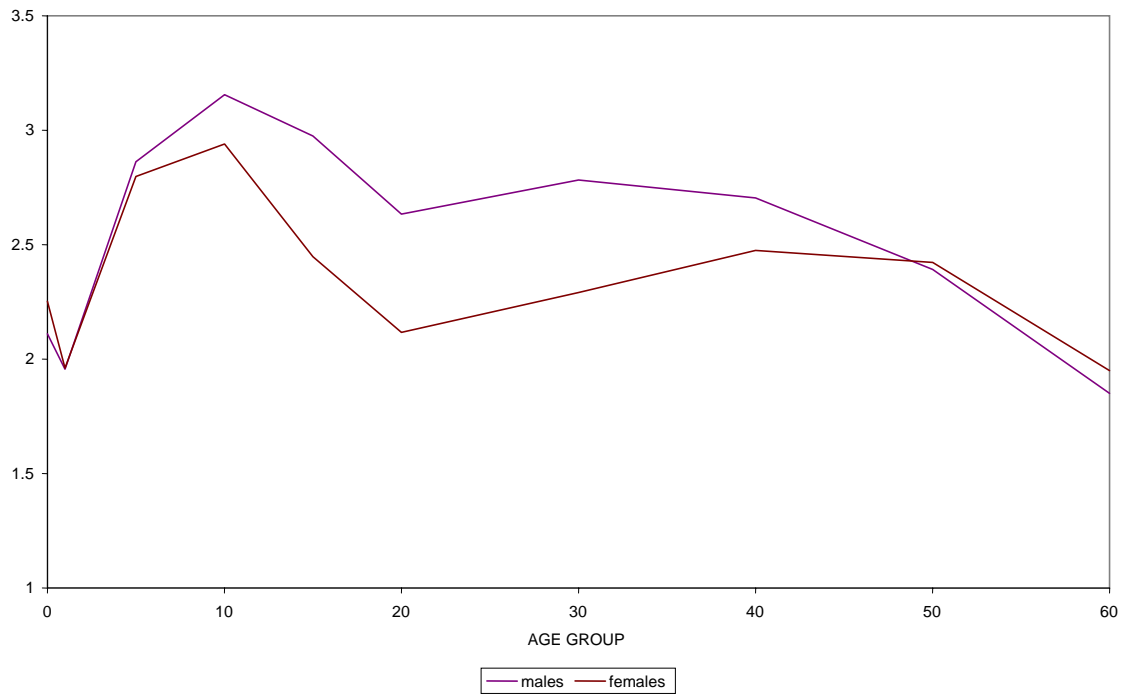
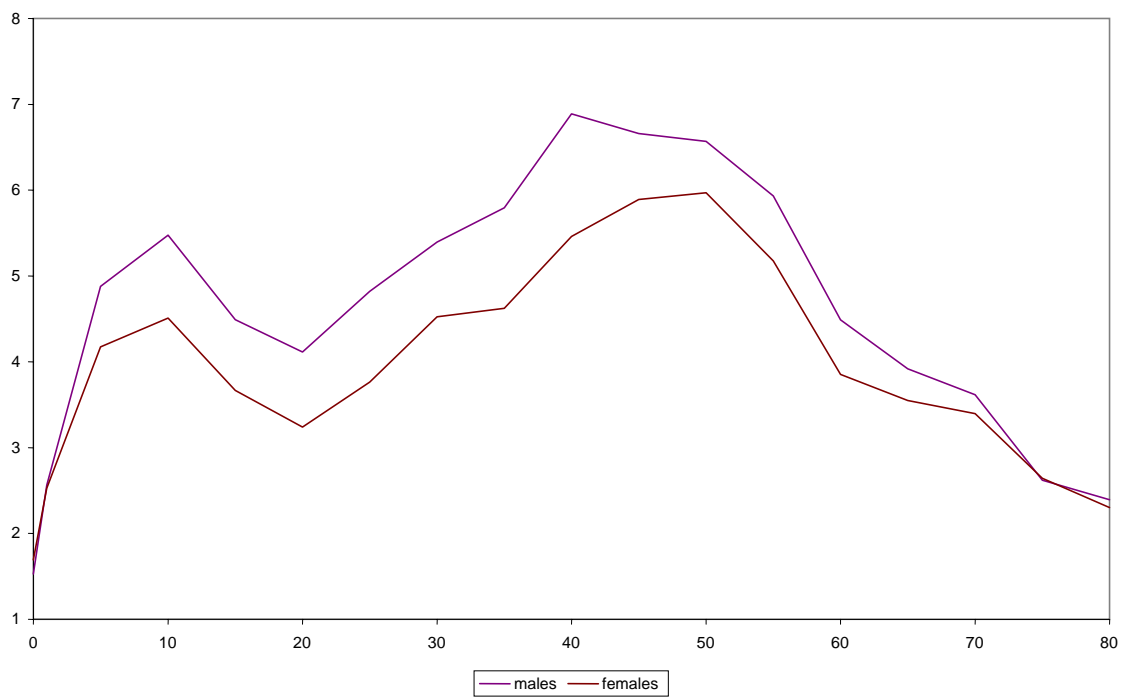


Figure 4.2(e). FINLAND 1868



4.4. Missing births

That famines nearly always kill goes without saying; do they also affect the number of births? In a well-known paper John Bongaarts and Mead Cain²² posited little impact on fertility since pre-famine conceptions had a minimal risk of miscarriage. In the longer run, they argued that fertility should rise as couples sought to insure against a repetition of famine through having more children. The reality is quite different. Famines almost invariably entail significant reductions in births and marriages. Without those reductions mortality would be higher. Indeed, reduced fertility is probably a more common symptom of famine than increased mortality.

