

The Political Ecology of Famine:
The North Korean Catastrophe and Its Lessons

Meredith Woo-Cumings
Department of Political Science
The University of Michigan

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Why famine? Famine is one of the oldest and most traumatic trials of humanity, but it isn't going away anytime soon: our modern world may be awash in surplus foodstuffs, yet our new century is still punctuated by famine and fear of famine. If Lord John Russell, Prime Minister at the time of the Irish Potato famine, remarked that this was "like a famine of the 13th century acting upon a population of the 19th",¹ today this 13th century tragedy visits itself upon the 21st century, in places like North Korea, Mongolia, and Afghanistan. We should be concerned because contemporary famines are integrally related to the wars, political regimes, climate changes and resulting policy debates that affect our daily lives and occupy our daily discourse, but we have no consensus on how to fight this ancient scourge, long signified by the fourth symbol of the black horse of the apocalypse—death itself.

New scholarly interest in famines came in the 1980s, with an outpouring of research and a multidisciplinary debate on the famines of that

era in the African Sahel, particularly in Ethiopia and Somalia. Much of this interest was stimulated by important new work on famine and political regime types by the economist Amartya Sen, who won the 1998 Nobel Prize in Economics for his path-breaking work. But even more importantly, as I shall later discuss, the new attention came as a result of growing sensitivity to the precariousness of our planet and its ecology, to which the persistence of famine in the modern (or post-modern) age gives grim testimony.

Shifting the Focus of Public Policy Debate on Famine

There is of course no single theory of famine, but the theory that has had more influence recently than any other is Amartya Sen's, with his emphasis on political regime type: democracies not only do not fight each other, it turns out, but they also do not have famines. Sen's work has been called the most comprehensive framework since Malthus for analyzing famine and deprivation,² and it was a major departure from supply-side understandings (famine as the predictable result of there being too many people, too little food). Sen has effectively demonstrated that famine is rarely if ever about insufficient stocks of food; it is about the politics of food distribution. Sen's theory developed within the context of his comparative analysis of famines and procedures for their relief in democratic India and totalitarian China, and is part of his life-long advocacy of individual freedom and democracy as both a means toward and the proper goal of contemporary development. Development is not about the wealth of nations, he has argued in *Development as Freedom*, it is really about the substantive freedom that

individuals enjoy. In other words, it is about the richness of life “in the sense of activity” that Aristotle examined in the *Nicomachean Ethics*.³ Sen’s orientation is echoed in the current development *Zeitgeist*, for example in the “comprehensive development framework” which World Bank President James Wolfensohn describes as an “analytical framework that presents the structural, social and human aspects” of development.⁴

Human freedom and the development of all creative human capacities constitute an admirable and unassailable ethical program, one that I completely share. But how does this program fare as an empirical proposition, in relieving or ending famine? At the end of the day, I will argue that Sen’s work does not help us very much in understanding the vexing phenomenon of famine in our time. It is not just because his analysis favors democracies when so many famines occur in non-democracies (and therefore his political remedies are unavailing), or that it is market-based when famines so often occur in non-market societies, but because Sen’s arguments *do not go far enough* to address critical social and developmental issues that are raised by human catastrophes like famines. I will develop this critique below in successive cuts, or waves, deeper and deeper as it were, in the frame of mind that the best complement one can do for a fine scholar is to take his views seriously and see how well they explain our world.

To anticipate my argument, I will propose the following four alternative ways of thinking about famine in our time. First, I don’t believe that there is a simple correlation between famine and political regime type—Sen’s celebrated idea that famines do not occur in democracies. But even if it were

true, in practical policy terms this generalization does not get us very far in dealing with the pressing problem of famine that today threaten many weak nations around the world. Instead of focusing on political regime type (democratic or authoritarian), I will focus on political processes that immobilize attempts to alleviate problems of food shortage. I will make this argument in the context of disagreeing with another part of Amartya Sen's theory—namely that famine is not a function of decline in food availability, so much as a shift in differential access to food. In socially hierarchical and differentiated societies like those in South Asia, famine is clearly and primarily a matter of access to food and famine can occur in the context of abundance of food, as it did in Bengal in the early 1940s. On the other hand, famines in communist China in the 1950s, or communist North Korea in the 1990s, occurred in the context of unanticipated food shortages amid relatively egalitarian distribution, regardless of the other abominable shortcomings and failures of these regimes. Food availability supply, which is in great part dependent on climatic variability, remains important, in my view, in understanding occurrence of famine.

Second, I argue in this paper for the need to move away from the arrogance of our age, the modern Promethean conviction that we have defied and tamed the elements. Climatic change and aberrational weather may have much more to do with famine than regime type, especially in less sophisticated economies whose technology and economic resources are ill-equipped to deal with such aberrations. In the case of a relatively autarkic country like North Korea, this may be even more true; of course, I recognize

that in making this argument I run the risk of absolving a creaking, obsolescent totalitarian system of its sins. My point, rather, would be that the sins of this system are five decades old, but its experience of famine, a mere five years—and these turn out to be years of remarkable climatic aberration. Rather than apologizing for North Korea's cruel and increasingly hapless rulers, I am interested in the lessons this case may hold for other vulnerable economies of very different internal constitution—authoritarian, democratic, or somewhere in between.

Third, I will argue for the need to shift our focus away from Sen's "entitlement protection" through guaranteed employment at subsistence wage and gratuitous relief for the unemployable, to a larger developmental imperative. This is really another way of saying that we must stop thinking in terms of disaster relief amid general agrarian torpor, and move toward creating the basis for sustained development. This imperative is absolutely fundamental when dealing with a society undergoing critical transitions as the result of famine. This brings me to the next point.

Fourth, the literature in economics on famine, not excepting Amartya Sen's work, does not help us in understanding the long-term consequences of catastrophes like famine. Famine is a historical marker like no other for the people who suffer it; in many societies famines serve as a common means of recording and recovering the experiences of the past, pivotal dates which act as the pole around which all other experiences and impressions are collected and organized. Famines have thus unleashed great social transformations: in China after the Great Leap Forward, famine paved the way to a period of de-

collectivization in the early 1960s that anticipated in many ways the major de-collectivization after 1978. In North Korea, famine has transformed the country, for better or worse, into a “transitional economy,” where most vital economic activities are now taking place outside the “normal” planned economy, for the first time in that regime’s history. In both North Korea and China, famine seems to have forced changes that the leadership itself could not (or would not) envision. Thus, understanding the long-term impact of famine is critical for devising new strategies of development in these societies.

My particular concern in the latter part of this paper is with the most widely-publicized famine in the 1990s, in North Korea. Occurring primarily in the years 1995 through 1998, this famine was truly biblical in scope, if estimates of casualties running as high as 2.5 million are accepted.⁵ If this excess mortality rate is credible, then the North Korean famine would be a catastrophe more severe, in proportional terms, than famines which befell China during the Great Leap Forward (claiming anywhere between 18 million to 30 million people), or India during its last major famine, the Great Bengal Famine of 1943, said to have claimed anywhere between 1.5 million deaths to double that figure.⁶

In spite of its ubiquity in the news media, the famine in North Korea has received very little serious analysis. We see the same images of starving children over and over in the media, but get little scholarship. The dearth of reliable data on this famine is one cause, but then famine data are notoriously unreliable in general. North Korea’s “Hermit Kingdom” autarky

and closure to foreigners is another cause, of course, but even after international relief agencies were given greater access to North Korea than any other foreigners in the history of the country, this famine has eluded most scholarly scrutiny.⁷ What scrutiny exists, moreover, fails to examine the North Korean famine comparatively, especially in the light of previous famines in socialist countries. Nor is there any study that examines the current famine in the light of tried-and-true indigenous strategies of adaptation and coping in times of food shortage, something that had long been at the core of traditional statecraft in Korea. Of more contemporary concern is the process by which a developing country with comparatively high rates of industrialization and urbanization (North Korea's economic achievement once led the economist Joan Robinson to exclaim that the North Korean economic miracle was greater than any in modern times⁸) has collapsed into famine and global mendicancy.⁹ Finally, I also want to examine the effects of one thing we all share with North Korea, which is a global climate regime of apparent stable continuity that masks sharp recent changes that have placed food cultivation at risk in a number of temperate climate regions.

The Specter of Modern Famine

Famine in the modern or early modern period has rarely been a matter of insufficient production of food; instead it usually happens because of sharp political changes or armed conflicts that cut off ordinary supplies of food. Thus famines occurred under the malign neglect of colonial or occupying governments (the Irish potato famine, for instance, or the Dutch hunger of

1944-45), or as a consequence of war and revolution (starvation during the Paris Commune, in Germany during the last stages of WWI, or during armed sieges, the most famous being the Siege of Stalingrad in 1942-43); sometimes famine results from ideological politics, like bad central planning, failed or violent agricultural reforms, and ethnic cleansing--Stalin's collectivization schemes and the ensuing famine in the Ukraine and elsewhere seemed to combine all these elements.

Asia has been no different. Famines under colonial occupation included the massive starvation in the rebel-held areas in the United States-occupied Philippines in 1900; Japanese-occupied Tonkin in 1944-1945; in British occupied India, including the 1877 famine in the Indian Deccan, as well as Great Bengal Famine of 1943. Traumatic famines that combined war with ideological criminality afflicted Cambodia from 1975, when the Lon Nol government collapsed and Pol Pot came to power, to 1979 when the Vietnamese invaded and overthrew the Khmer Rouge.¹⁰ Lesser hunger-related ideological fiascos occurred during periods of agricultural collectivization: in Mongolia in 1930-32, following a Soviet decree for the permanent settlement of nomads; in Vietnam in 1954 with upwards of 1 million dying of starvation during land reform campaigns; and what is commonly seen as the biggest ideological debacle of them all, the Great Leap Famine in China, 1958-1962.¹¹

Among these cases and in this comparative light, North Korea remains a stunning anomaly for the following reasons: (1) the famine occurred forty years after collectivization; (2) North Korean leaders had paid particular

attention to the food problem from the inception of the regime in 1948, given that the major food-producing regions of the country were mostly in South Korea, and by the 1980s had achieved food self-sufficiency, according to the CIA and other external observers; (3) this is an urban and industrial, if not fully industrialized, country; (4) the public distribution system had functioned well, was highly egalitarian, and had years of experience in shifting food between regions to relieve shortages. So what went wrong? I will argue that the famine in North Korea (examined in much greater detail later in this paper) raises a number of questions that cannot be reconciled within existing frameworks for understanding and analyzing famine. We need to revise our thinking about famine, which will help to develop new policy mechanisms for dealing with its deadly effects.

Famine as Failure of Entitlement and Politics: Amartya Sen and His Arguments

Famine, David Arnold once observed, is one of the most powerful and emotive words in our historical vocabulary, which makes it all the more difficult to isolate its meaning and significance. Food is, after all, one of the principal sinews of power in its most basic, tangible and inescapable form. For many historians, famine is therefore an accelerator of long-term historical change.¹² A famine connotes a breakdown of the system of production, distribution and consumption of essential foodstuffs, and as a historian of food supply in the Greco-Roman world once noted, analysis of famine would

involve an investigation of nothing short of “the whole material basis of Greco-Roman civilization.”¹³

It may be that the experience of South Asia, for Amartya Sen, makes famine an entirely different affair—a matter of degree rather than kind, that is, degrees of hunger distinguishable from chronic malnutrition in that famine involves “acute starvation and a sharp increase of mortality”¹⁴ but no necessary long-term consequences for society, or for history. Drèze and Sen’s definition conceives famine as an extreme progression along a spectrum of poverty and deprivation, but not as a cataclysmic breakdown of a social system. This perspective draws on India’s experience, before and after its independence, wherein famine is, as R. H. Tawney once said about China, the last stage of a disease which “though not always conspicuous, is always present.” For Tawney, famine in early 20th-century China was the occasion for perhaps his most famous metaphor:

There are districts in which the position of the rural population is that of a man standing permanently up to the neck in water, so that even a ripple is sufficient to drown him. The loss of life caused by the major disasters is less significant than the light which they throw on the conditions prevailing even in normal times over considerable regions.¹⁵

Sen also sees famine as distinguishable from chronic hunger and deprivation in that speedy intervention can prevent it, through a calculated reliance on existing distributional mechanisms. Such preventive interventions occurred in Bihar in 1967; Maharashtra in 1973; in West Bengal in 1979; and in Gujarat in 1987.¹⁶ The unfortunate implication of this argument, though, is to say famine is a disaster to be averted with fast public intervention,

whereas chronic and endemic hunger exists and perdures, a *condition* to be endured by the people unfortunate enough to suffer it.

Sen calls his approach to famine an “entitlement approach,” concentrating on the ability of people to command food through the *legal means* available in the society, including the use of production possibilities, trade opportunities, entitlements vis-à-vis the state, and other methods of acquiring food.¹⁷ The entitlement approach assumes a market-based society, where property rights are clearly specified, and “entitlements” are a matter of utilizing available means toward the end of food sufficiency. It isn’t clear why this approach is helpful in understanding famines, however, given Sen’s insistence that famines are most likely to occur in non-democratic (usually meaning communist totalitarian) polities; it seems rather to be a part of his definition of the problem in the first place.

Mortality in this definition connotes an individual’s entitlement collapsing into the ‘starvation set’—as opposed to the set of exchange entitlements, given endowments, this set does not contain any feasible bundle that would include enough food to survive. Two distinct ways in which this might occur is (1) the *endowments* contract, through crop failure, death of livestock, and the like; (2) *exchange entitlements shift*—for example through a rise in food prices, or a fall in the prices of wages or assets.

The problem with this kind of reasoning is that it does not explain how individual starvation aggregates into full-fledged famine. However to say this is merely to recapitulate the most common criticism of Sen’s theory, one that has already been scrutinized from every conceivable angle—and variously

criticized as “descriptive” rather than prescriptive, apolitical, ahistorical, economistic, static—not to mention tautological: “an elegant, academic way of saying nothing more than ‘people starve because they can’t buy enough food’.”¹⁸ For my purposes, however, the most important element in Sen’s theory is his linkage of famine to politics. Indeed, it was this element in his theory that the Nobel Prize Committee cited as his singular achievement, and unlike his economic theory of entitlement or public choice, there has been curiously little criticism of his theory that democratic states don’t have famines. This is baffling, because in truth there is very little substance to his insight into democracy and its relationship to famine.

