

CHAPTER 8

POVERTY AND FAMINES

AN EXTENSION

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SCHOLARS are normally elated when they produce one big idea in a given field. Amartya Sen has produced two big insights, not one, in the field of hunger and famines. One of the insights is about how democracy prevents famines; the other concentrates on the role of entitlement failures in causing famines.

The two insights work at different levels of causation. Entitlement failures—i.e. the inability of vulnerable families or groups to command food, or work, to prevent starvation—are the *proximate* cause of famines. Since such failures are more likely to arise in authoritarian political settings, the nature of the polity enters the analysis of famines at the *underlying* level of causation. “A free press and an active political opposition”, says Sen, “constitute the best early warning system” (Sen 1999: 181). When these institutions, routinely present in a democratic polity, exert pressure, the government is forced to respond to early warnings. As a result, a democratic government finds a way to import, or procure, food from elsewhere, and supplies it to groups threatened by famine. Alternatively, democratic governments create emergency employment programs to generate incomes for the vulnerable groups, thereby enabling them to buy food available in the market. Entitlement failures are thus prevented from occurring, and an imminent famine does not become an actual famine.

While these two arguments are fundamentally compatible, what I wish to emphasize is that the methods used to generate them are strikingly different. The argument

about the relationship between democracy and famines is based on *variation in outcome* as a method of comparison. But the argument about the relationship between entitlements and famines is based on *commonality in outcome*, not variation. Let me explain.

The claim that famines do not take place in democracies is rooted in a dramatic *contrast* between India and China (Sen 1982). If we go by the standard yardsticks of infant mortality, life expectancy and malnourishment of children, it is clear that post-independence India has not looked after the health of its citizens well, but it has posted an enormous success to its credit: no famine has taken place in India since independence. India's last famine occurred in 1943, when the unelected British rulers were still in control of their Indian colony. Sen shows how after 1947 the institutions of a democratic polity, especially the press and opposition parties, played a role in spurring pre-emptive government action whenever the food supply dropped appreciably—for example, in the mid-1960s, in the first half of the 1970s and in 1985–7. In contrast, as reflected in its considerably better nutritional, infant mortality and life expectancy statistics, China has taken better routine care of its citizen's health, but it also witnessed one of the worst famines of the twentieth century, in which close to 30 million people died. The famine took place during the Great Leap Forward (1958–61). In the absence of a free press, good information on the scale of the tragedy was in all probability not available to the government, and since the system had neither free journalistic reporting nor opposition parties, Mao's regime felt no great pressure to take preventive action, even as millions starved to death.

In contrast, the central argument of *Poverty and Famines* (Sen 1981), a classic in the field of development,¹ was built upon four cases of famines: the Great Bengal Famine of 1943, and the famines of Ethiopia, Bangladesh and the Sahel, each of which took place in the 1970s. No *non-famines* were used for comparison. Sen argued that the conventional food availability decline (FAD) thesis could not explain the outcome. The FAD thesis had customarily linked famines to declines in the availability of food. Sen showed that the declines in food availability were either trivially small before or during these famines, or no declines had actually occurred. Entitlement failures caused those famines, as some vulnerable groups had neither the incomes to purchase food at a nutritionally critical time, nor any legally enforceable right to demand food, or employment, from public authorities.

Logically, if entitlement failure is the reason for famines, we ought to be able to demonstrate that *the opposite is true when famines do not take place*. In other words, if Sen has correctly identified the causal mechanism, we should be able to prove that when entitlements do not fail, famines cannot occur. Sen may still be right about the cause of famines, but without a comparison with non-famine outcomes, he

¹ As of 2007, November 30, according to the Google Scholar database, it is also Sen's third most frequently cited book. Only *Development as Freedom* and *Inequality Re-Examined* have been cited more often.

cannot be *sure* that the causal mechanism he has identified is indeed the right one. Studies based on commonality of outcome (or unvarying values of the dependent variable) can certainly knock down an existing theory, but as King, Keohane and Verba (1994) have argued, such studies cannot establish a new causal explanation.