Some demographers claim that averted births should be included in the demographic reckoning. In Ireland it has been estimated that 'lost births' numbered about 0.4 million in Ireland in the 1840s, whereas in China in the wake of the 1959-61 famine they have been reckoned as high as thirty million.²³ Such averted births are casualties of famine and should not be ignored. However, by the same logic the reduction in deaths and rebound in births that often follow in famine's wake should not be ignored either.

Famines also usually entail a decline in the marriage rate, but this rarely accounts for the decline in births. In France in 1694, for example, the drop in the number of births below the pre-famine norm was about six times the drop in marriages in the previous year. Reductions in the marriage rate are likely to have been greatest in the lower socio-economic groups, as in Bangladesh in 1974-75. In the

²² Bongaarts and Cain 1982.

²³ Mokyr 1980: 246-49; Yao 1999; also Razzaque 1988.

wake of famines, marriages postponed during the crisis sometimes lead to a rebound in the marriage rate.²⁴

There are several likely reasons for the decline in the birth rate. In the 1990s nutritionists identified the link between the hormone leptin, which is lacking when food intake is low, and reproductive functioning. This sharpens the link proposed in the late 1970s by Rose Frisch between reduced body fat deposits and fecundity. Lower libido is also a likely factor. Testosterone levels depend on nutrition, and so are much lower in times of famine. One of those involved in the Minnesota Human Starvation Study, which used as test subjects conscientious objectors to military service during World War II, exclaimed after weeks of semi-starvation: 'I have no more sexual feeling than a sick oyster'. In blockaded Leningrad Elena Kochina continued to sleep next to her husband, but only because they had only one bed: 'even through padded coats it's unpleasant for us to feel one another's touch'.²⁵ The main character in Knut Hamsun's *Hunger* (1890) fends off the offers of a friendly streetwalker with the complaint that [he had] 'absolutely no desire'. This decline in libido had its compensation: it conserved energy better devoted to seeking food. In Ireland the reduction in libido is reflected in the halving of the number of reported rapes in 1847-49 and, more poetically, in the line of a Kerry song saying that since the potato failed 'it was safe for young maidens to venture out alone'. A further reason for a declining birth rate during famines is spousal separation: men are more likely to migrate to seek work (see Chapter 3), and women more likely to migrate in order to beg.

²⁴ Lachiver 1991; Razzaque 1988.

²⁵ Keys *et al.* 1950 : vol. 2 :839; Kochina 1990: 67.

The decline in births in besieged Leningrad in 1942 is probably unparalleled in history. The number of births recorded there dropped from 4,229 in January and 2,883 in February to a monthly average of only 86 in the last four months of the year. During 1942, the birth rate was 6.3 per thousand, or about one-quarter of the non-crisis norm. Moreover, during the first half of 1942 two-fifths of births were premature, and during the siege as a whole one delivery in four was stillborn or perished within a month.²⁶