Democracies Don’t Have Famines?

Sen has argued forcibly in his many publications that there is a clear correlation between famine and the absence of democracy, but few note how that generalization usually devolves into an account of China’s travail during the failed “Great Leap Forward (GLF).” In the early 1980s demographic figures on depth of China’s famine turned the acronym “GLF” into the “Great Leap Famine,” a monstrous regime unleashing a monstrous famine that may have claimed the lives of 30 million people. In Sen’s work this experience became his great negative example, proving the theorem that had China been democratic, it never would have happened.

For specialists on China, nothing is more common than for South Asian colleagues to engage in debate along the lines, “so what’s so great about China”? China seems to get so much more attention, at least in the West,

than South Asia and especially India, sometimes called “the world’s largest democracy.” Sen’s variant on this argument, in a nutshell, is to say that when one compares India with China, there can be no doubt that China has done far better than India on almost every indicator of social and economic development, including health and nutrition, leading to longer life expectancy and lower child mortality, and a generally better record in egalitarian education and various other indices of social service and welfare. All of this is true, until one probes into the “skeletons in China’s cupboard”—and the most skeletons in China’s closet can be traced to “the disastrous famine of 1958-1961”¹⁹ China, unlike democratic India, was not able to avert a massive famine.²⁰

India’s democratic system is “radically more suited to deal with famines”²¹ because “the vigor of political opposition has now made it impossible for the government to remain passive without major political risks, and the fear of losing elections reinforces the general sensitivity to political embarrassment in the state assembly and in the central parliament.”²² In addition to this electoral (or democratic) accountability, an unfettered and active freedom of speech, especially mass journalism, contributes to the prevention of famine. By contrast,

What was lacking when famine threatened China was a political system of adversarial journalism and opposition. The Chinese famine raged on for three years without it being even admitted in public that such a thing was occurring, and without there being an adequate policy response to the threat. Not only was the world ignorant of the terrible state of affairs in China, even the population itself did not know about the extent of the national calamity and the extensive nature of the problems being faced in different parts of the country.²³

The absence of democracy in China went beyond the failure to prevent the Great Leap Famine, according to Sen, and continued to thwart its quest for development. For example the PRC has tolerated, if not promoted, the abysmally low literacy rate in Tibet—lower than in the educationally backward northern states in India—and this for Sen is another case of the linkage between freedom and social achievements.²⁴ China's draconian one-child policy of population control was also unfavorably compared to the experience of Kerala, a case of successful reduction in fertility rate that did not involve coercion. Kerala, Sen and his collaborator argue, has achieved this result voluntarily, primarily through higher female literacy rate.²⁵

If China's famine is Sen's most important negative example, Sen has also argued that the experience of famine prevention in Africa supports his general contentions about democracy. Famine prevention and aversion, he wrote, were most often found in "democratic" polities, like Cape Verde, Kenya, Zimbabwe under Robert Mugabe, and the most clear and felicitous case of African democracy, Botswana.²⁶ But the overriding example for his argument is China's Great Leap Famine, accompanied by the notion that whatever developmental lessons China may hold for the world, it is not the lesson that authoritarianism promotes development—a point that Sen uses in arguing vigorously against the so-called "Asian Values" explanation for the high-growth East Asian economies.²⁷

FAD (Food Availability Decline) and Ecology

Sen's seminal work, *Poverty and Famines*, opens with what is by now a famous quote: "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. While the latter can be a cause of the former, it is but one of many *possible* causes."²⁸ With this, Sen launched his argument against FAD—rejecting supply-side analyses of food crises, in favor of an analysis of the symptoms of and reasons for *demand* failure.

There are many virtues to Sen's rejection of any simple FAD argument. He avoids the misleading statistical biases of gross aggregation, focusing instead on the access to food of individuals or groups within society; he is also able to analyze famines that occur in "boom times" as well as during "slumps." But if his rejection of FAD has many virtues, these are not new virtues. From the 1860s onward, if not earlier, it was generally recognized in India, both by British administrators and Indian nationalists, that famines were not caused by food shortages per se, but were complex economic crises induced by the market impact of droughts and crop failure.²⁹ Or as one author put it, in arguing against simple FAD, Sen has "meticulously formalized this Victorian commonsense in the language of welfare economics."³⁰

There are two components to FAD theories, or supply side theories, namely demography (population growth) and drought (climate). The excesses of Malthusian analysis, which dwell upon on population growth as the cause of famine, seem to have gotten the polite burial they deserve. But the second part of this question, the complex interaction between climate

and society leading to a catastrophic reduction in food supply, warrants further scrutiny.

At first glance there are many good reasons to dismiss climate as a cause of famine. For one, drought and flood affect food production, not distribution; FAD assumes a totally closed economy, with no access to sources of food outside the affected area. A robust theory must explain why the food does not get imported from unaffected regions or countries, either in the form of trade or aid. FAD also assumes that everyone is equally affected, but the rich rarely die during famines; FAD cannot explain why some groups of people have better access to food than others. The idea that a calamitous drought leads directly to famine is also too simplistic; not all places affected by drought have famines. In other words, drought causes crop failure, but it is vulnerability to drought that causes famine.

The experience of the Indian subcontinent bulks large in Sen's theory of causation; indeed his arguments are less a theory than an ideal type built on the Indian subcontinent. His major work is based on the Bengal Famine of 1943-1944, where he states that there was not a serious shortage of food, only a decline of exchange entitlements, which led to inflation and speculation. But what caused the inflation and speculation that caused the decline in exchange entitlement? Sen had to admit, if grudgingly, the impact of " 'indifferent' winter crop in 1942, and a 'moderate short-fall in production' which by 1943 had been translated into 'an exceptional short-fall in market release'."³¹ A partial failure of the rains, a deficient crop yield, rumors of price rises—all these could have a severe impact on societies living on precarious

subsistence basis. Even in his focus on Bengal, Sen says singularly little about the long-term decline of agriculture in the province, the growing pressure on the land and the peasants' increasing burden of debt. David Arnold hit the nail on the head when he suggested that Sen's theory, meant to apply to generalized famine contexts, has its real significance for a highly differentiated and elaborately stratified agrarian society—precisely that of nineteenth and twentieth century Bengal.³²

What about societies that are not so highly differentiated and as elaborately stratified as India? Would not climate and rainfall variations have a greater impact? China and North Korea are not democratic societies, but they are egalitarian societies: thus Sen's generalizations about South Asia may not apply in these two cases. Food availability decline—or shortfalls of food production—would be a much more serious problem in a relative egalitarian society, where hoarding or speculation by moneyed elites would be mostly absent. This is not to suggest that elites in China or North Korea ever suffered as much as ordinary people, especially people living in remote areas. But it may well be that this kind of egalitarian agrarian socialism is more important in generating famine conditions, than is the absence of a democratic politics. According to Sen famines are the curse of non-democratic, closed polities, but it may instead be the curse of agrarian revolutions which, having run their course, create a mass base of egalitarian frugality that can tip over to famine with severe drops in food availability.

Entitlement Protection or Development Strategies?

Sen's definition of famine lacks a dynamic and developmental dimension, as we noted earlier, in that famine is defined as a sharp contraction in food intake amid a general agrarian situation of malnutrition and intermittent hunger. His entitlement theory remains focused on proximate causes of famine, and maintains a bias toward *food consumption protection* as the predominant objective of famine victims. Since famine is defined as "entitlement failure" suffered by a large section of the population, it stands to reason that famine prevention should be about the protection and reinforcement of entitlements, for example by recreating a minimum level of incomes and food allotments for those who are hit hard by famine. Or, as Drèze and Sen have put it: "Famine prevention is primarily concerned with the protection of food entitlements where they are in danger of collapsing."³³

The Indian success with famine prevention, the authors go on to argue, has to do with an administrative system aimed at recreating lost entitlements, caused by draughts, floods, economics slumps, and most importantly, "a political system" (namely, democracy) that "acts as the prime mover in getting the administrative system to work as and when required."³⁴ Admittedly this administrative and political system is a colonial product, going back to the detailed recommendations of the Famine Commission of 1880, which among other things framed the region-specific 'Famine Codes' embodying 'authoritative guidelines' to the local administration on the measures needed to anticipate and deal with famine, generating a strategy of

entitlement protection that combined guaranteed employment at subsistence wage with “gratuitous relief” for the unemployable. Under these codes employment in public works was typically remunerated with cash wages, with the expectation that private trade would meet the demands generated by these wage payments. The main Indian improvement as an addition to this British legacy was the public distribution system, an administrative practice accomplished mostly through price stabilization.³⁵

This British inspired famine relief system is what Sen and Drèze hold out as the model for other countries wishing to avoid famine. This form of entitlement protection is distinguished from “famine relief,” an emergency operation simply designed to rush food to the victims, whereas entitlement protection involves “a network of decisions relating to diverse policy areas such as the generation of incomes, the delivery of health care, the stabilization of food prices, the provision of drinking water, and the rehabilitation of the rural economy.”³⁶

The distinction between entitlement and simple famine relief is well taken, but it remains a question whether the bias of the entitlement approach is toward protecting a general agrarian structure of inadequate food consumption; in other words entitlement is clearly broader in its objectives than are simple relief operations, but the goal is to return to a humdrum daily life of subsistence cultivation, where an adequate diet is a generic problem, even if dying of hunger is not. The entitlement protection approach has little to say about measures to remedy the dismal conditions of an entire agrarian order—in fact it does not have a way to conceptualize such a problem. A

society producing a narrow surplus margin of food experiences a famine, and the point is to return it to the quotidian normalcy of narrow margins. But little is said about *development*, which might make it possible that both famine and generalized agrarian penury can be overcome—such that Tawney's peasant finally gets his nose permanently above the water.

Sen's great example of China's massive Great Leap famine places this problem of entitlement versus developmental reform in a kind of relief: after an agrarian revolution culminates by taking power and then enforcing violent land reform campaigns in the early 1950s, China's leaders created a vast egalitarian mass of peasant cultivators, and made major gains in the average food consumption of its 400 million people. The extremes of the Great Leap Forward then led to a catastrophic famine that becomes Sen's punctuation point, proving his theory about democracy and famine. Unquestionably the regime failed to respond in time to save the lives of millions of peasants, but when it did respond, it ultimately transformed the livelihoods of several hundred million peasants (modestly in the early 1960s, but permanently after Deng Xiaoping's reforms subsequent to 1978.) So in the end which is the punctuation point? Did famine occur because of an absence of democracy, or did famine stimulate an undemocratic regime to turn its back on its own ideological verities and let market mechanisms begin to create agrarian wealth? It goes without saying that had China avoided the terrible famine of the early 1960s, its record of agrarian reform and placing a floor on agrarian poverty strongly contrasts with India's perennial agrarian penury. But what if famine is itself a catalyst for dramatic regime reform, even in a totalitarian

system? What would that do to Sen's theory? We can examine this question better if we think historically about famine crises.

Sen's theory is thus an economic theory, and not a historical one; it has little to say about historical consequences of famine. But famines are historical markers; Cornelius Walford remarked that in Britain famine had given rise to "several of our more important and distinctive institutions." Among these were the English Poor Law, and the Corn Laws (from their origins in the 13th century, restoration in 1663, down to their final repeal during the Irish potato famine.) The catastrophe of the Great Leap Forward led to a massive reversal of policy, so that the disaster would never again be repeated. In fact, China never again repeated the tragedy of the kind of famine that visited it forty years ago.³⁷ Later on I will argue that social learning and transformation seemed to have occurred faster and more permanently in authoritarian China, and less in democratic India. I will also argue later that famine in North Korea has brought about a greater transformation in that society, thrusting it into an informal, transitional economy. In other words famine was an important historical turning point in China, as we saw above, and is likely to be so in North Korea.

Moore and Sen: A Compelling Alternative

In thinking about the differences between South Asia and East Asia, it is still instructive to recall a great text in the literature on comparative politics: Barrington Moore's *Social Origins of Dictatorship and Development*. In that seminal book Moore traced three modern paths of development:

revolution from above, the fascist route to modernity; revolution from below, the peasant-communist route to modernity; and the slower, more evolutionary (but still revolutionary) trajectory of the capitalist and middle class revolution, symbolized by England's history. At the most abstract level, East Asia experienced all three paths: China is Moore's model of the peasant-revolution route to modernity, just as Japan (seen through a German glass darkly) is his example of revolution from above. For a generation after 1945 North and South Korea embodied these two separate routes to modernity, but culminated in a capitalist democratic outcome in South Korea, similar to Japan. Vietnam's experience likewise detracts nothing from Moore's analysis.

If East Asia experienced these three paths to modernity, it is striking that South Asia experienced none—according to Moore. In India Moore found a weak impulse toward modernization, with “neither a capitalist revolution from above or below, nor a peasant one leading to communism;” yet he found it unquestionable that “a parliamentary regime has existed for some time that is considerably more than mere façade.”³⁸ Apart from the signal importance of religion in shaping India's history, Moore cites two other features of critical importance: (1) the widespread penury of agrarian cultivation, which he contrasts to the dynamic peasant agriculture in Japan and China's capacity for feeding hundreds of millions of people; and (2) the apparent peasant docility of the Indian peasants, which may not contrast much with Japan, but does so mightily with China, Korea and Vietnam.³⁹ As he put the point in its fullness,

Barring some technical miracle that will enable every Indian peasant to grow abundant food in a glass of water or a bowl of sand, labor will have to be applied much more effectively, technical advances introduced, and means found to get food to the dwellers in the cities. Either masked coercion on a massive scale, as in the capitalist model including even Japan, or more direct coercion approaching the socialist model will remain necessary. The tragic fact of the matter is that the poor bear the heaviest costs of modernization under both socialist and capitalist auspices. The only justification for imposing the costs is that they would become steadily worse off without it. As the situation stands, the dilemma is indeed a cruel one. It is possible to have the greatest sympathy for those responsible for facing it. To deny that it exists is, on the other hand, the acme of both intellectual and political irresponsibility.⁴⁰

One could hardly find a view more systematically at odds with Sen's, but this is not a question of simple comparisons of democratic India to totalitarian China or North Korea; instead Moore has a comprehensive view of modernity that totes up the costs of modernization alongside the costs of its absence, and a dark, complex view of history that leads him to examine the claims of contemporary democracies from a long, historical perspective—one that does not relegate the German or Japanese path (up to 1945) to the shadows of aberrational development, but reminds us that totalitarianism is not a communist monopoly. Moore critically assays India's fatal absence of development through much of its history, but also applauds the democratic moorings of post-independence India. Instead of fairy tales about presumed universal aspirations to democracy and its evil opponents, Moore remarks that "under close examinations no political system turns out to be edifying"⁴¹; each system had its formative crises, like defeat in two world wars and fascism in between for Germany, or the horrendous experience of the civil war for the U.S.