It follows that in order to be sure that the causal mechanism has been correctly identified, we need to do with *Poverty and Famines* what Sen did with the India-China comparison. We need variation in research design. In what follows I do this briefly by bringing in some well-known cases of non-famines. The argument that emerges supports Sen at the proximate level, but at the underlying level of causation it adds a new variable: technological dynamism in agriculture. An implication is that democracy is not the only variable that protects entitlements. Technological dynamism in agriculture can also lead to the same result by more or less obviating the need for entitlement protection.

Before I develop my argument in detail, let me begin with a methodological appraisal of *Poverty and Famines*. It may not have had variation built into its design, but Sen's research strategy still had some parts that were exemplary (section I). Having highlighted those strengths, I will bring non-famines into Sen's design (section II), and draw appropriate conclusions. Finally, in conclusion (section III), I will note how Sen, in some of his works published after *Poverty and Famines*, briefly—and intriguingly—anticipates my argument, though he does not develop it fully.

I. CAUSAL MECHANISMS

Published in 1981, *Poverty and Famines* had the customary traits associated with Sen's previous scholarship: mastery of logical reasoning, surgical economy of expression, and intense engagement with a problem of profound human importance. But *Poverty and Famines* also had something strikingly novel. Until then, Sen had never conducted in-depth case studies, nor used case studies as a tool of theory formation. Although Sen had written some empirical papers before, especially on agricultural economics (Sen 1966, 1976), his arguments were better known either for abstract reasoning, or for addressing the conceptual and normative issues that empirical matters often raise: for example, how to conceptualize inequality before measuring it, or how to measure poverty (Sen 1973).

Case studies are known for what has come to be called in non-economic social sciences "process tracing" (George and Bennett 2005). Empirical in spirit, process tracing is a step-by-step account of *how* the outcome in which we are interested—starvation and famines in this case—developed. The cases may be

selected for theoretical reasons, but the investigation is deeply empirical and process-oriented.

That is partly why *Poverty and Famines* carried such weight beyond economics. For the Bengal famine of 1943, Sen wrestled with the archives, and for the more contemporary famines, he immersed himself in the existing case materials. An exploration of the causes of famines required a systematic investigation of *how* exactly a famine developed without the superimposition of theory. Though Sen used his well-known capacities for abstract and philosophical reasoning to elaborate the concept of poverty and entitlements, his explanation of the causes of famines was ultimately inductive. Arguments about famines had not previously witnessed such a blending of philosophical acuity and inductive thoroughness.

Case studies, Sen's preferred method in *Poverty and Famines*, are often contrasted with "large-N" research, which studies a lot of cases together, or draws inferences from a large number of observations. The latter is notorious for mixing up causes and consequences. At its best, large-N research can establish *causal effects*, but it cannot give us an account of *causal mechanisms* (Gerring 2007). In contrast, by clearly laying out what came first and what happened later, process tracing is better at establishing causal mechanisms, though it may not be a method for establishing causal effects. For causal mechanisms to be investigated in depth, the number of cases must be reduced to a small-N research design. Discovering causal mechanisms requires empirical intimacy with case materials. Large-N research does not allow intimacy, only fleeting acquaintance.

In short, by leveraging one of the greatest strengths of case studies—identification of causal mechanisms—*Poverty and Famines* highlighted a serious flaw in the conventional wisdom about famines. According to the FAD thesis, famines are caused by a decline in aggregate food supply, or availability. If food availability remains unchanged or goes up, starvation, or famines, will not take place.

This formulation manifestly provokes a question about mechanisms. Overall food supply is an aggregate measure; starvation affects particular groups, not all. Therefore, we need an account of how something happening at an aggregate level can affect a fraction of those covered by the aggregate description. The opening lines of *Poverty and Famines* identify this problem with arresting immediacy: "Starvation is the characteristic of some people not having enough food to eat. It is not the characteristic of there being not enough food to eat" (Sen 1981: 1).