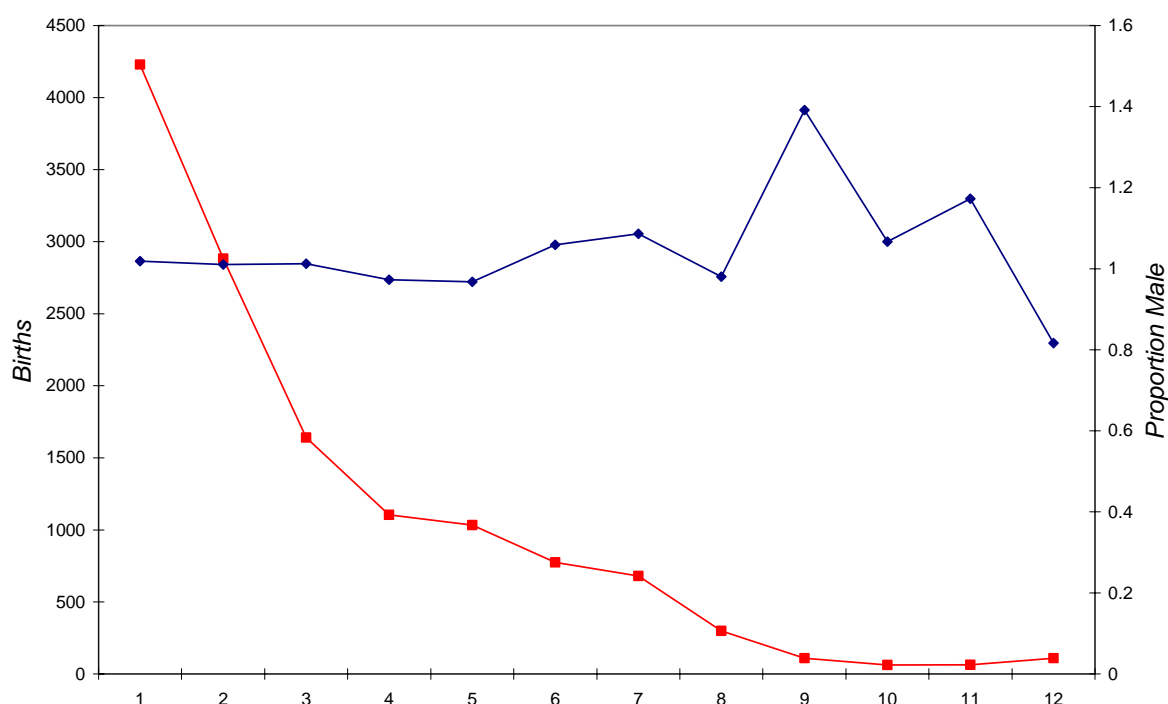
In the case of China in 1959-61 averted births are even harder to calculate than excess deaths, given the sizeable fluctuations in births during the period straddling the crisis. However, as Figure 4.1 makes plain, the recorded drop in births in 1960-61 was followed by an emphatic rebound in the following years. Births in 1962 exceeded those in any year since 1951, and in the following few years the birth rate was also higher than in any other year in the 1950s and 1960s. Indeed, the surplus over trend in 1962-65 – insofar as any pattern can be detected from these data – far exceeded the deficit between 1959 and 1961. Should these births be left out of the account, should they be deemed births postponed at the height of the crisis, or was the rebound unrelated to the events of 1959-61?

A related effect concerns the sex ratio of births during famines. Since bearing males exacts a greater toll on mothers, and since malnourished infant males are less likely to survive than infant females, famines may, for physiological reasons, reduce the proportion of males born. In evolutionary terms male foetuses could lose out because they require more energy. Hard evidence on this issue is thin, however.

²⁶ Antonov 1947.

During the Leningrad siege-famine the proportion of females did not rise (see Figure 4.3), but a recent study of the long-term demographic impact of the Great Leap Famine finds that it did in China in 1959-61.²⁷

Figure 4.3. Leningrad, 1942: Total Births and Proportion Male



4.5. What do People die of during Famines?

The symptoms of some of the most common present-day famine diseases – the swollen bellies and reddened hair of protein-starved kwashiorkor victims, the emaciated looks of children suffering from marasmus – are familiar from the media. History is full of depictions of famine diseases and their victims: ‘people [who] looked like they were from Hades, while others looked like pregnant women’

²⁷ Cherepenina 2005: 60-61; Almond *et al.* 2007.

(Thessalonica, 676-78AD), skin like 'dirty parchment...drawn tightly over the skeleton' (Ireland, 1847), young men 'tottering on their feet, and leaning on sticks as if ninety years of age' (China 1877), 'lips that are mere skin, ...eyes glimmering dimly in hollow sockets' (India 1896), children 'the colour of charred wood' (India, 1943), 'skins sticking like paper to their skeletons while the bones protruded out...body hair [sticking] out like thick black pins all over their bodies' (India 1943). Most of these images refer to signs of starvation. Yet although the lack of food is the ultimate reason for most famine mortality, infectious diseases rather than literal starvation account for the majority of famine deaths.

Two broad classes of causes of death are responsible for higher mortality during famines.²⁸ The first relates directly to nutrition, and includes actual starvation. More often, however, victims of this class succumb to nutritionally sensitive diseases brought on by impaired immunity, or to poisoning from inferior or unfamiliar foods that would not have been consumed in normal times. The second class is indirect and relates to the disruption of personal life and societal breakdown resulting from the famine. It may stem from increased mobility among the poor or from the deterioration in personal hygiene as people grow weaker and more despondent. Famines are also associated with outbreaks of seemingly unrelated diseases such as cholera, malaria, and influenza.

Tarakchandra Das's graphic eyewitness account of the destitute living on Calcutta's streets in mid-1943 is apposite here. The victims he encountered had no regard for personal cleanliness. The prevalence of bowel complaints made them afraid of bathing, but bathing was pointless in any case, since they lacked change of

²⁸ Mokyr and Ó Gráda 2002.

clothing. Their clothes accumulated the dirt of the streets; they answered calls of nature in alleyways and open spaces. Many relied on leaves to contain the gruel doled out in the public kitchens; this meant losing some, but they scooped up what they could from the pavement. Often they relied on contaminated rain water for drinking; they ransacked dust-bins and garbage heaps for left-overs. The rough, sometimes unhusked, *bajra* grain used in the gruel-kitchens accentuated their bowel complaints.²⁹

The Bengali famine and the Leningrad blockade-famine happened within a year of each other. The latter – the biggest ever in an industrialised economy – was the more intense of the two: about one-third of the city's population succumbed to it. Perhaps it would not have been so murderous had the Soviets airlifted more food in, and moved more citizens out. That was much easier said than done, however. One of the striking differences between the two famines is that while infectious diseases were responsible for most deaths in Bengal, few of Leningrad's 0.8 million or so victims perished of contagious diseases. This is all the more remarkable given that such diseases had been rampant in Russia during the famine of 1921-22, and endemic in non-famine conditions. One of the first actions of the People's Commissariat of Public Health, established in 1918, was to make the notification of infectious diseases compulsory. Between 1918 and 1921 over six million cases were notified, and presumably many more were not. In Leningrad seventy thousand cases of infectious disease in a population of less than one million were notified to the authorities. Yet little more than two decades later, according to the account of one *blokadnik*:³⁰

²⁹ Das 1949: 5-8.