Democracy and Famine

In the light of Moore's analysis, to say that Northeast Asia was one of [the] only regions in the developing world that was able to eradicate agrarian poverty and hunger (North Korea did so through the 1980s, if not in recent years of crisis), is to issue a profound challenge to Sen's analysis of poverty, hunger and democracy in South Asia. At the same time, it is important to understand that Sen would not really disagree with Moore's depiction of India's failure to eradicate everyday deprivation. Consider Sen and Drèze's discussion below:

Comparing India's death rate of 12 per thousand with China's of 7 per thousand, and applying that difference to the Indian population of 781 million in 1986, we get an estimate of excess normal mortality in India of 3.9 million per year. This implies that every eight years or so more people die in India because of its higher regular death rate than died in China in the gigantic famine of 1958-61. India seems to manage to fill its cupboards with more skeletons every eight years than China put there in its years of shame.⁴²

This passage is as honest as it is troubling; when taken in the general context of Sen's work on famine, a crude reading might suggest that Sen has allowed an obsession with a one-time catastrophe that befell China nearly half century ago blind him to an everyday holocaust going on in India. But he and his collaborator clearly understand Moore's telling point about everyday agrarian misery, and proceed to quantify it dramatically.

So perhaps now we can move to a direct comparison on his terms (rather than Barrington Moore's): regardless of what Japan or Korea (or Germany) may have experienced along their paths to modernity, does Indian

democracy make a critical difference in overcoming famine, as compared to totalitarian China? Or to put the question in Sen's terms, adversarial politics and an open press are important institutional arrangement for the prevention and relief of famine, but is the *absence* of those arrangement a sufficient cause of famine?

Sen and his collaborator, Jean Drèze, clearly think so. In their 1995 book on India, containing a chapter on the negative lesson of China (based, of course, on China's abominable record during the Great Leap Famine), they single out the Chinese government's immunity to public pressure as one of the causes of famine—particularly “informational failure,” combined with a “controlled press, which duped the public in suppressing information about the famine, but in the process deluded the government, as well.”⁴³ China's famine “raged for three years without it being even admitted in public ... and without there being an adequate policy response.”⁴⁴

But if China in the 1958-61 period is their main concern, their argument extends to “non-democratic regimes” more generally: the early 1930s famine in the Soviet Union, the Great Leap famine in China, and the late 1990s famine in North Korea all fall into the same category of non-democratic famine.⁴⁵ At the basis of such authoritarian politics, they assert, is the “alienation of the rulers from those ruled”

The political economy of famine causation and prevention involves institutions and organizations, but it depends, in addition, on perceptions and understandings that accompany the exercise of power and authority. It depends particularly on *the alienation of the rulers from those ruled*. Even when the immediate causation of a famine is quite different from this, *the social or political distance* between the

governors and the governed can play a crucial role in the non-prevention of the famine (emphasis added).⁴⁶

Like the argument about authoritarian systems, Sen extends these ideas about democracy and famine well beyond just India. He sees Botswana, Zimbabwe, Cape Verde, and Kenya as positive examples of democratic systems capable of averting famine. By contrast, authoritarian Sudan and Ethiopia are presented as negative examples where famines raged even without significant decline in food production.⁴⁷ But exactly what constitutes functioning multiparty democracy in the developing world, is not a small question; if India's claim to being the world's largest parliamentary system is true, Zimbabwe under Robert Mugabe and Kenya's recent travails of one-party rule make their claims to democracy much more tenuous. Furthermore a careful study of war and famine in southwestern Sudan shows that the democracy and famine correlation does not hold; it was the "democratic" government of Sadiq el Mahdi that was most hard-hit by famine. Famine, David Keen argued, was not just a product of war in Sudan, but of long-standing conflicts over economic resources exacerbated by a particular pattern of uneven development that generated growing pressures on food production, a pattern of unequal access actively promoted by a number of powerful interests (democratic or no), who stood to gain from it.⁴⁸

The perception that one developing country is democratic and another is not also affects aid regimes and decisions. Western governments soft-pedaled the problems discussed above in regard to the el Mahdi regime, in part because it was seen as "democratic."⁴⁹ Likewise Western aid donors

often use famine aid as a foreign policy instrument, with the aim of overturning governments they did not like, as happened in Ethiopia in 1983-1985.⁵⁰ It is much easier to do so if such governments are deemed undemocratic.

In the case of famines in communist countries—namely the Soviet Union’s in the 1930s and China’s during the GLF—Sen’s idea of lumping the Soviet Union and China together flies in the face of the best scholarship on Chinese and Soviet political economy. Few would agree that the “distance” between the state and the peasants was as great in the PRC as it was in the USSR; furthermore Stalin’s malice aforethought—or calculated indifference—to the plight of peasants in the Ukraine has no counterpart in Mao Zedong’s reaction to China’s famine. The Soviet people suffered severe famines in 1932-33, affecting major grain-producing regions of country including the Ukraine, the North Caucasus, and other regions, resulting in at least 6 million excess deaths between 1932 and 1934 (or between 8.95 million and 16.4 million in the period 1929-36).⁵¹ The Soviet state’s relationship to the peasantry had a semblance of “internal colonialism,”⁵² but no one has argued that Chinese peasants were similarly “colonized,” the result of China experiencing a peasant revolution in an overwhelmingly rural society, whereas the Bolshevik revolution moved from the cities to the countryside, in successive and increasingly violent “colonizations,” the last being likened by scholars like Moishe Lewin to military campaigns of forced grain confiscation. What began as a growing crisis in state-peasant relations caused by peasant discontent with Stalin’s collectivization program, calling

for unconditional fulfillment of delivery quotas to the state. These quotas constituted an “an extraction program which the city imposed upon the village,” and its consequence was to thoroughly alienate the peasantry—and this experience goes a long way toward explaining stagnant agricultural production throughout the Stalin era. Stalin believed that the state and the peasantry were at war, and in many ways, so did the peasantry.⁵³

In China the problem was not so much extraction of grain but rural development, which in turn required attentiveness to incentives that would get peasants to cooperate. Chinese grain procurement policy in the years before the Leap was moderate and made possible increased peasant consumption. So, instead of the Soviet situation of a war-like relationship between the state and peasantry, in China, excessive procurement was the result of competitive target-setting.⁵⁴ The period between 1949-1958 is often called one of unity between the peasants and the state, and considerable prestige for the Communist Party—a prestige shattered in the aftermath of the Great Famine, unleashing a series of powerful consequences. But prior to the Great Leap the collectivization process was deliberate and sensible, drawing the peasants quickly into conformity with central plans. Vivienne Shue’s work on peasant China on the eve of the Great Leap Forward details a well-thought out program of rural development that incorporated active participation of local cadres.⁵⁵

Sen and Drèze are right that during the GLF there was clearly a massive failure of information, primarily in the absence of good statistical and monitoring systems. Inaccurate claims of a bumper 1958 grain harvest, up

92 percent from 1957, led the planner to shift land from grain to economic crops like cotton, sugarcane, beets, and divert agricultural laborers to industries. The false figures also led the leadership, especially Zhou Enlai, to speed up grain exports to repay debts to the Soviet Union and to import capital goods, and led to fast adoption of the GLF's famed commune mess halls. Fantastic claims about grain output even led the leadership to encourage "all you can eat" practices, as if the communist dream of plenty had finally arrived.⁵⁶ Excessive grain procurement also resulted from politically-motivated exaggeration of harvest size and the destruction of objective reporting systems, which kept the leadership in the dark about the real supply conditions.

But was there a conspiracy of silence—a communist press that "duped the public in suppressing information"? Chinese reports at the time did mention the existence of malnutrition, "serious famine," and even "starvation," although it did not report the magnitude of loss of life.⁵⁷ Furthermore in the context of extremely tense relations between China and the U.S., the Americans found profit in publicizing China's food shortage problems (in 1960 especially), but the United States was not about provide food relief to China and so used the figures for propaganda, and of course China in turn was loath admit to "famine" before the international community.⁵⁸ "Who defines an event as a 'famine,'" Alexander de Waal once wrote, "is a question of power relations within and between societies."⁵⁹

Contrary to what Sen writes, most China scholars agree that by the fall of 1958 Mao Zedong was aware of food shortage problems caused by

excesses of the Great Leap; nor was 1958 a bad year in comparison to 1960, which was by far the worst year of the famine, with China losing net of ten million people.⁶⁰ (When Mao was told in 1959 that peasants were hiding food, he replied: "I would be happy if peasants really have hidden grain. I am afraid they have nothing to hide!"⁶¹). Mao initiated adjustments in early 1959, and supervised the implementation of the adjustment program—settling accounts within the commune, returning property and funds requisitioned from lower level agricultural collectives, and the like.

The adjustment program was derailed during the summer of 1959, but not because of absence of information. Instead the popular Defense Minister Peng Duhai challenged Mao's power: returning from the Soviet Union, he criticized the excesses of Great Leap Forward, leading Mao to launch a campaign against "right opportunism," thus setting back efforts to control the damage in the countryside. The looming conflict with the Soviet Union had distracted Mao's attention from the disaster, and it wasn't until 1961 that Mao finally made a self-criticism at a key Party meeting, and supported the far-reaching retrenchment from the Great Leap. The real parallel between the famines in China and the Soviet Union is not so much their political system or regime type but the circumstances that accompanied the breakdown of their normal functioning. In both cases, famines occurred in the context of sharp changes in routine procedure, and amid major political campaigns: the anti-rightist movement in 1957, the Great Leap Movement from 1958, and the anti-reactionary movement after the severance of relations with the USSR in

1960. These were the major political events that delayed the effective relief of famine—but they were not its causes.⁶²

The scholarship on China suggests that the real problem was the dramatic oscillation back and forth between periods of radical reform and periods of consolidation or retrenchment, leading to a massive immobilization of the system in the face of the major catastrophe in 1960-61. A massive and systematic systemic policy failure occasioned this immobility, but also prepared the ground for a radical retrenchment that made sure no such catastrophe would strike China in the future. The retrenchment and reform of the early 1960s showed that the Chinese government was capable of changing its course dramatically, not just for another radical campaign but in the interest of feeding the population and developing agricultural production—something that one would not expect within a totalitarian framework, according to Sen. This policy pattern seems to have been an idiosyncratic aspect of the Chinese communist system in the first decade after it came to power in 1949; it doesn't seem to have characterized regime agricultural policy and practice thereafter, nor did a similar pattern characterize other communist regimes. Furthermore the very existence of these radical oscillations followed by genuine regime learning, provides a stark contrast with the USSR—which never found a way out of massive agricultural failure, instead carrying forward the birthmarks of Stalin's violent campaigns against the peasantry. The actual political process in China in 1958-62 remains opaque to scholarly inquiry, but history since that terrible

time has shown that the regime was clearly more responsive than was the Soviet regime under Stalin, and clearly capable of learning from mistakes.

Variation in Political Regimes, or Variations in Climate?

“Climate,” wrote the French historian Immanuel Le Roy Ladurie, “is a function of time. It varies; it is subject to fluctuation; it has a history.”⁶³

Climate has a history of its own—every raindrop or snowflake records the trajectory of its life—but climate history also carries with it an extraordinary burden of human history. If we can only evaluate China’s response to the Great Leap Famine in the fullness of decades of time, climate history often operates in the measure of centuries. Furthermore the difficulties of doing interdisciplinary inquiry in history, political science, agrarian sociology and developmental economics pale before the requirements of integrating human history with climate. Thus climate is left to the scientists and human history to us, the scholars, who fall to our tasks regardless of the stiff winds blowing outside our doors. Peasants are not so lucky.

Yet the ecological vulnerability of Asian peasants is an old subject of inquiry, antiquated in its centrality to centuries of scholars; at one time imperial rulers and regime scribes were acutely aware of how their political fortunes fluctuated with the weather and the resulting harvest. R. H. Tawney observed that China’s attempt to control its environment by irrigation and flood control was the most venerable part of its agricultural policy.⁶⁴ The failure of the state to provide basic sustenance for people was an immanent sign of its (imminent) demise; natural disasters portended waning political

fortune.⁶⁵ Now arrives an interesting puzzle in our inquiry: India—a part of monsoon Asia—did not (at any time before the present) share China's intense concern about how the mandate of Heaven fluctuated with heaven's relentless climatic imperatives. Paul Greenough, a historian of India, observed about a Chinese scholar's work that "No Indianist, I believe, could make a similar assertion about the South Asian state at any time except the present . . . the fundamental political theme running through Chinese sustenance concerns is largely missing."⁶⁶ This may help to explain the conspicuous absence in Amartya Sen's work on the significance of climatic factors—and perhaps his distrust of central state intervention in food crises. If Chinese emperors came and went with the fluctuations of the weather (or thought that they did), people today are far more skeptical about the political impact of climatic change and far more confident of our capacity to tame or to defy the elements. In that sense famine is usually seen as something separate from ecology, more "as a symptom than cause, a sign of a society's inner weaknesses and not just a consequence of temporary climatic aberration."⁶⁷

In recent years, however, global ecological disasters that have adversely affected fragile economies have occasioned a renewed⁶⁸ interest in climate and social history: these disasters would include the devastating droughts in sub-Saharan Africa in the 1970s and 1980s; the El Nino events of 1972-1973, when droughts occurred simultaneously around the globe, adversely affecting food production in the Soviet Union, China, India, Central America, Australia, Indonesia, Argentina, Brazil, West Africa, and Ethiopia;

and of course the “Greenhouse effect,” the apparent heating up of the earth’s atmosphere due to increasing amounts of carbon dioxide and other trace gases produced by human activities—mainly global industrialization. The curiously named El Nino is a little guy that just keeps getting bigger and bigger: the 1972-73 event was considered one of the largest in a century, but was subsequently reconstituted on a much larger scale in 1982 and again in 1997-1998.