I.1 Entitlements

Why do some people not have enough food to eat? It is in answering this question that Sen developed the concept of "entitlements".² The concept of entitlement is

² While entitlement as a concept was first used in *Poverty and Famines*, it is in a later book that, in my view, it acquired radical clarity (Drèze and Sen 1989).

legal, not normative: “The notion of entitlement... must not be confused with normative ideas as to who might be ‘morally entitled’ to what. The reference instead is to what the law guarantees and supports” (Drèze and Sen 1989: 22–3).

In a market-based economy, entitlements can take various forms, three of which are critical: direct entitlements, exchange entitlements, and public policy-induced entitlements. When peasants produce food crops for family consumption, we speak of food as their direct entitlement. But one does not have to produce food crops to acquire food. Food can be acquired in a market exchange. Sen speaks of such exchanges as exchange entitlements. Finally, food can also be made available by targeted governmental supply; alternatively, governments can create public employment programs, which give those participating in such programs an income, which in turn can be used to buy food. This is an example of how public policy can protect entitlements.

Why do entitlements fail? Process tracing allows Sen to demonstrate that unless we employ a disaggregated approach and look at how different groups are affected, we cannot answer the question. Nothing very insightful can be inferred from aggregate statistics such as food availability in a country or a province.

Since most famine deaths occur in the countryside, it is analytically useful to think of the various groups that make up the countryside. The rural population can be divided into the following groups: those who own land—a lot of it (large farmers or landlords), or just a little (small peasants); those who own only their labor but no land (large landless laborers); those who do not own land but do not have to hire their labor out, seeking instead a living with a share of the crop (sharecropping tenants); those who have skills with which they make a living without working land (barbers, carpenters), etc.

Once the group characteristics are laid out, one can begin to see how entitlement failures may emerge. If the crop of those producing enough food for themselves is wiped out for some reason—because of a drought or flood, for example—their direct entitlements fail. If the government does not provide employment or food, exchanging what they own for food—land, cattle or labor—will be their best alternative. Given how often exchange is what the poor are left with, the concept of exchange entitlement becomes the centerpiece of Sen’s analytic scheme. Simply put, exchange entitlement signifies the set of commodities that a person can acquire in return for what that person owns. Labor can be exchanged for a wage; wages can be exchanged for food. A carpenter can put his skill into a product, which he exchanges for a price, and that can in turn be exchanged for food.

I.2 Famines: Reconstructing Two Examples

The FAD view looks at overall production and assumes consequences without factoring in the different natures of group endowments and entitlements. By

examining the causes of famines, Sen poses the issue very starkly. Can famines take place even when nothing happens to food production? Can thousands, even millions, of people die of starvation even when food production declines only marginally, not significantly? If the answer is yes, the argument will have to be formulated in terms of distribution of endowments and entitlements, not in aggregate terms.

To find out whether that is true, Sen, as noted above, studied four famines: the Great Bengal famine of 1943, in which an estimated 3 million people died (Sen 1981: 52); the Ethiopian famine of 1973/4, in which anywhere between 50,000 to 200,000 people lost their lives (Sen 1981: 86); the famine in the Sahel (1973), whose death toll was at least 100,000 (Sen 1981: 116); and the Bangladesh famine of 1974, for which the mortality estimates range from 26,000 to 100,000 (Sen 1981: 134). The Bengal and Ethiopian famines illustrate the causal mechanisms best.