³⁰ Pavlov 1965: 124-5.

How is the absence of epidemics to be explained, given conditions of acute hunger, shortage of hot water, lack of protection from cold weather, and physical weakness? Leningrad's experience proves that hunger need not be accompanied by the inseparable fellow travelers, infectious disease and epidemics. A good system of sanitation breaks down their comradeship, for not only during the winter months of 1941 but in the spring of 1942, when conditions were most favorable for outbreaks of disease, no epidemics occurred in Leningrad. The government set the people to cleaning streets, yards, staircases, garrets, cellars, sewer wells – in brief, all the breeding grounds where infectious disease might start. From the end of March to the middle of April, 300,000 persons worked daily cleaning up the city. Inspections of living quarters and compulsory observance of rules for cleanliness prevented the spread of communicable disease. The inhabitants were starving. Nonetheless, they fulfilled to their last days the social obligations necessary in a crowded community.

Scientist Elena Kochina, who also survived the blockade, noted in her diary the widespread presence of dystrophy on 10 December 1941, but a month later could still claim that there were no infectious diseases. The contrast with previous famines is indeed a striking one. The cold weather helped, given that the crisis was at its worst during the winter of 1941/2. As noted in the Pavlov's account, patriotic zeal and the energy and ruthless efficiency of the municipal authorities under Andrei Zhdanov were also factors. Zhdanov and the political leadership lived a little better than the people at large, but only a little better; many suffered permanent damage to their health. At the height of the famine, bronchopneumonia was diagnosed in three autopsies of every four. Acute tuberculosis, scurvy, and pellagra were also present. Dysentery was inevitable, but there were only sporadic outbreaks of typhus and

typhoid fever. Indeed, the numbers succumbing to typhoid fever, typhus, and dysentery – the classic famine diseases in temperate climates – were fewer in December 1941, at the height of the crisis, than in December 1940, before the blockade began.³¹ Although the authorities managed somehow to keep the city free of infectious disease, excess mortality was nonetheless enormous.

The success of the Leningrad authorities in keeping infectious diseases under control was replicated, although on a much smaller scale, in the Warsaw Ghetto, in western Holland during the 'hunger winter' of 1944-5, and in Axis-occupied Greece.³² As the death rate in the Warsaw Ghetto rose fourfold between 1940 and 1941-2, the proportion attributed to literal starvation shot up from one percent to 25 percent. Ironically, although the Nazis had created the ghetto in 1940 on the false pretext of shielding the non-Jewish population from typhus-infected Jews, the share of typhus in excess mortality remained relatively small. Yitzhak Zuckerman, a leader of the Jewish resistance, later reminisced: 'People often had high fever...[but] we had no cases of death from typhus'.³³ On the Greek island of Syros in 1941-2 over seven deaths in ten were attributed to starvation, hunger oedema, and general exhaustion or wasting of the body. Only five per cent of deaths was attributed to gastro- causes. Typhus and typhoid fever hardly registered at all. There was free vaccination against typhus, and the overall hygiene situation was good.³⁴ The share of typhus in excess mortality in the western Netherlands in 1944-45 was also small.

³¹ Kochina 1990: 52, 70; Salisbury 1969: 403; Brojek *et al.* 1946 and Table 4.1.

³² Ó Gráda 1999: 99-101.

³³ Zuckerman 1993, pp. 494-95.

³⁴ Hionidou 2006 : 190-219.

<i>Table 4.1. Number of cases of disease in Leningrad December 1940 and 1941</i>		
<i>Disease</i>	<i>Dec. 1940</i>	<i>Dec. 1941</i>
Typhoid fever	143	114
Dysentery	2,086	1,778
Typhus	118	42
Scarlet fever	1,056	93
Diphtheria	728	211
Whooping cough	1,844	818

Source: Pavlov 1965: 124 (from a report of the Leningrad Health Service, Jan. 5 1942)

A striking feature of conditions in the Netherlands before the *Hungerwinter* of 1944-45 is that despite the high population density and the non-availability of imports, the Dutch fared relatively well in terms of food and well being until September 1944. Neither the birth rate nor the death rate was affected. But popular memory of the war is heavily conditioned by events in the western Netherlands in eight months or so before liberation in April-May 1945. By the end of war half of the women in that part of the country had stopped menstruating, and the average weight loss was about 15-20 per cent. Estimates of the total number of deaths range from sixteen to twenty thousand out of a national population of over nine million. In this very 'modern' famine, in which infectious diseases were largely kept at bay, infants and elderly males without family support suffered most.³⁵

The pattern described applies to 'modern' famines occurring in relatively developed economies in abnormal conditions. Even before 1939 both the Dutch

³⁵ Trienekens 2000.

population and the Jews of Warsaw were almost entirely literate; they had access to clean running water for drinking and washing, sufficient changes of clothing and bedding to ward off lice, and stone housing that was relatively easy to keep clean; they also had good cooking facilities for what food there was and received good medical advice. Measures that prevented the spread of infectious disease had become part of their daily routine, and must have continued to do so during the war. Unlike the Russians in 1918-22 and Bengalis in 1943-44, they were able to use the preventive measures implied by the findings of Louis Pasteur and Robert Koch.