There is a long-discredited theory that alleges a link between temperate climate and the rise of modern society; however studies of how climate impacts poor and structurally simpler economies do not have to invoke some sort of invidious climatic determinism. Regional changes happen in the frequency, intensity, duration, and even location of extreme meteorological events. By breaking down climate into such key component as temperature, rainfall, range of variability, seasonality, and extreme events, one can more easily identify ways that climate may affect society and ways that those societal effects can be mitigated or adapted to, if not prevented by human action.⁶⁹ Such concerns are at the heart of many initiatives on sustainable development, with a pronounced emphasis on ecology.⁷⁰

The *Annales* school, in pursuit of “total history,” developed through investigations of the *longue duree*, which included the historical significance of climatic change and the cycle of seasons and harvests; the point was to discover the consequences these had for agriculture, settlement and trade, the movement of food prices, population trends, and the periodicity and dissemination of epidemic disease—all matters having a bearing, directly or

indirectly, on famine. But if it's easy to begin examining climate change and society, where to end? The natural and human history of climate is necessarily an interdisciplinary effort that could involve the insights of experts in most if not all of the natural and social sciences—biologists, meteorologists, geographers, archaeologists, historians, dendrochronologists, phenologists, glaciologists, geologists, and even palynologists.⁷¹ The disciplinary boundaries of the social sciences appear to replicate their deleterious effects in the hard sciences: as a recent NASA report states, in spite of the recognition of myriad global connections among Earth's components, "it is relatively recently that scientists in one discipline have had to confront the need for major contributions from other disciplines in order to achieve substantial advance."⁷²

In history and the social sciences one often finds this, in linking climate with human society: absolutely nothing. For example there is virtually no information on the impact of global climatic regime on North Korea;⁷³ thus in the later part of this paper we can do little more than piece together information about global ecological change, and look for coincidental changes in rainfall variations in North Korea for the period 1995-2000. First, we need to say a few things about global climatic changes on society. Luckily there is an original and exemplary account of global climatic change and its political implications, one that has greatly influenced my thinking. This is Mike Davis' *Late Victorian Holocausts: El Nino Famines and the Making of the Third World* (2001).

Ostensibly Davis' subject is the rise of what has come to be known as the "Third World," which he traces to a terrible confluence of events between the world climate system and the global economy—what happened to people caught "between the teeth of ... massive and implacable cogwheels of modern history:"

In the first instance, there was the fatal meshing of extreme events between the world climate system and the late Victorian world economy. The 1870s ... provided numerous examples of a new vicious cycle ... linking weather and price perturbations through the medium of an international grain market. Suddenly the price of wheat in Liverpool and the rainfall in Madras were variables in the same vast equation of human survival"⁷⁴

Davis's account of "global climate-meets-global economy" has a cruel implication for North Korea—a country that was hell-bent to maintain prophylactic barriers against the rest of the world may have been at the eye of the global ecological disaster, and ended up descending into a famine that was as unusual as it was unaccountable.

We will examine that below, but Davis's account begins at least a century earlier, in the teeth of a prolonged or "Victorian" drought, which created simultaneous famines around the world—in India, Ceylon, north China, southern Java and Borneo, the Visayas, Egypt, Algeria, Morocco, Angola, South Africa, northeast Brazil—and, interestingly enough, Korea. If these peoples were in the grip of merciless drought, a biblical black horse trampling roughshod through each afflicted place, they could not (and did not) know that they were not alone. But Davis' retrospective global eye is on the general condition that he believes explains the idiosyncratic local calamity: a phenomenon now known as ENSO—El Nino Southern Oscillation, the Moby

Dick behind the fourth horse of the apocalypse.

ENSO is, in Davis's words the "elusive great white whale of tropical meteorology for almost a century,"⁷⁵ and the crux of the ENSO theory is the recognition that giant oscillations of ocean temperature and air pressure in the equatorial Pacific directly affect normal rainfall patterns over much of the globe. ENSO is the great secular fluctuation, whereas "El Nino" is a weak counter-current that slightly raises sea temperatures off the coast of Ecuador and Peru every year near Christmas (thus El Nino, "the Christ child").⁷⁶ The ENSO white whale is different: the active ocean component of a vast, Pacific Basin-wide oscillation in air mass and ocean temperature, most influential in its warm phase of ENSO (the cold phase is known as El Nina). The ENSO warm extreme appears to have close association with drought in much of the monsoon tropics and northern China. "ENSO," writes Davis, is indeed the unlocked "secret of the monsoons" itself.⁷⁷

Scientists have exhaustively studied the ENSO phenomenon, especially in the aftermath of the ENSO-related disasters of 1997-1998 (of which more, below.) The World Meteorological Association, in conjunction with various agencies under the United Nations auspices, held a series of conferences, based on reports from various national governments that were affected by the catastrophe, and the information is readily available to the public.⁷⁸ An alarming fact is that the El Nino cycle seems to have been accelerating in recent years, quite possibly as the result of the "greenhouse effect."⁷⁹ History only counted eight or nine "very strong" El Ninos going back to 1728, around the time colonized Americans welcomed King George III to the throne: on an

average of on ENSO every 42 years. In our time two of the three largest (1982-83, 1997-1998) have occurred within fourteen years of one another. Even stranger, the El Nino of 1990-95 wouldn't go away; it is said to be the longest in the historical and paleo-climatic records. This leads some to argue that its very uniqueness in the very long run of previous centuries must mean that it is the residue of human behavior: of anthropogenic global warming.⁸⁰

To the extent that the meteorologists are correct, some apocalypses attributed to individual human failing—like Mao's Great Leap Forward turning to a world's worst famine—look more like a consequence either of a cruel atmosphere, or general human folly (sending all those hydrocarbons through smokestacks the past two hundred years). The "strong" El Nino of 1957-1959 produced nearly a million refugees in the Brazilian *sertao*, and caused droughts in China; why not at least some room for it bringing Mao's schemes to ruin, too? Yet the rejection of climatic factors is so routine that Dali Yang, author of the most thoughtful and carefully-researched account of the Great Leap Famine, does not see fit to dwell on the weather. Instead, Yang examines party membership or the density of commune mess halls in famine-struck areas, to understand the determinants of famine-related deaths.

Chinese meteorologists have long sought to understand a drought in the GLF period that affected one-third of the nation's cultivated acreage—which they see as the most extreme of the twentieth century. "For the first time in human memory, people could actually wade across the Yellow River."

From its peak of 200 million tons in 1958, grain production dropped by 15 percent in 1959, and declined by another 15 percent in 1960 before flattening out in 1961. The average proportion of the sown area hit by natural disasters in 1959-1961 was more than double that in 1949-66 (minus 1959-1961).⁸¹

In one of the finest works to date on Chinese agriculture, Y. Y. Kueh uses impressive statistical modeling for the years between 1931-1991 to argue that the enormous grain losses during 1959-1961 were caused primarily by large-scale weather anomalies, which fluctuated far more wildly than all the other episodes of disturbances in the period under his study. He also finds that the grain yield and output losses in 1960-1961, combined with sown-area losses in 1959, were much greater than those of other periods of major agricultural instability (for example during 1931-37 and 1970-84).⁸²

Professor Kueh also argues that outputs and yields of rice and wheat crops per sown hectare were biased consistently downward in 1960 and 1961, whereas in other periods of climate fluctuation, rice and wheat yields varied inversely with climate trend lines. Thus in previous episodes of large-scale climate disturbance, good harvests in other regions (or alternative crop seasons) could serve partially to offset the losses incurred. No such compensatory adjustments characterized the 1959-61 period. To return to our earlier analysis, food availability decline (FAD) seems to have been an important factor in creating the world's biggest famine disaster. The scientists say it was weather-induced and the political scientists say it was ideology- and Communist Party-induced. Can we solve this puzzle?

As a collective catastrophe, famine often leads to a complete breakdown of the customary patterns of work, and customary norms of morality and social behavior. Yet, as Arnold notes: “However unexpected, however devastating the crisis, a society will not act entirely out of *character* during a famine.” (italics mine.)⁸³ Martin Ravallion, the pre-eminent economist of famine, put it differently—famine is a tragic magnification of normal market and government failures; to understand famine one must understand how normal institutions work under stresses they do not normally encounter.⁸⁴ These insights may allow us to square the circle: the Great Leap Famine was indeed a huge magnification of policy failure, in the context of a socialist economic revolution; but it was made far worse by the ENSO impact. A great deal of further inquiry will be needed to determine how to apportion responsibility—to Mao, to ENSO, and to the “normal” breakdowns of any society faced with famine.

If Mao’s China was not just any society, its *character* in Arnold’s sense is, for Amartya Sen, an “authoritarian polity” in which an ideological tyrant wields unchecked power, even against common sense. It is this fundamental absence of accountability that causes the famine. But if China is also remembered as a *developmental* society (“catch up with England in 15 years” was one ubiquitous slogan of the GLF), and the Great Leap Famine as a classic—if gargantuan—developmental failure, we may not resolve the dispute with Sen’s characterization, but we can begin to understand why and how the leadership eventually rectified its problems through another set of centrally-directed developmental plans (equally unchecked by democratic

accountability), done for the purposes of reform and retrenchment, which led to subsequent agricultural development and no repeat of massive famine.

The idea behind the Great Leap Strategy, scholars of China generally agree, was an attempt to break developmental bottlenecks by improving agricultural productivity through labor-intensive mass mobilization, using the tried-and-true methods of restarting the “revolutionary zeal” of the Ya’nan days. To get agriculture to keep pace with industrial development and the needs of urban food supply, the Chinese sought an improvement of agricultural processes based on technological dualism—mobilizing surplus labor for large scale, highly labor-intensive projects for reclaiming and irrigating land, and to institute flood control. Additional surplus labor was supposed to expand small scale industrial production in the countryside.

In retrospect the choices that the Chinese leadership made were quite explicable, as Alexander Eckstein argued; he found it to be an example of a “Nurkse-Ecklaus” type strategy of economic development. He refers to Ragnar Nurkse’s insights that surplus labor in underdeveloped countries could be converted into capital, and R.S. Eckaus’s ideas about output maximization through the simultaneous pursuit of dual sets of technologies. Eckstein argued that the failure of the Great Leap was not so much one of developmental conception, but of implementation—a failure born of unrealistic expectations on the one hand, and inadequate and technically deficient implementation on the other.⁸⁵ These failures obviously exacerbated the food crisis from 1960 through 1962, which in turn spilled over into industrial production, transport and trade. Communization had a profoundly

disruptive impact on traditional institutions and farming patterns, especially in its initial phase, and this, combined with planning and technical errors, led to drastic decline in output. All of these factors were compounded by the sudden withdrawal of the Soviet advisors and technicians in 1960, suspending a number of industrial projects.

The short-term impact of the Great Leap failure is well known. In the immediate aftermath, private plots were fully restored, agricultural work went back to the “work teams” that approximated so-called “natural village” working groups, and wider scope was provided for the placement of farm produce in rural free markets. This retrenchment remained essentially unchanged through the Cultural Revolution (which was primarily an urban “revolution”). In fact since the Great Leap tragedy Mao never again tampered with the team-based organizational framework. More important, the long term historical implication of the Great Leap Famine, some scholars argue, lay at the bottom of the de-collectivization and rural reform since 1978—or at least this move would have been impossibly difficult, save for the catastrophe that had occurred twenty years prior to it. In an impressive study that combines inductive case studies with quantitative statistical analysis, Dali Yang (1996) has argued that the Great Leap Famine furnished the crucial historical motive for dismantling the rural collective institutional structure. He shows in a painstaking way how the areas that suffered more during the famine or were farthest from Beijing, were also more likely to spearhead the introduction of Deng Xiaoping’s household responsibility system. Chinese peasants often refer to the household responsibility system as the “second

land reform”—or as Yang puts it, a land reform without landlords (1996:177). So perhaps we can say that if the 1877 famine in the Indian Deccan produced a great institutional change in the form of the Famine Code of 1880, the Great Leap Famine in China paved the way for the transition to market socialism.

In the end, if we do not yet have the answer as to the singular cause of the GL Famine, we do have several nuanced explanations for policy failure. If the central government was not accountable, it was nonetheless decisive in 1961 in disavowing the most highly-touted developmental strategy of its entire tenure (i.e., the GLF). Thus we can conclude that in democratic and accountable India, famine relief follows the predictable paths of a society of this *character* (a decentralized, pluralistic entity with governmental accountability); and in undemocratic and not-accountable China, you get a massive developmental policy reversal—as the predictable response of a highly centralized, developmentally-mobilized entity. And then, there is the ever-present white whale: the ENSO that might have rendered impotent the best-laid plans of any leadership, democratic or not, reformist or not.

North Korea's Great Leap Backward

Before leaving China's Great Leap forward to famine for North Korea's Great Leap backward (to famine), we need to remember some points of comparison. The first is the sequence of crisis: the Great Leap Forward occurred in a largely agrarian society—in social composition it was 70 percent peasant—and it followed on the heels of the heady industrial successes of the

1950s. Facing a disastrous failure, the leadership reversed gears and provided industrial inputs for agriculture (instead of relying as they had in the past on maximizing traditional, labor-intensive means of production), even if this meant a temporary respite in industrial investment. The government also restored a measure of material incentives and rewards as a means for motivating farmers and workers.

By contrast, the North Korean crisis happened in a largely urban, industrial society, with a social composition the reverse of the China of the Great Leap years: upwards of 70 percent of the population were in the urban-industrial sector. The agricultural crisis occurred *after* the industrial crisis, and not before it: by and large, North Korea's industrial structure had collapsed as the result of a trade collapse in 1991 in the aftermath of the demise of the Soviet Union, and a subsequent collapse in the energy regime necessary to sustain industry.