Of the four famines, the Bengal famine of 1943 has attracted the most attention (Arrow 1982; Bose 1990; Bowbrick 1986; Goswami 1990; Islam 2007; Ravallion 1997; Sen 1987). Part of the reason is the sheer scale of mortality. But the more important reason was that Sen identified it as a "boom famine" (Sen 1981: 75). The food supply in Bengal in 1943 might have been lower than in 1942, but 1942 saw an unusually high output. If anything, food output in 1943 was 13% higher than in 1941, which was not, however, a famine year. If the food supply in 1941 was so much lower and still a famine did not take place, then the causes of the 1943 famine would lie elsewhere, not in food output. Sen showed that sharp movements in the exchange entitlements of some groups constituted the primary cause. Peasant cultivators and sharecroppers were affected least. Landless agricultural laborers, fishermen, transport workers and paddy huskers were the biggest victims. They did not directly own land and its products, but bought food in the market. Once a war economy had created enormous inflationary pressures in the economy, food became so expensive that these groups simply could not buy enough food for their families. Mass starvation was the result.

The Ethiopian famine, unlike the Great Bengal famine, is not normally commented upon, or not enough in any case, but it illustrates the causal mechanisms in a very clear way, and is worthy of brief reconstruction.

During 1972 to 1974, the north-eastern province of Wollo was hit hard by a shortfall in rain. The total output in Ethiopia, however, did not drop significantly: it went down by a mere 6 to 7%. But the death toll was not less than 50,000, and possibly as high as 200,000, mostly concentrated in Wollo.³ In other words, while Wollo was doing badly, much of Ethiopia was going through a normal food cycle.

Sen's process tracing allows him to identify what can be called the three interconnected puzzles of the Wollo famine. The resolution of these puzzles shows how the famine developed.

³ The provinces of Tigray and Hareghe were also affected.

1. Food from other parts of Ethiopia did not reach Wollo. Why not?
2. If food from other parts did not reach Wollo, one would expect food prices to rise, for demand for food would exist but supplies, in the absence of replenishments, would decline. Food prices, however, did not go up. Why not?
3. If food prices did not go up, one would expect food to be affordable. People, however, starved to death. Why?

Yet again, Sen convincingly shows that if we focus on the aggregate food supply, we will not be able to resolve these puzzles. But if we start looking at who the famine victims were, we begin to get answers. Small farmers were the greatest victims.

As the output drastically declined in Wollo, small farmers lost their normal and primary source of income. Since their incomes failed, the effective demand for food also declined, even though a need for it existed. Food prices, therefore, did not rise. As output dropped, many farmers tried to sell their lands. With very few takers, land prices plummeted. Some farmers also tried to sell their livestock. Some livestock, of course, had died, but others could not be sold. With falling incomes, livestock prices also fell dramatically. Further, as the farmers' livelihood declined, so did that of the artisans, who depended for their welfare on the welfare of the land owners. Finally, since the effective demand for food fell so drastically, there was no market incentive for grain traders outside Wollo to send in supplies. The normal operations of market processes ensured mass starvation.

The four case studies allowed Sen to derive two big conclusions. First, famines are entitlement failures. At best, food supply is one of the factors, but it is by no means the most important one. Second, not all groups suffer from famine. Certain groups are especially vulnerable to famine threats. What one owns and what it can be exchanged for is critical. On the whole, those owning labor are more vulnerable than those owning land; and those owning small patches of land are more vulnerable than larger farmers. Unless the government can provide supplementary food or employment in times when a famine is approaching, market processes, left to themselves, can actually produce mass starvation.

II. THE GREEN REVOLUTION AND FAMINES

While the above argument flows neatly from the cases chosen, the Green Revolution, which transformed agriculture, especially in Asia, is missing in *Poverty and Famines*. Once brought into analytic gaze, it offers revealing contrasts, comparable to the radical sharpness of Sen's India–China contrast on famines. Ironically, the Green Revolution reinforces Sen's argument about entitlements, but it produces a new candidate—technological dynamism in agriculture—for what prevents

entitlement failures. In addition to democracy, technological dynamism in agriculture emerges as an underlying factor pre-empting entitlement failures.