Meanwhile, in sub-Saharan Africa, infectious diseases remain endemic in non-crisis years and they still increase the death toll from famines.³⁶ In the emergency refugee camps of Eastern Sudan in 1985 children aged less than 5 years were severely undernourished, but they were more likely to succumb to measles, diarrhoea/dysentery, respiratory infections and malaria than to starvation. Malnutrition and disease increased in these refugees after they arrived in the camps. In 1985 there were epidemics of cholera in Somalia and Ethiopia: in the Sudan 'acute gastroenteritis' and '001' were the official euphemisms for the same disease.³⁷

It follows that the causes of death from famines in sub-Saharan Africa today have much more in common with Ireland in the 1840s or India in the 1890s than with famine-affected regions of Europe in the 1940s. Why is this so? Part of the answer is the cost of medical care: extreme poverty is responsible for children catching deadly diseases even when their parents are familiar with the modes of transmission simply because they cannot afford the minimal needs for prevention. Thus, in Thane, near

³⁶ Salama *et al.* 2001; Waldman 2001.

³⁷ Shears *et al.* 1987; . <http://www.davidheiden.org/dust.htm> (downloaded 7th Sept 2007)

Bombay, a woman who had already lost two children through water-borne illnesses pointed out that 'to boil water consistently would cost the equivalent of US\$4.00 in kerosene', a third of her annual income.³⁸ Another part of the answer must be that while knowledge may have spread at least to medical personnel and officials, behavioral patterns and consumption were subject to a great deal of inertia. It is not enough for people in some sense to 'know' what causes disease, they have to be *persuaded* to change their behavior. Even more important is that the associated remedies must have been difficult to effect in the existing crisis conditions. In sub-Saharan Africa, the world's main remaining famine-prone region, infectious and parasitic diseases alone are still responsible for nearly half of all deaths even in normal times, with diarrhoeal diseases accounting for nearly one in four of those. Another 13 per cent are due to respiratory diseases. In Asia (excluding China) the same categories account for about one-third of all deaths.³⁹ In other words, in such places these diseases are endemic: little wonder, then, that they dominate during famines. Much mortality in both Africa and Asia – both crisis and non-crisis – could be prevented by low-cost primary health care such as immunization, prophylactics, and re-hydration. In these underdeveloped areas, however, public health lags rather than leads medical science.⁴⁰

In demographic terms, the Soviet famine of 1931-3 may have marked the beginning of a transition from 'traditional' to 'modern' insofar as the main causes of death were concerned. Traditionally, famine brought a disproportionate increase in deaths from infectious diseases. However, in the Soviet case, while there was a big

³⁸ Bryceson 1977: 111.

³⁹ Murray and Lopez 1994.

⁴⁰ Mokyr and Ó Gráda 2002.

rise in recorded cases of typhus and typhoid fever, the *proportion* of all deaths due to infectious diseases was lower in 1933 (the first year in which the data were recorded) than in the immediate wake of the crisis in 1934.⁴¹

It is commonplace to argue that famines nowadays are rarely the product of food supply declines alone.⁴² The ready availability – at a price, of course – of medical technology to prevent and treat infectious diseases such as typhus and dysentery compounds the anachronistic character of present-day famine. Even before the widespread availability of prophylactics, the revolution in hygiene spawned by Pasteur and Koch changed the character of famine mortality in different parts of Europe during World War II. In contrast, as noted above, even today much of sub-Saharan Africa has yet to undergo this 'epidemiological transition'.

Historical demographer Massimo Livi-Bacci notes that 'in those cases where social organization, though sorely tried, nevertheless survives, increased mortality is imputable above all to the "direct and final" consequences of starvation rather than to epidemic attacks'⁴³. While this is so, a better generalization might be that in places where infectious disease is endemic in normal times, it wreaks havoc during famines. Hence measles is a big killer during modern famines in sub-Saharan Africa: vaccination is lacking. The degree of 'social organization' depends on economic development.

Moreover, the incidence of the different causes of death is likely to vary by age and gender. In Ireland in the 1840s nearly half of all reported deaths from starvation and one-third of deaths from diarrhoea/dysentery were of children aged less than ten

⁴¹ Wheatcroft 1983; Davies and Wheatcroft 2004: 430-1; Adamets 2002: 171-2.

⁴² Sen 1981.