In 1995 and 1996 natural calamities (unprecedented floods, primarily) pushed North Korea into full-fledged famine, which showed its worst face in 1997-99, after extended droughts that added insult to the injury of the floods. The extent of famine-related mortality in North Korea remains, like everything else about that country, shrouded in mystery. Estimates vary from the 200,000-300,000 range—thought to be the lower range by Peter Hayes, the director of the non-profit Nautilus Institute who has frequently visited North Korea—to the uppermost figure of 3.5 million, based on interviews with refugees in China.⁸⁶ A recent study by two American demographers, and published in the July 2001 issue of *Population and*

Development Review, puts the figure between 600,000 and one million, which they derived by transposing North Korea onto the experience of the Great Leap Forward.⁸⁷

Two dramatic departures followed upon these calamities: pleading for the world to come to its aid, and the collapse of the food distribution system. The North was not immune to asking for handouts from the external world, its self-reliance dogma notwithstanding. In the early 1990s, according to the then-director of the ROK intelligence agency, the North asked for 500,000 tons of rice from the South on condition that it be supplied secretly, an idea that was eventually dropped.⁸⁸ By 1992, after another skimpy harvest and in the wake of the collapse of the USSR, North Korea launched a "Let's Eat Two Meals a Day" campaign, and by 1994 the North Korean news broadcasts began to admit the existence of hunger in the socialist paradise. In the same year, during negotiations in Geneva with the United States, North Korean officials spoke urgently about their food problems—but this went unheeded by the US officials who were preoccupied with the nuclear issue.

In 1995 North Korea may have faced a harvest shortage of about two million tons of grain, but with little foreign currency or access to credit to find substitutions from outside.⁸⁹ Around the same time the public distribution system (PDS) in North Korea that used to shift food fairly evenly from surplus to needy areas began to break down, with central authorities finally resorting to triaging the Northeast⁹⁰--a region that was historically very poor, whether in the pre-modern or Japanese colonial period.

In 1995 North Korea openly asked the world for emergency food aid. Japan and South Korea eventually provided 500,00 tons and 150,000 tons, respectively, but not without politically motivated snafu.⁹¹ North Korea also asked for help from the United Nations, but the response was tepid until the United States announced a \$2 million contribution to the UN emergency appeal, without attaching any conditions—against the wishes of the South Korean government which by now had second thoughts about food aid.⁹² In December 1995, the FAO and the WFO issued a joint statement warning of massive famine in North Korea, followed by a similar such statement by the International Committee of the Red Cross (ICRC); by early 1997 the WFP provided eyewitness accounts of malnutrition, and described North Korea as walking the edge of a major famine.⁹³

As a condition for providing assistance, UN agencies and other aid-givers obtained access to previously inaccessible parts of North Korean countryside. As of 1999, the WFP maintained an in-country staff of 46, with access to 159 of 171 promised counties (out of the total 211 counties in North Korea), and access not only to farmers but also to school children, caregivers, hospitals, schools, and family visits. The WFO also conducted food and crop assessments and nutritional analyses, and the ICRC got involved in disaster relief programs, like evacuation, rescue, mass feeding, and shelter provisions in coordination with the North Korean authorities. Such unprecedented foreign access undoubtedly has important long-term consequences, as we will discuss later in the paper.

The UN agencies, NGOs, and other organizations were now able to plumb the depth of the North Korean disaster. Various figures for acute malnutrition and stunting for children proved to be in the range of 16-18 percent and 62-65 percent respectively, making the North Korean malnutrition rate worse than any country in Asia, except for India and Bangladesh.⁹⁴ (Here the reader will notice the quiet return of Sen's premises, where malnutrition rates are perennially higher in India and Bangladesh during "ordinary" times, than in North Korea during the depth of famine.) Furthermore analysis of malnutrition rates implied that food, when available, was probably going to children first.⁹⁵ This is perhaps not so surprising; as a long-time CIA analyst of North Korea has observed, the "one thing that North Koreans do not hide behind the veil of secrecy ... is their love of children."⁹⁶

Regular foreign food supply thus became the mainstay of North Korean diplomacy from the mid-1990s to the present. The amount of food imported into North Korea—through food aid, subsidized commercial sales, cross-border barter trade—was said to be close to a million tons in 1995-1996, over a million tons in 1996-1997, and over 1.3 million tons in 1997-1998. (China also seems to have provided a very quiet aid program in these years, which is hard to measure—but some observers think China's hidden aid sometimes reached nearly one million tons of grain per year). The timing of pledges and deliveries did not match the peak of famine, however, and some say that the actual delivery of needed food did not commence in large scale until spring of 1997.⁹⁷

Unfortunately there is little reliable information on the supply and demand for food requirements in North Korea, and thus the estimates on domestic production and imports vary wildly; figuring out actual demand requires information on demographic data that either does not exist or is not released.⁹⁸ But the often quoted figure for very basic food needs for North Korea is between five and six million tons of grain, with bare subsistence is thought to require just under five million tons. In 1990 grain production in North Korea is said to have reached 8 million tons (and may have been even higher in the mid-1980s), but it plummeted incredibly and catastrophically to 2.5 million by 1996; since then harvests have varied and have usually been above the 1996 nadir—but never above five million tons. The estimate for 2001 is 3.8 million tons, but that would be still more than one million tons below the lowest estimate for subsistence.⁹⁹

The collapse of the North Korea economy clearly represents a failure of the political process—although not necessarily of its regime type, since for nearly four decades the same regime did better than most other developing countries to protect social entitlements of the people—but it is also the hardest part to understand. The sudden death of Kim Il Sung in June 1994, the only leader the country ever had, was followed by a murky transitional leadership as his eldest son went into a period of mourning that by 1997 had lasted the full, traditional three years; undoubtedly a system that depended so heavily on top-down leadership found itself shocked and immobilized by the passing of the only person in the country who could make a decision without worrying about the consequences.¹⁰⁰ Kim Jong Il may also have

resisted taking full power (and thus taking responsibility) in the midst of a famine catastrophe, given the age-old relationship between the Korean king and the “mandate of heaven” (a term the North Koreans used frequently in the mid-1990s).

The Food and Energy Crisis

The collapse of North Korean agriculture, American and South Korean economists argue, stemmed in large measure from the over-centralization of decision-making and the absence of an incentive system.¹⁰¹ But all socialist agriculture lacks an incentive system almost by definition, and North Korean agriculture became quite productive, in the eyes of trusted foreign analysts, in the 1970s and 1980s—with little change in incentive or planning systems. Agriculture in North Korea was also far more de-centralized from the mid-1960s onward, than in pre-1978 China. This “retreat from socialism,” introduced in 1966, had re-forged the link between land and peasants, and increased the incentives for production.¹⁰² The production team in China—that is, the basic accounting unit, just above household economy with private plots and family sideline production—had consisted of twenty to thirty households.¹⁰³ In North Korea, it was far more de-centralized, with fewer than ten households in a “sub-team”¹⁰⁴ that was permanently assigned to a given area of land and assorted implements. The homes occupied by these households were also inheritable property, even if they could not be bought and sold. In other words many North Korean peasants remained in small work units from the days of collectivization in the 1950s down to the 1990s,

with none of the sharp and abrupt changes that characterized Chinese agrarian relations—just a deepening of peasant ties to the local land after 1966. So, a generic explanation—“lack of incentives”—cannot account for the North Korean fiascos in the 1990s.

The answer may be sought, instead, in the curious economic structure of North Korea that bound agriculture extremely close to industry and the energy regime, creating a domino effect such that when the North Korean energy regime collapsed, so did industry and then agriculture (which depended heavily on industrial inputs). North Korea had a very modern agriculture in comparison with other developing countries, and by the 1970s the ubiquitous green belts of maize around meticulously terraced fields had become the pride of self-reliant North Korea, the jewel of its socialist achievement. But this pride also drove a program built on the ruthless exploitation of land unsuited for agriculture, and energy-intensive forms of cultivation.

The North Korean economy is primarily industrial and highly energy-intensive, and the estimated per capita energy use in 1990 was 71 gigajoules per person, more than twice that of China in the same year, over half of Japan's, and similar to South Korea's.¹⁰⁵ The main sources of energy source for DPRK are coal (with coal reserves estimated at between one billion and ten billion tons), and hydropower (with developable hydroelectric potential estimated at 10-14 GW). Most of North Korean energy infrastructure—coal mines, thermal power plants, hydroelectric plants—was built during the 1950s to 1980s with substantial financial and technical assistance from the

Soviets,¹⁰⁶ but some of it also went back to Japan's industrial development of the North in the last decade of colonial rule—when northern Korea was tied closely to Manchuria and made for one of the fastest-growing regions in the world economy.¹⁰⁷

The unconquerable structural problem of the North Korean energy regime was its complete dependence on imported oil, which came to a creaking halt by 1991 with the collapse of the Soviet Union and China's opening to South Korea in 1992. Domestic sources of commercial energy—coal and hydroelectric power—were severely damaged in the floods of 1995 and 1996, followed by a drought, then a tidal wave in 1997. Energy experts from the Nautilus Institute in Berkeley put it like this:

Coalmines were flooded (some mines producing the best quality coal, near Anju, were on the coast below sea level to start with). Hydroelectric production was affected by floodwaters that damaged turbines and silted up reservoirs, then by drought that reduced water supplies below the levels needed to generate power. Electric transmission and distribution lines were damaged, as were roads and transportation equipment. Heavy erosion and scavenging for food denuded landscapes, reducing the availability of biomass for energy use.¹⁰⁸

The cessation of concessionary oil imports and the damage by nature to the production of domestic energy, combined with the irrationality of a centrally planned system where energy supply was distributed according to quotas set in the central plan, meant that the energy regime in North Korea was in total collapse by 1995-6.

Today all forms of modern energy supply are down by more than 50 percent compared with 1990, affecting all sectors of the economy, and

especially transportation, industry and agriculture. For agriculture, the lack of fertilizers, fuels, and electricity have seriously affected soil fertility, water pumping, field preparations, and the planting, harvesting, processing, and distribution of crops.¹⁰⁹

North Korea is of course a very mountainous country, which, combined with its high elevation and cool climate, is relatively unsuited for production of food. In fact, Western economists have often said that North Korea not only lacks any discernible comparative advantage in food production, but also is unlikely ever become self-sufficient in food production.¹¹⁰ If so, North Koreans nearly succeeded, in beating the odds. Between 1961-1988, North Koreans managed to double agricultural output,¹¹¹ mostly through a program of technological modernization that was closely connected to the long-term succession of Kim Jong Il (it was in the works for at least 25 years).

Contrast this with the Great Leap Forward, when Mao tried to increase production by relying on traditional inputs—like animal and human manure (rather than chemical fertilizers) and labor-intensive mobilization (rather than modern irrigation equipments and power pumps). Unlike China, also, the collectivization in North Korea (between 1953-1958)¹¹² was a relatively well-planned and orchestrated affair, and did not turn out to be a fiasco like the Great Leap Forward. So, in North Korea we find a modern socialist agriculture that remained productive, predicated after 1966 on the “sub-team” as the basic unit, making it more de-centralized than most other socialist agriculture (save perhaps Yugoslavia and Poland where collectivization remained

incomplete and a significant proportion of agriculture remained as non-collectivized family undertakings).¹¹³

North Korean rural electrification was said to be completed by 1969, but such dependence on electrification, in a country with perennial energy shortage, meant that the consumption of electric power in the cooperative farms became increasingly erratic.¹¹⁴ Electricity was also widely used to power water pumps for irrigation and drainage. In North Korea, impressive irrigation programs connected vast networks of waterways, comprising a double-circular system of drainage as well as irrigation, for protection against floods as well as drought. These waterworks pass through mountains and rivers, with one waterway lifting water 230 meters up by 13 stages, irrigating fields 340 meters above sea level (some of these also trace back to the Japanese period). By 1992, 25,800 pumping stations and 1,700 reservoirs interconnected a waterway system of 40,000 kilometers.¹¹⁵

The sophistication of the North Korean irrigation system went together with massive attempts to increase crop acreage in a mountainous country, so short of cultivated land. By the late 1960s North Koreans claimed to have brought close to 1.4 million hectares of new land into cultivation (700,000 hectares each for rice and maize) and in the mid-1970s they launched a campaign to terrace 200,000 hectares of hillside fields with a gradient of 16 degrees or higher—and these programs included the irrigation of upland dry fields.¹¹⁶

North Korea also relied heavily on both chemical fertilizers and tractors as agricultural inputs. It was also far more reliant on chemical fertilizers than

China or Vietnam, and in 1990 it used as much fertilizers per hectare of agricultural land as South Korea, which uses more fertilizers per hectare than almost any other country in the world, save Japan.¹¹⁷ But two primary fertilizers used in North Korea, urea and ammonium sulfate, are both petroleum-based, and the shortage of petroleum feeds have adversely affected domestic production of fertilizers.¹¹⁸ What we do know is that North Korea traditionally manufactured 80-90 percent of its own fertilizers, but since 1995, domestic production has been less than 100,000 tons per year, from 600,000 to 800,000 tons a year before 1990. Thus, agriculture currently operates at 20 to 30 percent of normal levels of soil nutrient inputs. This shortfall is said to be the largest single contributor to reduced crop yields and to food shortage.¹¹⁹

The North Koreans were also curiously reliant on tractors, an oddity in a country that is land-scarce.¹²⁰ But tractors held a special place in the North Korean heart as a symbol of socialist agriculture and self-reliance; they produced their own brand of tractor by 1958. In the mid 1970s, there were said to be four tractors in use per 100 hectares. The North Korean agricultural requirement for tractors is said to be 140,000 tons of petroleum products, mostly diesel. In 1990 North Korean diesel consumption stood at 120,000 tons, and it now stands at 25,000 to 35,000 tons per year, leading to 70 to 80 percent reduction in the use of tractors and other farm machinery.¹²¹

So, what accounts for such excessive use of industrial inputs? One answer has to be the historic significance of the chemical industry, going

back to Japan's huge Nissan Chisso plant installed in the late 1930s;¹²² also the availability of fertilizers and oil imports on concessional terms from the Soviet bloc, allowing the North Koreans to increase levels of application at marginal costs lower than that for other East Asian economies. The other answer has to be the importance of food self-sufficiency as a political goal, so much so that economic inefficiency and cost probably did not matter quite as much.¹²³

North Koreans did try to reduce the rural sector's dependence on its precarious energy regime. To save electricity, for instance, they converted the Hungnam Chemical Fertilizer Complex to use the unconventional technology of gasifying anthracite, an abundant resource in North Korea, thus to produce ammonia. This saved electricity by three-quarters—but there was a catch: the process of anthracite gasification is a clumsy technology, it frequently led to breakdowns, and the factories sat idle for long periods of time for want of repair parts.¹²⁴ On the other hand, the important nitrogen fertilizer plant in Hamhung—the colonial legacy of Jun Noguchi, which in the years before World War Two was the second largest fertilizer plant in the world—has remained inoperable at least since 1994, with the DPRK government appealing to the world to refurbish the plant.¹²⁵

The energy crisis in the 1990s stemmed in part from the collapse of trade with the Soviet Union, its main trading partner. The trade with the Soviet Union not only accounted for the stunning three-fifth of North Korea's total trade in 1988, but it was on a concessionary basis. Soviet coal and oil exports to North Korea, for instance, went at substantially less than world

market price. Using the “mirror statistics” issued by the Russian State Statistical Committee, Nicholas Eberstadt of the American Enterprise Institute and others calculate these energy subsidies to be an additional \$400 million between 1980-1990, in addition to the \$ 4 billion North Korean trade deficit in the 1985-1990 period that Moscow was willing to finance.¹²⁶

Then trade flows abruptly collapsed in 1991, with the advent of hard currency terms of payment for Soviet products and services; in 1993, even the Chinese would demand payment at the standard international price and in hard currency rather than through barter trade. In 1991 imports from the USSR dropped to under \$600 million, equivalent of two-fifth of North Korea’s total import level in 1987 and 1988. By 1993, Russian exports to North Korea were less than a tenth of the 1987-1990 level.¹²⁷ Such trade collapse was made all the more catastrophic by the fact that the North Korean industrial base was largely constructed with Soviet material and technical assistance, and thus difficult to substitute.