It is noteworthy that all of the 1970s famines studied by Sen occurred in regions that did not go through a green revolution: Sub-Saharan Africa and Bangladesh. For reasons outlined below, while the agrarian ecologies of Sub-Saharan Africa have made virtually the entire continent resistant to the Green Revolution, something that continues to be true even today, most of Asian agriculture had been technologically transformed by the early to mid-1970s. Bangladesh, where a famine did take place in the 1970s, was among the few exceptions in Asia.⁴

The key question is: why did famines *not* occur—in the 1970s or later—in those parts of the world which went through a green revolution? To be more specific, why did famines occur in Sub-Saharan Africa and Bangladesh, but not in India's Punjab, Malaysia and Indonesia?⁵ As is widely known, the mid-1970s were generally a difficult time for world agriculture, partly because of the weather in several parts of the globe and partly because of the oil shocks. Due to the energy intensity of the Green Revolution, the oil price increases led to huge cost escalations after 1973, but the Green Revolution areas nonetheless emerged relatively unscathed and without nutritional catastrophes. In contrast, Bangladesh and Sub-Saharan Africa suffered famines.

Let us first briefly go through the technological aspects of the Green Revolution.⁶ The new technology, as it was called then, had two analytically separable sides: the biochemical (seed, water, fertilizer) and the mechanical (tractors, threshers and combine harvesters). The core of the revolution was biochemical. Once agricultural scientists had developed the new high-yielding variety (HYV) seeds in the early 1960s, piloted their use on experimental farms and confirmed by the mid-1960s that the new seeds raised yields significantly, it also became clear that for best results, the new seeds required (1) timely and controlled quantities of water, and (2) an optimal dosage of chemical fertilizer. Only irrigation could make (1) possible, not unpredictable rains. The HYV seeds, irrigation and chemical fertilizer thus became the yield-increasing core of the Green Revolution.

Though there are several reasons why Africa did not have a green revolution, the absence of irrigation was the key factor, as the father of the Green Revolution has recently reminded us (Borlaug 2007). Sub-Saharan Africa was, and has remained, heavily dependent on rain; very little of its cropped area is irrigated. In contrast, a substantial part of Asian agriculture was irrigated as early as the 1970s. Bangladesh

⁴ The other Asian exceptions in the 1970s were the Maoist countries China, Vietnam, Cambodia and Laos.

⁵ The only pre-1970s case study in *Poverty and Famines* is functionally equivalent: the 1943 famine took place in Bengal, which was not at the technological edge of Indian agriculture at that time. After the British invested in irrigation systems, Punjab established a huge technological lead over the eastern part of the country. Punjab did *not* have a famine in 1943; Bengal did.

⁶ For more details, see Varshney 1995 (10–14, 52–7).

was then a major Asian exception. It was flood-prone, not drought-prone like Sub-Saharan Africa, but its agriculture in the 1970s suffered from a lack of substantial irrigation capacity. The country normally had an excess of rain, whereas the Green Revolution, due to the requirements of the new seeds, required controlled and timely irrigation. Bangladesh's agrarian ecology thus allowed only a slow adoption of the new technology. A green revolution did finally take place, but only later, in the 1980s, when a serious change in agricultural policy came about. The World Bank notes:

Most of the increase in rice production since 1980 has been on account of the winter season (January–May) *boro* crop. Traditionally, the main rice crop in Bangladesh was the monsoon season *aman* crop (August–December), which depends almost entirely on rainfall and regular seasonal flooding of rivers and streams. *Following the liberalization of imports of diesel engines and pumps for tubewell irrigation and expansion in fertilizer in the 1980s and the growing use of high yielding varieties of rice . . .*, the area planted to *boro* increased sharply. The *boro* area has almost quadrupled since 1980, replacing the lower yielding *aus* rice crop (April–August) in many areas. In the meanwhile, as a result of concomitant productivity improvements, *boro* production has increased almost six-fold.

(World Bank 2007a: 57; italics added)

What relationship between the Green Revolution and famine prevention can be proposed? Consider first the direct and exchange entitlements of small farmers owning lands in the so-called Green Revolution belts. I shall examine later the larger implications for those parts of an economy not touched directly by the Green Revolution.