⁴³ Livi-Bacci 1991: 47.

years, compared to only one fifth of those succumbing to 'fever'. Females accounted for 50.4 per cent of cholera victims and 47.1 per cent of those dying of 'fever', but only 42.7 per cent of those dying of diarrhoea/dysentery and 41.4 per cent of those who starved to death. In the case of the northwest of England in the late sixteenth and early seventeenth centuries, Andrew Appleby inferred from the population age-structure and seasonality of burials from local parish registers that excess mortality in 1587-88 was mainly due to typhus, whereas in 1597-98 and 1623 most famine deaths were caused by starvation, not disease.⁴⁴

During the Great Irish Famine, the graver the crisis the higher was the incidence of starvation and dysentery/diarrhoea, and the more likely they were to have been the proximate causes of death. Further, although the incidence of fever increased sharply in the worst hit regions, the proportion of famine deaths due to 'fever' tended to be fairly constant across the island.

⁴⁴ Appleby 1978.

<i>Table 4.2. Main Causes of Excess Deaths in Ireland in the 1840s [%]</i>		
Cause	Ulster	Connacht
<i>Hunger sensitive:</i>	20.2	26.5
Dysentery/Diarrhoea	11.8	16.3
Starvation	2.4	5.2
Dropsy	2.3	1.9
Marasmus	3.8	3.2
<i>Partially sensitive:</i>	49.7	40.4
Consumption	10.0	5.8
Others	39.7	34.5
<i>Not very sensitive:</i>	30.1	33.1
Fever	19.3	23.7
Cholera	2.3	3.7
Infirmity, old age	8.5	5.7
<i>Total</i>	<i>100.0</i>	<i>100.0</i>

Little is known about the mechanics of mortality in China in 1959-61. Before 1949 infectious diseases ‘plagued the country and threatened many lives’. In Notestein’s study of a large sample of rural Chinese households in 1929-31, of the five most important causes of death (out of sixteen) on which information was sought were smallpox, dysentery, typhoid, tuberculosis, and cholera (in that order).⁴⁵ Table 3, based on a study of Yunnan province in southwestern China in the early 1940s, implies that infectious diseases then played as big a role in Yunnan as they did in Ireland on the eve of the Great Famine. Perhaps the most striking differences are the much smaller proportion of pre-famine Irish deaths attributed to dysentery/diarrhoea and to cholera.

⁴⁵ Notestein 1938.

<i>Table 4.3. Main Causes of Death in Ireland in 1840 and in Yunnan Province, China in 1940-4 [% of total]</i>		
<i>Cause</i>	<i>Ireland, 1840</i>	<i>Yunnan, 1940-4</i>
Smallpox	4.35	6.73
Dysentery/ diarrhea	1.04	14.09
Cholera	0.19	11.97
'Fever' (incl. Typhoid)	12.69	12.08
Other infectious (incl. measles, scarlet fever)	12.36	6.66
Convulsions	5.00	7.25
Coronary, respiratory	15.23	12.66
Digestive	11.44	5.54
Infirmity, old age	19.08	6.16
Total violent and sudden (incl. external)	3.32	2.32
Other and unspecified	15.25	14.44
Total	100.0	100.0
Source: Mokyr and Ó Gráda 2002: Table 1; Chen 1946: Tables 25 and 26		

Although Yunnan was relatively poor even by Chinese standards, the comparison suggests that infectious diseases should also have bulked large in 1959-61. Yet popular accounts of the GLF famine emphasize starvation rather than disease. By implication the Chinese famine of 1959-61 was, like those in Leningrad, the western Netherlands, and Greece during World War II, a 'modern' famine in terms of marked a transition: proportionately far fewer victims died of infectious diseases than in 1917-22. Could the Maoist campaigns to improve water quality and personal hygiene and impose mass inoculation against infectious disease have had such a dramatic effect within the space of a few years, thereby altering the causes of death during the 1959-61 famine? A graphic and unsettling account of conditions in Fenyang in Anwui during the famine refers to '*e si*' (death by starvation); other

accounts refer to dropsy (i.e. hunger edema) and hepatitis (probably linked to the consumption of unhealthy or contaminated foods), but do not mention classic famine-related epidemics.⁴⁶ But the issue surely requires further dispassionate investigation.

4.6. *Long-term impacts*

Famines often wreaked demographic devastation in the short run: what of their long-term impact? Let us consider their broad economic impact first. Because famines usually leave non-human inputs relatively unscathed, they are likely to shift income distribution in labor's favor. Farmers in turn are prompted to shift away from labor-intensive to more land-intensive cultivation and output. This is what happened in England in the wake of the Black Death; the rise in the land-labor ratio led to higher wages and reductions in crop yields per acre. In Ireland after the 1840s, these adjustments were accentuated by the persistence of emigration after the famine and the rise of livestock prices relative to those of grain. However, where population recovers in the wake of famine, the effects just described are unlikely to be permanent.

History suggests that malnutrition and disease in 'normal' times were more potent positive checks on population growth in the long run than the Third Horseman. One reason for this is that famines were probably not frequent enough to fulfill their Malthusian mission. A second is that famines offered no more than an ephemeral 'remedy' to overpopulation unless survivors 'learned' from the tragedy that they had escaped, since the resultant demographic vacuum would quickly be

⁴⁶ Bernstein 1983; Ó Gráda 2008.

filled. In the case of Qing China, Malthus himself conceded that famines 'produce[d] but a trifling effect on the average population'.