The collapse of trade with the Soviet Union did not lead to a surge in trade with the PRC, however—a standard North Korean tactic back in the days of the “Sino-Soviet split.” The North Korean reaction, in the immediate aftermath of the trade collapse, was to slash its exports to China, thus to conserve resources to domestic use, leading to further contraction of trade. In the event, the PRC did emerge as a principal exporter of food and energy to North Korea, although the PRC demand in 1993 for hard currency payment seems to have affected its food exports to North Korea, to a drop of almost two thirds, and energy exports by over a quarter.¹²⁸ The timing of this

precipitous decline in food and energy exports could not have been worse; when combined with Beijing's recognition of Seoul in 1992, it led to a long-term freeze on high-level Sino-North Korean contacts. Once the famine was in full fury in 1995, however, the Chinese reversed their stance, and began to provide North Korea with energy and food at old "friendship" prices.¹²⁹

A key problem with electricity supply for North Korean irrigation is not the total amount over the course of a year—which is said to have a shortfall of 1.0 billion kWh—but the peak power required during the irrigation season in May. The 1998 UN expert mission put it like this:

The unreliable water supply is mainly due to unreliable pumping, which is mainly caused by an unreliable electricity supply... Examinations of records at three major pumping stations indicated that they had suffered an average of nearly 600 power failures per year, over 2300 hours per year with no power, an average voltage reduction of over 15 percent ... and a 10 percent average frequency reduction ... The frequent power failures result in considerable waste of water ... the short fall in water available to the crops is estimated to be about a quarter of the total requirement.¹³⁰

This appears to be just one more way in which a cascading "domino effect" led to the implosion of what had been a highly successful agrarian program, at least by socialist standards. Perhaps this multitude of pyramiding calamities further immobilized a leadership left in chaos by the sudden disappearance of its "Great Leader." All in all, we seem to have a neat explanation for how abrupt external pressure from a capricious climatic environment in the mid-1990s, tended to press upon one nodal point after another in a complex industrial-agricultural system. That is, until we examine capricious fluctuations in that same external climate.

Climate and Famine

“On the sticky summer day of June 26, 1995,” wrote Don Oberdorfer, long the Japan/Korea correspondent for *The Washington Post*, “the skies over [North Korea] darkened. Rains began to pound the earth, rains that were heavy, steady, and unrelenting and that soon turned into a deluge of biblical proportions.”¹³¹ The DPRK Bureau of Hydro Meteorological Service recorded 23 inches of rain in ten days, and in some areas as much as 18 inches of rain fell in a single day, bringing floods that were considered “the worst in a century.”¹³² When the rain stopped in mid-August the North Korean government announced that 5.4 million people were displaced, 330,000 hectares of agricultural land destroyed, 1.9 million tons of grains lost, and put the total cost of the flood damage at \$15 billion.¹³³

Outside observers were skeptical of the North Korean claims, likely little more than an excuse to cover up for the dismal failure of the economy and a ruse to obtain large famine relief from the United Nations. The Australian researchers, Heather Smith and Yiping Huang, believe that just as the Chinese used climate as the main excuse for the Great Leap Famine, the North Koreans, too, were using climate as an excuse.¹³⁴

Did food production drop precipitously in 1995-1997 when the climate was most unfavorable? The FAO data seem to indicate so, from a whopping 8 million tons in 1990 to 2.5 million tons in 1996. The Smith/Huang data that deflates the FAO series with other data show that between 1995 and 1997 grain output fell to half of the 1988 level.¹³⁵ Yet because grain output did not

improve in 1998-1999 when weather conditions improved, Smith and Huang discredit climate as a significant factor in precipitating the famine.

When you combine an unforgiving and highly variant climate with existing environmental degradation, however, the lack of agricultural recovery in 1998-1999 does not appear to be a mystery. The North Korean version of Khrushchev's "virgin land scheme," bringing more marginal lands into production led to deforestation and increased rapidity of run-off, soil erosion, riverbed silting, and to flooding. The energy crisis also led people to forage wood for biomass—wood, fiber, and crop wastes—for household cooking and heating, further imposing burden on competing uses, like animal fodder and compost, affecting food supply. The overuse of ammonium sulfate as nitrogen fertilizer has acidified the soil and caused reduction in yields. In other words, it would be unrealistic to expect a quick recovery in 1998-1999.

In any event, the floods in 1995 and 1996 proved to be only the beginning. Epic floods were followed by the "worst drought in decades," according to the FAO/WFP Mission Report of July 1997, and after relatively stability in 1998 and 1999, in 2000 drought struck again. This drought of 2000 also affected China, a number of other countries in central and south Asia, and the Middle East, but the impact was greatest on North Korea since it can produce food in only one season, June to October. FAO/WFP representatives reported empty reservoirs, with the overall water situation extremely poor.

Following on the heels of this drought North Korea had the "coldest winter" in decades; the DPRK was again hit by a prolonged severe drought in

the spring of 2001, ravaging winter/spring wheat, barley and potato crops. Spring rain had virtually failed between March to mid-June 2001, with drought lasting more than 100 days in many places, “reportedly the largest spring drought in recorded history.” This led to acute loss of soil moisture, depletion of reservoirs and crippling of irrigation systems, according to another FAO/WFP Mission Report, in July 2001.

To make a long story short, North Korea seems to have been at the center of global ecological disaster—it was profoundly affected by the ENSO of 1997-1998, said to be one of the worst in recorded history going back some three hundred years. The information on this 1997-1998 El Nino is abundant, given how environmental issues have quickly worked themselves to the top of the UN agenda, and also within the framework of the International Decade for Natural Disaster Reduction (IDNDR). Nowhere, however, is North Korea mentioned in connection to El Nino—the same country suffering one of the most publicized famines in recent history.

It is not clear what might have caused the floods of 1995 and 1996, since those were not El Nino years—i.e., there was no major warming in the tropical eastern Pacific. K.-M. Lau of the NASA Goddard Space Flight Center thinks that the floods may therefore be due to internal atmospheric dynamics—by chance, and hence unpredictable—or some other factors. In the extratropics, natural calamities tend to occur more chaotically, and hence less predictable.¹³⁶ Another possibility is that the 1995-6 floods were episodic events interrupting a long-term drying trend in northern China and North Korea from the 1950s to the present. These may or may not be linked to El

Nino, because North Korea is located at much higher latitudes (38 degrees North to 45 N), far away from the main effects of El Nino whose influence is mostly tropical and subtropical. Rather they may be related to global warming, and a natural phenomenon called the "Arctic Oscillations," which affects polar regions, including Eurasia and the North Pacific Ocean.¹³⁷ It will require much more work on this recent period by meteorologists before weather anomalies of the mid-1990s can be sorted out.

On the other hand, the droughts of 1997 were clearly related to El Nino. Because the regions of northern China, northern Korea and northern Japan tend to be under similar climatic "forcing," we can assess the North Korean situation by extrapolating from studies of these other regions. K.-M. Lau and Hengyi Weng, both at NASA, have studied the impacts of the 1997-1998 El Nino on major drought and flood occurrences over China, and concluded that "severe drought in northern China, and to a lesser degree the flood in southern China, in 1997 is likely a result of the influence of anomalous SST [sea surface temperature] forcing during the growing phase of the 1997-1998 El Nino." Furthermore they report that on the average over all China, approximately 53% and 49% of the rainfall variance in 1997 and 1998, respectively, can be attributed to SST anomalies associated with El Nino. These are two of the largest anomalies in the past 44 years, in terms of the percentage of explained rainfall variance by global scale SST.¹³⁸

The 1997-1998 El Nino had a long reach, stretching from Syria to Mongolia to China and North Korea, and also to Southeast Asia, devastating several developing economies that were mostly hapless against the most

unusual climatic abnormalities. A particularly severe winter in Tibet wiped out an estimated 20 percent of all livestock.¹³⁹ In Mongolia it produced a summer drought that left the animals unable to fatten for winter, and eventually killed some 3 million livestock.¹⁴⁰ In Indonesia, an extended El Nino-associated drought aided the devastating fire that ripped through its tinder-dry forests, causing an estimated forest damage of 17,600 square miles. In Tajikistan, famine threatened its six million people, in what was deemed to be a worst drought in a half-century.¹⁴¹

Consequences of the North Korean Famine

The famine also forced North Korea to become, for better or worse, a transitional economy. Bradley Babson of the World Bank even refers to its “informal economy,” noting the retreat of the state from the everyday provision of the necessities of its people.¹⁴² The social system that used to be able to provide income guarantees, education, medical security, low infant mortality rates, longevity, and social welfare service to the entire population (and since the urban population is more than 60 percent, this is a very large fiscal burden for the state), has now thrown its hands up, unable to cope. Thus North Korea is in a transition that it neither wished for nor planned.

There now exist relatively free markets—the informal economy—all over the country--for agricultural commodities and daily needs, but with an increasingly broad range of goods being bought and sold (more often, bartered). After 1995 Central authorities basically broke the social contract with the people, reducing grain rations for farm families from 167 kilograms

per person per year to 107 kilograms; this in turn reduced the incentives of farmers to turn over food to the state, for urban and industrial workers. In 1996 the central government made an important decision to decentralize authority for feeding the population from national and provincial bureaucracies to county administrations. Finally in January 1998, a decision announced that each individual family was henceforth responsible for feeding itself, rather than relying on the Public Distribution System (PDS). In reality, the PDS was simply not functioning, as the number of people relying on PDS went from 61 percent in 1994 to 6 percent in 1997.¹⁴³

The Government-run PDS is a system through which 13.5 million people –or around 60 percent—received subsidized food rations, and has been the primary mechanism for the distribution of food in North Korea. It is not a social service system, but rather a method of worker compensation. Main groups outside of the PDS are workers on state farms, who receive only six months' rations through the PDS, and workers on cooperative farms who must depend on on-site production. The latter group has borne the brunt of the losses due to flooding, and has been the main recipient of humanitarian assistance. Predictably, farmers have resorted to diverting food in secret pre-harvestings. According to the fall 1996 WFP/FAO agricultural assessment, in fall of 1996 half the corn harvest—nearly 1.3 million metric tons—was missing, leading to central authorities to dispatch soldiers to protect the fields. But this was not quite effective due to bribes to the soldiers, and given the breakdown as well in the military distribution system, leading the soldiers

(the ranks of the armed forces include more than one million people) to join farmers in diversion.¹⁴⁴

Farmers are also focusing on cultivating their private plots of land to grow vegetables, and on secret plots in the mountains outside the control of the collective agricultural system. These secret plots, called fire fields (*hwajon*), are very steep, however, and often infertile. With the farmers concentrating more on their private plots, some UN aid workers have noted that the soldiers seem to have replaced the farmers in planting and harvesting in collective farms.

The most significant element of the informal economy are the "farmer's markets," of which there are said to be over three hundred all over North Korea, providing some 70-80 percent of food and other daily necessities to local and urban populations. The UN and NGO workers have also noted recent phenomenal increases in the frequency, selection of products, and size of these markets. This resembles the famine situation in market economies analyzed by economists like Martin Ravallion and Amartya Sen.

Price distortions have also fostered this informal economy; the official exchange rate is 2.2 North Korean *won* to the dollar, and the black market rate is 200. (The typical monthly wage for a North K worker is 200 won; the monthly cost of feeding a rural family of four is 4,000 won, and a typical urban-family consumer basket costs about 10,000 won.) With distortions this large, there are great incentives for the leakage of state-produced goods from the state distribution system into the informal markets, asset stripped

and other forms of stealing from state enterprises, and selling of surplus production by farmers to the markets rather than to the state.¹⁴⁵

Informal cross-border trade with China has also intensified, although little is known about informal trade across the Russian border. It has probably grown rapidly as well. Foreign aid has also fed the rise of the informal economy, as corrupt officials diverted food aid from the aid program. It has also helped stabilize and reduce the price of food in the farmer's market, in some cases reducing the price of food by 25-35 percent between March and September 1998. Prices in this new economy in North Korea are set by the market and not the state, which could be very significant. If the urban population—that is, more than 60 per cent of the total population—are relying on the new economy for 70 percent of their daily needs, this is a very significant transition taking place. It is interesting to note, in this regard, that even during *Perestroika* the size of informal markets was not as large in the USSR, in relative terms, as North Korea's, and the one thing that the state resisted most was the setting of prices by markets.¹⁴⁶

The state in North Korea has no choice but accept the expansion of farmers markets throughout the country, as an unofficially recognized mechanism to satisfy basic needs of the people, not met through the PDS. But it would be incorrect to think that the leadership thinks the informal economy was a permanent solution to North Korea's many profound problems. Rather, when it deigns to acknowledge these changes at all in official publication, it describes them as temporary, emergency measures,

while the state seeks significant expansion in international relations to get more aid and help, and to reconstruct the social welfare system.