It is clear, at least in retrospect, that the mechanical inputs of the Green Revolution had a size bias: only the bigger farmers could afford tractors or combine harvesters. But the biochemical inputs were relatively size-neutral (for details, see Varshney 1995: 121–33). Only small capital outlays were required to buy seeds and chemical fertilizer in the marketplace and to purchase water through an irrigation channel. It was not surprising, therefore, that small farmers also benefited tremendously from the Green Revolution in highly irrigated agricultural zones or countries. In 1962/3, farms smaller than five acres were unable to produce a wheat surplus in Punjab, the heartland of India's green revolution, but after the introduction of the Green Revolution technology, a surplus could be produced on farms as small or marginal as 1.25 to 2.5 acres (Blyn 1983; Chaddha 1986). A massive technological breakthrough, via productivity enhancement, thus protected small-farmer entitlements. Further, by reducing the length of the cropping cycle, the new seeds also made multiple cropping possible.

In the current stage of research on agrarian political economy, the focus is rightly on the exhaustion of the Green Revolution by the late 1980s and on how to deal with the second-generation effects of the excessive, rather than optimal, use of Green Revolution technology: overuse of fertilizers and pesticides and the increasing

toxicity of soil and water in some agronomic regions of the world; salinized upper soils and declining soil fertility in some other parts; and sinking groundwater levels and the prohibitive costs of small irrigation in still other parts (World Bank 2007b: ch. 8). Today, we have a different scientific task ahead of us: namely, how to readapt, or reinvent, Green Revolution technologies for the next generation of challenges. But it is worth recalling the transformative role played by the Green Revolution four decades back. In the 1960s, 1970s and 1980s, the Green Revolution vastly improved agricultural productivity in Asia, increasing grain supplies and making food security possible for millions who would otherwise have been quite vulnerable.

As the examples from India, Malaysia and Indonesia below will illustrate, there are two principal ways in which the Green Revolution substantially reduced mass hunger in Asia and prevented famines:

- (1) by making small farmers in irrigated areas more productive;
- (2) by making it possible for governments to accumulate buffer stocks, which could be used:
 - (a) to stabilize food prices all over the country, including prices in those parts that were not irrigated and could not use the Green Revolution technology directly, and
 - (b) to make food available in times of supply shocks.

A third, macroeconomic, route to greater welfare is also conceivable, though the full development of the idea need not detain us. The Green Revolution made quick industrialization possible in several cases, especially in South-East Asia. As we have known since Marshall, industrialization requires food and labor surpluses. It is also normally accompanied by an eclipse of agriculture, but the eclipse is least painful when it is led by a productive agricultural sector, releasing labor and food surpluses (and also possibly savings) simultaneously. Industrialization based on productive agriculture proceeds much better than industrialization based on repression of the agricultural sector, as it creates gainful employment for those no longer necessary in agriculture (Varshney 1995: ch. 2).

II.1 India

From 1965 to 1967, two successive droughts brought India's food production down to the level of 1956/7. Public food stocks, for feeding urban India's poor and lower middle classes, were almost entirely dependent on subsidized grain imports from the United States, which reached a staggering 10 million tons in 1975/6 (Varshney 1995: 48–9). To explain where India was headed, a popular book of the mid-1960s argued that those wounded in the battlefield were normally split into three camps: those only slightly wounded, who were not a cause for concern; those more seriously wounded, who could be saved through surgery; and those so grievously

injured that they were left to die. India was argued to be in the third category: "No matter how one may adjust present statistics . . . it will be beyond the resources of the United States to keep famine out of India during the 1970s" (Paddock and Paddock 1967: 217).

Defying these pessimistic predictions, India's food production started rising after 1967/8, as a green revolution swept through Punjab, Haryana and western Uttar Pradesh. In 1965/6 and 1966/7, India's grain production was 72.3 and 74.3 million tons respectively. By 1970/1, India was producing 95 million tons of grain. Moreover, in 1971 India unilaterally terminated American wheat imports, as public stocks of domestically procured grains had reached 8.1 million tons. Further, by 1986/7, India's public stocks had risen to 30 million tons, which ensured that the acute drought of 1987/8 did not turn into a famine. Until 1965/6, most of the increases in food production were due to acreage expansion. But for roughly three decades after 1966-7, productivity per acre, not increases in cultivable acreage, drove the growth in food production, thus lifting India from the agricultural abyss of the mid-1960s.