Recent scholarship tends to downplay the demographic impact of famine in the longer run.⁴⁷ Despite histories of enormous excess famine mortality, famine had little apparent impact on demographic trends in India, China, or the Soviet Union. Even in post-1850 Ireland, emigration rather than hunger was decisive in keeping population from rising again, and the rate of natural increase in the wake of the crisis was highest in regions worst hit by famine. The collapses in the birth rates of Russia and Europe today are having a much greater demographic impact than the famines of the past. The populations of Africa and India are still growing robustly despite past famines; that India's population grew twice as fast in 1900-40 as it had grown in 1860-1900 was only in part due to the attenuation of famine mortality. Finally, China's one-child policy has had a much bigger impact on population trends than the series of famines that came to an end with the disaster of 1959-61.

Nonetheless it would be rash to deny entirely the claims made over two centuries ago by pioneering Swiss demographer Johann Heinrich Waser⁴⁸:

The crisis caused by pestilence can be compensated within a decade. Damages caused by famine and starvation have had more severe consequences, however, because after those catastrophes the impoverished, worn-out and discouraged people are in want of the dearest necessities of life and will need years to recover. Whoever is not in the highest degree careless will think twice before he gets married, and due to

⁴⁷ Menken and Watkins 1985; Fogel 2004.

⁴⁸ Cited in Braun 1978: 324.

the fact that children will not be considered the blessing of God but rather a burden of married life, the population will increase very slowly.

Waser would have understood the well-known reluctance of the post-famine Irish to marry. The catastrophe of the 1840s supposedly taught them to strive for higher living standards through an end to the subdivision of farms and marrying later and less. Smaller farms, instead of being divided up, were sold off, or else passed on to neighboring relations. The shift allegedly exacted a price in increasing intra-familial tension as brothers competed for farms, and their sisters for dowries. There is evidence, certainly, of a decline in nuptiality and of increasing emigration and literacy – proxies for ‘modernization’. However, such a ‘shock therapy’ interpretation of post-famine Ireland does not square with all the evidence; in particular, the propensity to marry was slowest to change in Ireland’s poorest counties. There is tentative evidence too of a preventive check at work in eighteenth-century Finland, through higher proportions of men and women never marrying.⁴⁹

There is stronger evidence, in the recent past at least, of the prudential demographic response highlighted by Waser. Family planning programs in India and Bangladesh were given fillips by the famines of 1943-4 and 1974-5, respectively. In drought-prone Northern Ethiopia, it is claimed that growing ecological stress and food insecurity prompted shifts, at least for a time, in the demographic behaviors and attitudes of farming communities in the 1980s and 1990s. These included a significant increase in acceptance rates of family planning services; changing attitudes towards early marriage and having a large number of children; an actual reduction in fertility;

⁴⁹ Connell 1968; Walsh 1970.

increased out-migration (particularly by young people); and increasing involvement on the part of farmers in activities generating income outside of agriculture.⁵⁰

The impact of famine on the health and life expectancy of surviving cohorts has been the focus of a considerable medical literature in the recent past.⁵¹ There is increasing evidence of a close link between health and nutrition *in utero* and in infancy, on the one hand, and adult health and longevity, on the other. This implies that famines should have long-term demographic and health effects.⁵² A pioneering 1976 study comparing birth cohorts in and outside the area affected by the Dutch *Hungerwinter* found that deprivation during the last trimester of pregnancy and in the first three months after birth reduced the risk of obesity in adult males, while deprivation in the first trimester increased adult male obesity rates. A more recent Dutch study focusing on women found a significantly increased risk of obesity in the daughters of women pregnant during the crisis. The children of women who were pregnant during the famine were also more likely to develop late-onset diabetes, resulting in an imbalance of blood sugars. Yet another recent Dutch study suggests that women exposed to malnutrition as children are now at increased risk from breast cancer. This finding does not square with the received wisdom that reduced food intake (up to a point) cuts the risk of cancer, prompting the researchers to speculate that the famine might have disturbed hormonal factors in young females. Recent

⁵⁰ Caldwell 1998: 693; Ezra 1997; compare Hill 1989.

⁵¹ E.g. Barker 1992.

⁵² True, a major study of the Finnish famine of 1868 found no difference between the life expectancies of cohorts born before, during, and after the crisis, concluding that malnutrition before birth and during infancy was unlikely to be 'crucial' to adult health (Kannisto *et al.* 1997); while a recent study of people born during the Dutch Hungerwinter of 1944-45 could establish no connection between exposure to famine conditions and life expectancy to age 57 years (Painter *et al.* 2005).

analyses of the impact of foetal malnutrition in Leningrad on the risk of heart disease later in life found that starvation, or the stress that accompanied it, particularly at the onset of or during puberty, led to increased vulnerability to cardiovascular disease in later life.⁵³ Research in St. Petersburg – where famine was more intense in 1941-43 than in either the Netherlands in 1944-45 or even China in 1959-61 – indicates that the siege reduced the life expectancy of children who survived it, with increased incidence of arteriosclerosis damage being the main contributory factor.⁵⁴