Does the rise of this informal economy portend a larger political change? It is hard to tell. Some observers have been quick to note the significance during the famine years of a devolution of economic authority from the central government to provincial and local authorities, and the delegation of economic authorities from local authorities to newly established trading interests in cities across borders with China. The argument is that if in North Korea “grain is power,” then central government must be relinquishing power, now that grain does not always flow from the center.¹⁴⁷

But a different conclusion is also possible: the informal economy, rather than being the downfall of the central authority, may be serving to maintain the status quo and to shelter the regime from making reforms that would permit a new dynamic development.

The easiest thing to be said about the ultimate consequences of this famine for North Korean reform is also the truest: it is too early to tell. Things inside North Korea have changed dramatically since 1995, as has the country’s relationship to the world. The new and widespread informal markets would be an excellent basis upon which a reformist leadership could build momentum for dramatic changes in the orientation and productivity of the economy, in both agriculture and industry. But at this writing, no one can say that the leadership has come close to the dramatic breakthrough toward real reform that marked China’s new departures in 1978. If this happens, it will make my comparison with China’s developmental trajectory—outward

from famine to a real solution to the food problem (and many others)—look rather good. That would be small recompense for me, but a huge gain for a population that has suffered terribly under the multiple afflictions of a remarkable structural conjuncture of outmoded social system, capricious climate, and stupefying leadership immobility.

Conclusion: "The light which they throw"

In this paper I have not sought to develop another generic theory of famine to replace Amartya Sen's, but to point out the limits of his theory in explaining the complex interaction of calamities—both natural and manmade—that delineate the parameters within which a full explanation of political regime response to famine might be possible. Sen's approach is really about the symptoms and etiology of famine in a relatively stagnant agrarian economy, presided over by an imperfect democratic system that nonetheless has become adept at reading the signals of approaching famine and responding to them. In this paper we have examined his major negative example and one he could not have known about but which is nonetheless China's regime-type brother: North Korea. Yet these cases seem to provide stark counterpoints for Sen's analysis; these two totalitarian systems experienced stunning famines at different times and different places, with different outcomes (so far), but we have not been able to lay the blame for these famines solely—or even mostly—on the authoritarian rigidities of the systems themselves.

Sen was admirably comparative, examining India and China in the light of each experience, but in the cases of India, Maoist China and North Korea, we found dramatic differences in the structural, social and human aspects of development, the politics of food distribution, and even in Sen's richness of life "in the sense of activity." On his most important point of comparison, we simply did not find strong evidence for any one-to-one relationship between famine and political regime type. Close examination of our planet and its ecology, however, may be the strongest challenge to any simple theory about why famine happened in these two communist countries.

The historian of food crisis in antiquity, Peter Garnsey, denied the possibility of a theory of famine: they are individual events; when the black horse rides in it may always be a horse of a single color, but each horse brings a scourge that varies as much as extreme weather: "Weathermen call hurricanes 'Alice', 'Bertie', 'Charlie', or whatever, always using a different name, implicitly acknowledging that each hurricane has its own particular identity. Each food crisis, similarly, was an individual event."¹⁴⁸ But I would not deny the possibility of a good theory of famine; I just know that such a theory must account for the short and long term fluctuations in water and wind, sun and darkness, geographical placement on a changing planet, and historical change in the constitution of human societies.

Famine is an enormously complex social and biological phenomenon, as much so as war. We have many theories of war; they tumble out of the publishing houses every day. None are fully satisfying. There is, however, one elegantly parsimonious theory of war: democracies don't fight each

other. Sen has a similarly elegant theory: democracies don't have famines. If we grant him that he is right (readers of this paper need not be told that I disagree), there would still be the question of what to do about it. When the masons of the new order "stumble to their tasks," in Tawney's wonderful metaphor, where do they start in building democracy in North Korea, or China, or Mongolia, or Afghanistan, thus to prevent yet more scourges of famine? If Sen's arguments are not satisfying in distinguishing different famines, his remedies also do not go far enough to address critical social and developmental issues.

The persistence of famine in our time really suggests a new, larger, and better grounded developmental imperative for this new century. Thus far, the literature in the economics of famine, including Amartya Sen's work, does not give us the grounding we need to help us in understanding the long-term consequences of catastrophes like famine. Food availability supply, which is in great part dependent on climatic variability, remains important. A good historical and comparative understanding of how nature's calamities manifest themselves differently in different social formations can help us distinguish periodic agrarian holocausts from the humdrum daily catastrophes that still afflict as much as two-thirds of the world's population—or as Tawney put it, "The loss of life caused by the major disasters may turn out to be less significant than the light which they throw on the [appalling] conditions prevailing even in normal times" (p. 10 above). We need to revise our thinking about famine, which will help to develop new policy mechanisms for dealing with its deadly effects. Then we can seek out reforms and

developmental programs that might hope to eliminate both kinds of agrarian misery.

We also, as I said earlier, need to interrogate the remaining great arrogance of our age, the modern conviction that we have defied and tamed the elements. If we cannot control our global climate, we can try to understand its movements, and avoid or contain their worst effects. Certainly this is the preeminent place where we need to “think globally but act locally.” The famine in isolated North Korea was part and parcel of a global ecological disaster, happening with greater frequency as the result of the global warming. A North Korea never wanting to join the world—or only to do so on its own terms—and which went an extraordinary length to remain as autarkic as possible, ended up being nearly wiped out in a global ecological disaster. A capricious climate, then, became a sad remainder that North Korea lives in the same world climate regime that we all do.

North Korea probably occasions less sympathy around the world than any other developing country, but its withdrawal from the world was *for* development, it was in search of wealth and power for the country. It did not simply stagnate like Burma or Albania, something that makes this little known case all the more interesting. The sins of its system, we noted, began more than half a century ago. But its experience of famine has been a mere five years, and these turn out to be years of climatic catastrophe. North Korea reaped the whirlwind in recent years, and its experience really points to the need for the development community to begin paying a whole lot more

attention to climatic issues, and to assist developing countries to predict and cope with climatic aberrations.

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Notes

¹ Arnold (1988: 127)

² Desai (1988:108)

³ Dreze and Sen (1998: 12)

⁴ Wolfensohn (1999)

⁵ This figure, probably at the high end, is extrapolated from the Johns Hopkins University School of Public Health interview of 440 North Korean refugees, mostly from North Hamgyong province. The results indicate that from 1995-1997 death rates might have risen eightfold over what they had been in pre-famine North Korea. Births also declined by 50 percent from 21.8 per thousand to 11 per thousand in 1997. Andrew Natsios of the humanitarian relief agency, World Vision, estimates that 245,000 out of a population of 2 million in North Hamgyong may have starved to death, or 2.5 million excess deaths out of the total North Korean population of 20 million, excluding the 1.2 million soldiers and the residents of Pyongyang. (Natsios: 11-12)

⁶ The upper figure of 30 million excess death comes from the work of three American demographers (Ashton, Hill and Piazza, 1984), and the lower figure of 18.48 million in extra death and 30.79 million in lost births for the 1958-1961 period is from Shujie Yao, based on the estimates of lost population, death and birth rates generated by the PRC State Statistical Bureau, and casting them against expected rates for the famine period. (Yao: 1366) For the controversy over the excess mortality figure for the Great Bengal Famine, see Sen (1981: 52, and especially his Appendix D for famine mortality, 195-216)

⁷ It is commonly thought that Soviets and Chinese must be one category of foreigners with lots of access to North Korea, but in fact for decades the government restricted communist diplomats and officials to the capital city or to their provincial places of work, and required Foreign Ministry approval for travel elsewhere within the country.

⁸ Quoted in Smith (1999: 1)

⁹ Recent studies of North Korea are more general in nature. For broad overview of the North Korean economy, with some discussion on the food crisis, see Eberstadt (1997), Noland (2000). An economic analysis of current food shortage in North Korea may be found in a monograph by Smith and Huang (2000).

¹⁰ For discussion of famine in northern Vietnam in 1944-1945, see Popkin (1979); Anh (1998). For US occupation in the Philippines and famine in rebel-held areas, see De Bevois (1995). References to the famines in India are numerous. Representative works used in this study include Sen (1981); Dreze and Sen (1999); Davis (2001); Arnold (1988); Aykroyd (1974). For discussion of famine in Cambodia, see Ea (1984) and Shawcross (1984).

¹¹ For the failure of collectivization in Mongolia, see Bawden (1968) and Rupen (1979); on Vietnam, see Woodside (1989); for China, see Ashton et al (1984); Becker (1996); Bernstein (1984); Eckstein (1977); Lieberthal (1997); Lin (1990); MacFarquar (1983); Peng (1987); Riskin (1987); Yang (1996); Yao (1999).

¹² Arnold (1988:3-5)

¹³ Garnsey (1988: ix)

¹⁴ Dreze and Sen (1998:7)

¹⁵ Tawney (1932: 77)

¹⁶ Dreze and Sen (1998: 7-8)

¹⁷ Sen (1981: 45). Elsewhere Sen defines his approach like this: " In each social structure, given the prevailing legal, political, and economic arrangements, a person can establish command over some alternative commodity bundles... The set of alternative bundles of commodities over which a person can establish such command will be referred to as this person's 'entitlements'." (Dreze & Sen 1998: 9) This concept of entitlement focuses on a person's legal, as well as social, rights of ownership. The categories of entitlement are:

1. *Trade based entitlement*, which describes ownership transfer through commodity exchanges
2. *Production-based entitlement*, which describes the right to own what one produced with one's own (or hired) resources
3. *Own-labor entitlement*, which incorporates all trade-based and production-based entitlements derived from the 'sale' of one's own labor power
4. *Inheritance and transfer entitlement*, which refers to the right to own what is willingly given by others, including gifts and bequests, as well as transfers by the state such as social security or pensions (Sen 1981:2)

¹⁸ Devereux (1993:82). Alex de Waal (1990) has argued that Sen's work does not include or deal with include coping strategies of famine-affected people, social disruption, and violence, and is inadequate to account for famines in Africa. Furthermore, he has argued, on the basis of his work on Sudan, that during famines people choose not to consume rather than sell vital assets, and that most mortality related to outbreak of epidemic, not shortage of food. Meghnad Desai (1988: 108) has also criticized Sen's theory for lacking a dynamic framework, and a way to bring out "the dynamic and simultaneous interdependence of the physical and the economic aspects of famines." For a comprehensive review of the literature on entitlement, see Devereux (1993)

¹⁹ Dreze & Sen (1998: 205)

²⁰ As for what "caused" the Great Leap Famine, Sen cites problems associated with collectivization; problems associated with distribution (town vs. country, communal dining); informational failure, linked to "a controlled press, which duped the public in

suppressing information about the famine, but in the process deluded the government as well”: and that government was immune to public pressure (Dreze & Sen 1995: 75-6)

²¹ Dreze & Sen (1995)

²² Dreze & Sen (1998:126)

²³ Dreze & Sen (1998:212)

²⁴ Dreze & Sen (1995:66)

²⁵ Dreze & Sen (1995: 81-83)

²⁶ Dreze & Sen (1998: 133-161)

²⁷ Sen (1997)

²⁸ Sen (1981:1)

²⁹ Davis (2001:19)

³⁰ Desai, quoted in Davis (2001:20)

³¹ This admission is quoted in Arnold (1988:45)

³² Arnold (1988: 46)

³³ Dreze & Sen (1998: 85)

³⁴ Ibid: 122

³⁵ Ibid: 125

³⁶ Ibid: 118

³⁷ For an argument linking the post-1978 reform to the Great Leap Famine, see Yang (1996).

³⁸ Moore (1966:xxii)

³⁹ Ibid: 330

⁴⁰ Ibid: 410

⁴¹ Ibid: xii

⁴² Dreze & Sen (1998:215)

⁴³ Dreze & Sen (1995: 75-6)

⁴⁴ Dreze and Sen (1999: 212)

⁴⁵ Sen reiterates his arguments about famine and democracy/non-democracy in many of his publications. Mostly he has confined his discussion to China and India, but in recent years he has included the Soviet Union and North Korea in the same category of non-democratic famines. See Sen (1999).

⁴⁶ Sen (1999: 170)

⁴⁷ Sen (1999: 179; Dreze & Sen 1998:133-161).

⁴⁸ Keen argues that long-standing conflicts over economic resources were exacerbated by the discovery of oil in 1978, and the desire to extract the oil encouraged a government policy of depopulating oil-rich areas of the south, while the SPLA directed intense military efforts toward preventing the extraction of oil. See Keen (1994).

⁴⁹ Ibid: 212

⁵⁰ Dreze (1999: 1226)

⁵¹ See William Conquest, Sheila Fitzpatrick, Alec Nove, etc.

⁵² Bernstein (1984: 339)

⁵³ Ibid; also see Nove (1969)

⁵⁴ See Bernstein (1984: 350-351). China was far less willing to adopt policies that would create misery for the peasants, for obvious reasons. Per capita agricultural output in China in 1957 was half of that in USSR, and so whereas USSR was concerned with securing the surplus, China was more concerned with how to create the surplus in the first place. In the USSR party membership was 70% urban, whereas in social composition China was 70% rural. (Lieberthal 1997: 93)

⁵⁵ See Shue (1980:6) and Lieberthal (1997:87). Shue provides a careful analysis of the policies that laid the groundwork for socialist transformation: 1. high level of sophistication and specificity in planning for rural development; 2. flexibility in basic-level policy implementation; 3. all-out attacks on rural problems; 4. recruitment of activists and cadres from the local villagers to carry out rural reforms; 5. promotion of rural change was centered around village class struggle; 6. careful design and use of material incentives to draw the peasants into cooperation; 7. a fair degree of discretion left to local cadres.