The Green Revolution had two effects on the entitlements of India's poor citizens, one direct and the other indirect. The best example of the direct effect was noted above. Even though it was initially believed in some quarters that only the bigger farmers would benefit from the Green Revolution, smaller farmers also soon started producing food surpluses on their meager farmholdings. That gave them greater capacity not only to feed themselves, but also to withstand shocks. The biochemical inputs could be easily purchased, and the mechanical inputs rented, if not bought.⁷

The indirect effect had to do with how the Green Revolution enhanced the buffer stocks of food grain, allowed the distribution of greater quantities to the poor, and moderated food prices overall. Consider the droughts of Maharashtra from 1970 to 1973. Food at a reasonably low price could be moved to Maharashtra due to the rising productivity and the surpluses produced, in Punjab, Haryana and western Uttar Pradesh. To prevent famine, Maharashtra at the peak of the crisis was providing employment to as many as 5 million people through public works programs (Drèze and Sen 1989: 129).⁸ Had the Green Revolution surpluses not been available, food imports on international commercial prices would have made India's external macro-balances extremely precarious. Unlike now, India's foreign exchange reserves were meager in the early 1970s. Exports were not rising and the dollar remittances from Indian migrants were yet to fill the public treasury. In short, in addition to the institutions of democracy, especially the free press and opposition parties, exercising pressure on the Maharashtra government, as Sen has noted, the

⁷ While the welfare implications of the Green Revolution for small farmers in irrigated areas were significantly positive, the implications for the landless were ambiguous (Blyn 1983; Varshney 1995: 133-8).

⁸ See also Echeverri-Gent (1993).

buffer stocks made possible by the Green Revolution were almost certainly another reason for the absence of famine in Maharashtra from 1970 to 1973.

II.2 Malaysia and Indonesia

In South-East Asia, too, the Green Revolution transformed agriculture, improved productivity and nutrition, including that of small farmers, and made the possibility of a famine, even in times of production downturns, increasingly remote. The evidence for these claims is contained both in anthropological village-level accounts and the larger aggregate analyses.

In the Muda region of Kedah, a relatively poor state of Malaysia, double-cropping began in 1970, as a major irrigation scheme made the adoption of Green Revolution technology viable. James Scott notes that

[b]efore double cropping, one third of the farm households in the region rarely grew enough rice for the annual subsistence needs of the family. ... Double cropping in this respect has been a great boon. Even smallholding tenants with a single *relong* (.71 acre) can now grow enough rice at least to feed a family. ... *It is a rare peasant these days who does not eat rice twice a day.* The provision of irrigation water and the use of fertilizer not only raised yields but has also made those yields more reliable, season by season. ... the prospect of going without rice has been largely removed from the fears of even poor villagers.

(Scott 1985: 66; italics added)

Furthermore, the incidence of nutrition-related diseases markedly declined, and "between 1970 and 1976 the rate of infant mortality in the Muda region was cut by nearly a half" (Scott 1985: 67).⁹

If India had a democracy at the time of its green revolution and Malaysia a semi-competitive electoral system heavily inclined towards the countryside, where most Malays lived, Indonesia's green revolution had no such confounding variables explaining the decline of mass hunger and elimination of famines. Under Suharto, Indonesians knew no political freedoms, but the countryside of what was arguably the poorest country in the world in the mid-1960s, when Suharto took power in a coup, was dramatically transformed in the 1970s. In 1965, Indonesia's daily caloric supply was 1,742 kcals, which was below the daily caloric supply not only in Malaysia and Thailand, but also in India, Pakistan and what later came to be called Bangladesh. By 1985, Indonesia's daily caloric supply was second in South-East Asia only to Malaysia's, and had left all of South Asia behind (Timmer 1991: 148). The key was a set of policies that combined government support of crop prices, rural