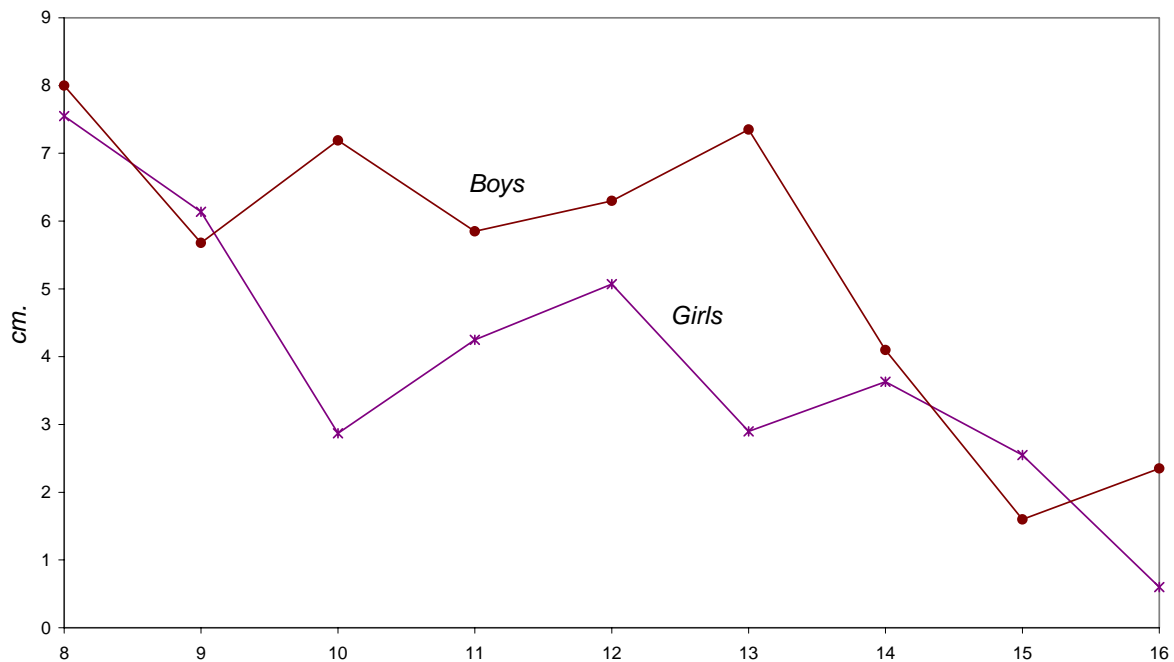
There is also some evidence that being conceived at the height of famines increases the likelihood of suffering from mental illness in later life. A study of children born in the Netherlands during and after the *Hungerwinter* found that the incidence of schizophrenia was much higher in those conceived when the crisis was at its peak. The incidence of neural tube defects among this cohort was over twice as high (3.9 per 1,000 versus 1.7 per 1,000) as for those born between August and October 1945. A much larger study of subjects born before, during, and after the 1959-61 famine in the badly-affected Wuhu region of China's Anhui province has also found that children conceived during the crisis stood a much higher risk of schizophrenia. Among those conceived at the height of the famine, the risk more than doubled (from 0.8% in 1959 to two per cent in 1960-61). Why this outcome occurred is not clear; attributing it exposure to toxic foods such as tree bark and tulip bulbs is pure speculation.⁵⁵

⁵³ Ravelli *et al.* 1976; Elias *et al.* 2004; Stanner *et al.* 1997; Sparén *et al.* 2004; Lumey 1998.

⁵⁴ Sparén *et al.* 2004; Khoroshinina 2005 : 208.

⁵⁵ St. Clair *et al.* 2005.

Figure 4.4. Height Loss of Boys and Girls Aged 8 to 16, 1945 vs. 1939



Source: Kozlov and Samsonova 2005

Being conceived or born during famines also seems to affect expected height in adulthood. The impact of famine on the height of Leningrad children is evident in Figure 4.3. Boys aged between 10 and 13 years in 1945 were about 8 cm. shorter than boys of the same age in 1939; the gap for girls was less, but still substantial. The gap is all the more striking given the likelihood of a selection survival effect in favour of stronger children. Similarly the hardships endured by those born in Germany in the wake of World War II had a significant effect on their height in adulthood.⁵⁶ A recent study by two Chinese scholars suggests that the adult heights of those exposed to famine conditions *in utero* or shortly after they were born in China in 1959-61 were

⁵⁶ Kozlov and Samsonova 2005; Greil 1998.

over an inch (3 cm.) less than they might have been otherwise.⁵⁷ The negative implications for health and life expectancy may be imagined.

Medical research into the long-term consequences of famine leaves open the further disturbing possibility that extreme malnutrition *in utero* or early childhood adversely affected the mental development of those at risk. It is too soon to generalize from the tentative results of analyses based on a few recent famines, but the medical studies just described may well indicate that the longer-term human cost of famines has been underestimated in the past.

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⁵⁷ Chen and Zhou 2007; see too Cai and Feng 2005.

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