⁵⁶ Yang (1996:37, 65)

⁵⁷ Riskin (1990:28)

⁵⁸ US Department of State, Foreign Relations of the United States, 1960-1961 (check page number)

⁵⁹ Waal quoted in Davis (2001: 21)

⁶⁰ See Lieberthal (1997), Yang (1996), Riskin (1990).

⁶¹ Yang (1996:45)

⁶² Stalin and Molotov pushed for rapid collectivization against the advice of Andreyev, the party secretary of North Caucasus, and Shlikhter, Ukrainian commissar for agriculture, who both argued for delay. Any arguments for putting limits on excesses were crossed out by Stalin. Nove argues that the condemnation of the rightists enabled the central committee to operate more consistently the line of the offensive against the kulaks (Nove 1969:161, 164).

⁶³ Le Roy Ladurie (1971:1)

⁶⁴ Tawney (1932: 102)

⁶⁵ For an extended argument, see Li (1982)

⁶⁶ Greenough (1982)

⁶⁷ Arnold (1988:32)

⁶⁸ The “renewed” interest is in reference to the long reticence that scholars have felt about the relationship between climate and society, lest it be regarded as some sort of climate determinism a la Ellsworth Huntington—that civilization cannot flourish in tropical climates that lack the marked seasonal changes of temperate zones that serve to stimulate the energies of populations.

⁶⁹ Glantz (1990:182)

⁷⁰ The term sustainable development owes its widespread usage to the 1987 World Commission on Economic Development (WCED) report, *Our Common Future*, which defined it as: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: (1) the concept of “needs,” in particular the essential needs of the world’s poor, to which overriding priority should be given; and (2) the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.

⁷¹ See Le Roy Ladurie (1971:1-3,7), Arnold (1988), Li (1982).

⁷² NASA Report of 1988, quoted in Glantz (1990:197).

⁷³ Not only is there no written work on it, an extensive search on the internet turned up nothing that connected the recent El Nino-connected drought with the famine in North Korea. The author has contacted scientists at NASA who confirm that North Korea belongs in the same climatic forcing as northern China, but that there is no longitudinal work done on North Korea, and no work that assesses the impact of the 1997-1998 El Nino on the 1997-1998 drought in North Korea.

⁷⁴ Davis (2001:12)

⁷⁵ Ibid: 213.

⁷⁶ El Nino is the name given to an oceanic-atmospheric phenomenon that can generally be defined as an invasion of warm surface water from the western part of the Pacific Basin into the eastern equatorial Pacific (primarily off the coasts of Peru and Ecuador. This "pool" of warm water heats the atmosphere above it, causing cloud formation, instability in the atmosphere and, ultimately, rain. As the systems of rain-bearing clouds shift, following the location of higher sea surface temperatures, excessive rainfall patterns also shift. Thus, regions that are usually arid receive excessive rainfall patterns (e.g. the arid coast of western South America), while regions that usually receive abundant rainfall (e.g. parts of Indonesia and the Philippines) are plagued by droughts.

⁷⁷ Davis (2001:18)

⁷⁸ Glantz (2000) and Glantz (1990)

⁷⁹ The argument is that much of the additional heat trapped by greenhouse gases is stored in an expanded Warm Pool and deepened thermocline in the western tropical Pacific Ocean, then released in more frequent and larger El Nino events. An enhanced ENSO cycle, in other words, may be the principal modality through which global warming turns into weather. (Davis: 238)

⁸⁰ Davis (2001:238)

⁸¹ See Yao (1999:1367), and Davis (2001:251)

⁸² Kueh (1995:102-3)

⁸³ Arnold (1988: 8)

⁸⁴ Ravallion (1997:1206, 1236)

⁸⁵ Eckstein (1977: 56-59)

⁸⁶ Peter Hayes (1999) in his interview with Elizabeth Farnsworth of the Public Broadcasting Service put the upper end at ten percent of the population—about 2 million people, and lower end in the range of 200,000 – 300,000. US Congressional staffers who visited the country concluded that from 1995 to 1998 between 900,000 and 2.4 million people have perished from starvation or hunger-related illnesses, with deaths peaking in 1997. Non-governmental organizations, extrapolating from interviews with refugees in China and observations on the ground, have produced estimates of excess deaths on the order of 2.8 to 3.5 million (Noland, Robinson and Wang (1999: 1) Nicholas Eberstadt, a demographer and a long time watcher of North Korea, observed that "the number of delegates at the 1998 Supreme People's Assembly implied a mid-1998 population more than three million fewer than demographic projections made on the basis of the 1989 census." If the estimates are accurate, it implies a double-digit share of the pre-crisis population of roughly 22 million has succumbed. (Quoted in Noland, Robinson and Wang 1999: 1) Andrew Natsios of World Vision, who conducted relief effort in North Korea, has consistently quotes a death figure of 2-3 million for the 1995-1997 period. (Natsios 1999:1)

⁸⁷ Goodkind and West (2001). The authors assume a rough parallel in the circumstances between the Chinese and North Korean cases, including a putative economic transformation of massive scale, like collectivization. Needless to say, the North Korean fiasco was not caused by collectivization, and in that sense, different from the Chinese instance.

⁸⁸ The then head of the Korean intelligence was Suh Dong Kwon. South Korea responded that in an open society like South Korea's, a secret shipment would be impossible to hide, whereupon the idea was dropped.

⁸⁹ Oberdorfer (1997:372)

⁹⁰ Apparently the North Korean central authorities shut down the PDS in North Hamgyong, South Hamgyong, and Kangwon, preferring to focus on supplying food to the western provinces. Famine thus began in the northeast provinces two years earlier than in other areas (Natsios 1999: 2, 8-9)

⁹¹ The snafu involved North Korea flying its own flag over the boat carrying relief rice. When President Kim Young Sam's ruling party subsequently suffered an electoral defeat, he interpreted it as the public anger over his North Korean policy and the North Korean ingratitude, and spoke out against any more food aid. The promised 150,000 tons were delivered, however (Oberdorfer 1997:374).

⁹² By 1996 the South Korean government sought to dissuade others from providing aid, saying to US and Japan in January 1996 that the NK plight was not serious (Oberdorfer 1997: 374), and that in any event food aid ought to be tied to the resumption of the formal North-South talk. A week later US went ahead and announced a \$2 million contribution to the UN emergency appeal without conditions.

⁹³ See Noland, Robinson and Wang (1999)

⁹⁴ The figures of 16 percent acute malnutrition and 65 percent stunting comes from Judy Cheng-Hopkins, Director of WFP for Asia and CIS Region, and the figures for 18 percent and 62 percent for the same are for 1998 and come from UNICEF nutritional surveys. See InterAction DPRK Working Group (1999), and Natsios (1999:13).

⁹⁵ Different societies perform food triage differently. During famine in South Asia, for instance, adult males tend to get preferential treatment because they are better able than other groups to work.

⁹⁶ Hunter (1999:45).

⁹⁷ Natsios (1999: 13-14)

⁹⁸ The demand for food is difficult to compute because "the world does not know how many North Koreans there are, let alone their distribution across different demographic categories." (Noland, Robinson and Wang 1999: 7) Likewise there is no data on caloric intake. Yet, differing assumptions regarding caloric needs and nutritional sources generate significantly different estimates of demand. For the data on domestic production, outsiders base this on planted acreage and yields. Estimates of planted acreage may not be difficult, but the estimates of yields are more

problematic. The ROK National Unification Board gets its data by operating experimental farms in SK and China mimicking NK agricultural techniques. The World Food Program gets its own from selected field sampling. Data on food imports, mostly through "mirror" statistics, are also inaccurate since most of them come from the PRC, which may be misclassifying food aid in its trade statistics. Most importantly, barter trade is not reported at all. (Noland, Robinson and Wang 1999: 8)

⁹⁹ Williams, von Hippel and Hayes (2001).

¹⁰⁰ Cumings (1997), chapter seven.

¹⁰¹ Eberstadt (1999); Noland, Robinson and Wang (1999); Choe (1996)

¹⁰² Lee (1994: 511)

¹⁰³ Riskin (1990: 19)

¹⁰⁴ Prior to 1966, the basic work team used to consist of an average of 65 peasants, and assignable to a different field each day, which made it harder to forge links to land.

¹⁰⁵ For information on North Korea's energy regime, see the excellent paper by Williams, von Hippel and Hayes (2001).

¹⁰⁶ Ibid: 5

¹⁰⁷ See Woo (Woo-Cumings) (1991), chapter 2.

¹⁰⁸ Ibid: 6

¹⁰⁹ Meanwhile the rural ecosystems under severe stress due to the increased use of fuelwood and crop wastes as substitutes for commercial energy supplies. Inadequate energy supplies for cooking, heating, and lighting also have negative impacts on human health. See Williams, von Hippel and Hayes (2001:3)

¹¹⁰ North Korea is located in the north temperate zone roughly bisected by the 40 degree north latitude line, just about as the State of Pennsylvania is in the United States, but slightly larger in geographical size than Pennsylvania, and with population about 50 percent larger. Some 80 percent of the land is mountainous, with an average elevation of 440 meters above sea level, much higher than Pennsylvania where the highest mountain is only 980 meters above sea level. As for the argument that North Korea is unlikely to become self-sufficient in food production, see Noland (2000).

¹¹¹ Smith and Huang (2000: 201), based on the data compiled by the authors.

¹¹² Between 1953 and 1958, one million farms households into collectivized firms, mostly "cooperative farms," and a small number into state farms. Cooperative farms are technically owned by the member farmers, who are paid in incomes in shares of

what they produce. Between 1956-1960, grain production increased by 32 percent to a total of 3.8 million tons, according to Kim Il Sung's proclamation (Lee 1994: 511)

¹¹³ Kornai (1991:77)

¹¹⁴ Lee (1994: 515)

¹¹⁵ Irrigation is one area for which accurate and details statistics exist. See Lee (1994: 515-7)

¹¹⁶ Ibid: 515

¹¹⁷ According to FAO, in 1972, NK fertilizer use 194 kilograms per hectare of agricultural land, lower than Japan and South Korea but much higher than in China or Vietnam. In 1990, however, North Korea was at the same level as South Korea. South Korea and Japan at the North Korean level of income would have used far less fertilizers than North Korea (Smith and Huang 2000:204).

¹¹⁸ Noland, Robinson and Wang (1999:1)

¹¹⁹ Williams, von Hippel and Hayes (2001:9)

¹²⁰ Yujiro Hayami and Vernon Ruttan, in an 1970 article that compared factor prices and technical change in the US and Japan from 1880 and 1960, argued that labor abundant countries (like Japan) pursue land-saving technology (fertilizers) whereas land abundant countries (like the US) use labor-saving technology (tractors). Interestingly, North Korea made extensive use of both land-saving and labor-saving technologies. FAO data reveals that the growth rate of the number of tractors was a steady 7 percent per annum in 1961-1977, but jumped to 14 percent per annum in 1977-1984 as the mechanization program intensified (Smith and Huang 2000:204).

¹²¹ Williams, von Hippel and Hayes (2001:9-10)

¹²² See Woo (Woo-Cummings), chapter 2.

¹²³ Smith and Huang (2000).

¹²⁴ Between 1973-1975, there was a spurt in establishing facilities for fertilizers, especially for using apatite mineral for the manufacturing of phosphorous fertilizer, as well as an importation of a turnkey fertilizer plant from Western Europe—this was a deviation from its self-reliance ideology. During the second seven year plan (1978-1984), however, there was a setback in fertilizer production because acid was sent to industries before they could be sent to phosphorous factories. After 1984-1986, production of fertilizers was stagnant and uneven (Lee 1994: 521).

¹²⁵ Williams et al. (2001:8)

¹²⁶ See Eberstadt, Rubin and Tretyakova (1995:88). Using "mirror statistics" issued by Goskomstat, the Soviet (and now Russian) State Statistical Committee, the authors made statistical calculations about the impact of the collapse of trade with the Soviet Union. This process of reconstructing North Korea's trade structure using

the mirror statistics is a tedious process involving several steps in which different systems for categorizing trade flows are harmonized; different valuation schemes, harmonized; and different financial measurement bases reduced to a common denominator.

¹²⁷ Ibid: 97

¹²⁸ These figures are based on another "mirror statistics," this time through the PRC's Customs General Administration in its China's Customs Statistics publications. See Eberstadt (1995: 673).

¹²⁹ Between 1996-2000, China reportedly agreed to provide NK with 500,000 tons of grain, 1.3 million tons of crude, and 2.5 million tons of coal. PRC also announced that it donated 100,000 tons of grain to North Korea in 1995, 500,000 tons in 1996, 150,000 tons in 1997, 100,000 tons in 1998, and 1 million tons of oil between 1989-1996. See Smith and Huang (2000:205)

¹³⁰ Quoted in Williams, von Hippel and Hayes (2001:11)

¹³¹ Oberdorfer (1997:370)

¹³² In 1995, between July-August when the country receives 60-65 percent of annual precipitation, rain was three to five times the normal level.

¹³³ Noland, Robinson and Wang (1999:4)

¹³⁴ Oberdorfer (1997), Noland, Robinson and Wang (1999), Smith and Huang (2000) all seem to agree that the North Koreans exaggerated the damage from the floods in 1995.

¹³⁵ For the FAO figure, see Williams, von Hippel and Hayes (2001), figure 1 on page 3. For Smith and Huang, see their 2000 article, figure 2 on page 214.

¹³⁶ My correspondence with Dr. Lau, November 18, 2001.

¹³⁷ Ibid.

¹³⁸ Lau and Weng (2001:1, 10)

¹³⁹ Editorial, *ENSO Signal*, January 2001 (16)

¹⁴⁰ Erik Eckholm, *New York Times*, September 25, 2001.

¹⁴¹ *New York Times*, October 3, 2000, A3.

¹⁴² Babson (2001)

¹⁴³ Natsios (1999:5-11)

¹⁴⁴ Ibid:6

¹⁴⁵ Babson (2001:88)

¹⁴⁶ In the USSR, private and non-planned economic activities were permitted, from early on, and "peasant markets" and private plots were tolerated, with a thriving "second economy" providing for most small services. But it was never allowed to become as big as the farmer's markets in North Korea (Gregory: 45-6)

¹⁴⁷ Snyder (1997:4)

¹⁴⁸ Garnsey (1988:39)