⁹ One should, however, note that with the introduction of massive mechanization in the mid-1970s, some of the gains made by the poor in the first flush of the Green Revolution were reversed, as labor was displaced (Scott 1985: 74–81). However, the displaced labor was soon absorbed into the rising industrial sector in Malaysia. For the impact of markets on famines in general, see Ravallion (1987).

public works and new Green Revolution technology, leading among other things to higher labor productivity, benefiting the poor directly (Timmer 1991: 125).

Indeed, the food security of Indonesia was transformed so radically by the mid-1990s that when the post-Suharto shock came in 1998, and the economy shrank by a whopping 18–20% in a year, there was considerable misery all around for the poor, but no famines occurred. An economic decline of such magnitude in one year could have been expected to lead to mass starvation. But more than two decades of technological dynamism in agriculture had produced greater food security throughout the country.

In short, if entitlement failures were prevented in India and Malaysia by the combined effect of technological dynamism in agriculture and political competition, in Indonesia, which lacked democracy till 1999, the pure effect of the Green Revolution technology stands out. Technologically induced productivity and income gains, achieved over three decades of the Green Revolution, were the underlying causes of Indonesia's success in preventing entitlement failures right through the 1970s, 1980s and 1990s, but most especially during the huge economic contraction of 1997/8.

It is possible to misread my argument about the relationship between technological dynamism and famines. Let me therefore provide some final clarifications. First, my argument does not posit a sharp contradiction between markets and public action. In retrospect, it is clear that the success of the Green Revolution was premised upon a supportive government policy framework. Government intervention was quite necessary for input provision, research and extension, grain procurement, and stabilization of food prices. Markets were used, but in a larger framework which included government intervention. Second, my argument should not be read as a restatement of the FAD hypothesis. Technologically induced increases in supply are fundamentally different from increases, or declines, in food availability in a technologically stagnant framework. Moreover, the Green Revolution technology directly increased the capacity and entitlement of the smaller farmers: they did not have to depend on aggregate supplies to protect their entitlements. The FAD theory is purely aggregative.

III. CONCLUDING REMARKS

Though *Poverty and Famines* does not deal with the Green Revolution and its implications for famine prevention, my principal argument in this essay is that even if we include the Green Revolution cases, Sen's theory of entitlement holds. What changes is simply a possible line of causation at the underlying level. Sen's focus has been on democracy as one of the key underlying variables preventing

famines, but one can also show that technological dynamism in agriculture can lead to prevention of famines in both democratic and undemocratic settings. In short, technological dynamism merits a separate causal status of its own.

It should be noted that in works published after *Poverty and Famines*, Sen partially anticipates the core aspects of my argument. Though his focus while dealing with hunger has never been on the Green Revolution, his distinction between the short-run and the long-run causes of famine does take him briefly towards the following insight:

The protection of entitlements in the short run has to be contrasted with the general promotion of entitlements in the long run. In the short run, famine prevention is essentially a question of encountering an immediate threat of entitlement failure for vulnerable groups. In the long term, of course, much more is involved, and a durable enhancement of invulnerability requires promotional policies, such as the expansion of general prosperity, the reduction of insecurity through economic diversification, and the creation of secure earning arrangements. (Drèze and Sen 1989: 66)

In another brief passage written a decade later, Sen speaks in a similar vein:

In preventing famines, it helps to have a more opulent and growing economy. Economic expansion typically reduces the need for entitlement protection. This is a lesson of obvious importance for sub-Saharan Africa, where the lack of overall economic growth has been a major underlying source of deprivation. The proneness to famines is much greater when the population is generally impoverished and when public funds are hard to secure.

(Sen 1999: 175)

My principal argument in this essay began with methodology, but its substantive essence is, for all practical purposes, an elaborate extension of this insight.

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