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Progress And Barbarism

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EMPIRES OF FOOD

FEAST, FAMINE, AND THE
RISE
AND FALL OF CIVILIZATIONS

EVAN D. G. FRASER
AND
ANDREW RIMAS



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TO GABRIELLE AND PALOMA

EMPIRES OF FOOD

Praise for *Empires of Food*

‘This isn’t just first class scholarship, it’s energetic writing. Fraser and Rimas have a knack for the little detail that unveils the big thought. *Empires of Food* is a must-read for anyone who wants to know why every night a billion people go to bed obese and another billion go to bed hungry.’

—George Alagiah

‘It is an absorbing, fascinating and timely book. The analysis of our social and historical relationship with food by Andrew Rimas and Evan Fraser is compelling, and their warning is stark. Best of all, it’s a rattling good read.’

—Matthew Fort

‘*Empires of Food* deals with a subject of grave importance and profound implications for the political economy of the world. Although the subject is serious, it is written in a compelling and readable style. While not pedantic or ponderous in any way, it is of impressive academic rigor. This book needs to be read and thoughtfully considered by policy-makers and citizens everywhere. And if you enjoy lunch, don’t fail to read it!’

—John Manley, former Deputy Prime Minister of Canada

‘Food is powerful stuff not to be trifled with. A grand read.’

—Fergus Henderson, St John Restaurant

‘With a breathtaking sweep, *Empires of Food* takes us on a rollicking culinary journey through the ecological history of civilization. The result is a rare treat: hard-hitting analysis cooked to read like a captivating novel. For pure pleasure or a deeper understanding of why civilizations rise and fall, it’s a perfect choice for any curious mind.’

—Peter Dauvergne, Professor and Canada Research Chair in Global Environmental Politics, University of British Columbia; author of *The Shadows of Consumption*

‘*Empires of Food* is a panoramic and prescient book which presents the challenges that civilizations have faced with agricultural production and societal fashions for food. The authors approach the issue with refreshing pragmatism and urge us to move towards a “glocal” approach to consumption norms. Their compelling narrative recognizes the value of efficient global food systems while also appreciating the importance of local connections to reduce ecological impacts. Such a vision for our palates holds much promise in balancing the debate on food ethics and sustainable development.’

—Saleem H. Ali, author of *Treasures of the Earth: Need, Greed, and a Sustainable Future*

‘Evan Fraser and Andrew Rimas vividly recreate centuries of spice-filled ships and grain silos to show that while the pen and the gun may be the visible tools of diplomacy, the knife and fork are often the true instruments of human change. Their unsentimental march through our history and into the future reaches a conclusion that is both inspiring and unnerving: civilization is what we eat.’

—Sasha Issenberg, author of *The Sushi Economy*

'With a flavor of Jared Diamond, *Empires of Food* thoughtfully weaves religion, military history, and science into a historical arc of how food undergirds civilization's rise and fall. Though the food riots of 2008 are now overshadowed by the economic crisis, *Empires of Food* reminds us that those violent protests are an inevitable pattern of history. Sprinkling discussions of monks and bird guano in with the Roman Empire and colonization, the book elucidates the inherent instability of how our current food infrastructure has evolved and will make you rethink how you eat.'

—Jennifer 8. Lee, author of *The Fortune Cookie Chronicles*

INTRODUCTION

The two authors of this book have never gone hungry. We've never even lacked an embarrassment of dried pasta choices. This is important to know because, while this book is about food as a historical—and environmental, economic, and political—force, the act of eating is a highly personal one. Every family has its culinary DNA. Ours were Scots Canadian (Fraser) and Lithuanian American, undercut by the influence of an ancestor from Alsace (Rimas). In the one case, this meant tuna casserole, sweet and sour spareribs, and stir-fried beef with broccoli and carrots; the other was stuffed cabbage and chicken crepes Mornay. But growing up, both of us knew the comfortable expectation of the ice cream quart, the ham sandwich on white, the stuffed tortilla bag. Eating connects us to our histories as much as it connects our souls to our bodies, our bodies to the earth. So it's useful to consider that we mean “sustenance” when we write the word “food.”

Historically, sustenance has taken the form of the gritty, bland grains that kept humanity alive for ten thousand years. Yet eating is never merely the care and maintenance of cells. No species would invent chocolate *ganache au crème fraîche* for the sake of cellular health. As well as triggering at least two of the more enjoyable stimuli, eating is about society. It's about fellowship and memory, about Proust's madeleine, about our culinary hooks in the reflecting pool. At its most evolved, it's the second glass of port, the bite of Camembert assessed alongside the nibble of Stinking Bishop, the fresh-shucked oyster in a porcelain dish. Eating is what all animals do, but humans do it beautifully.

But we didn't write this book as a celebration of gastronomy. The libraries of the world are full of prose dedicated to the dripping sensuality of the table, and long tracts of our previous book, *Beef: The Untold Story of How Milk, Meat, and Muscle Shaped the World*, are unabashedly epicurean. But while writing *Beef* we began to mull over the topics that formed the skeleton for this book: how climate change will alter our menus; why obesity and hunger coexist in the world with such seeming inevitability; whether the Earth's soil will burn away into dust. And whether our beloved Western supermarkets will someday lock their sliding doors, their refrigerators humming over aisles shorn of meat.

These are very old questions. They were asked, in a form, by laborers hoeing at the sandy runnels off the Euphrates five thousand years ago. They were asked again by Mayan farmers watching the parched skies of the medieval Yucatán. The Romans asked them, as did the Mycenaean Greeks. And so did Californians before the arrival of movie cameras. Now, in this age of designer fertilizers and test-tube crops, we're forced to ask them again. But today, we need to find new answers.

Our ten-thousand-year-old urban civilization could be summed up in the throwaway line "We are what we eat." From Jericho to Manhattan, cities have been founded on the creation and exchange of food surpluses. Food is wealth, and so food is art, religion, government, warfare, and all the potent, sometimes stinking blossoms of culture. We've built complex societies by shunting corn and wheat and rice along rivers, up deforested hillsides, and into the stewpots of history's anonymous generations.

These societies, these food empires, can only exist if three things happen: Farmers need to grow more food than they eat; they need a means of trading it to willing buyers; and they need a way to store it so it doesn't dissolve into

sludge before reaching its economic apotheosis. When these three premises are met, urban life flourishes.

Which is, in itself, the seed of a problem. Food empires, like the crops on which they're founded, have a tendency to grow. Unlike wheat stalks, though, they have a tendency to swell past sustainable boundaries until they implode. For instance, a food empire might stretch out during a period of mild sun and soft rainfall, but when the weather turns foul a few centuries down the line, it hastily shrinks on account of the cold. Or it may throw its economic heft behind a particular crop, using specialist producers to feed its hungry cities. But this makes the food empire vulnerable to droughts, floods, and pests, leading it to topple when the crop fails. Or it may expand in a furrow of fresh soil, breaking virgin ground, exhausting it, then breaking virgin ground again until the hillsides stand bare.

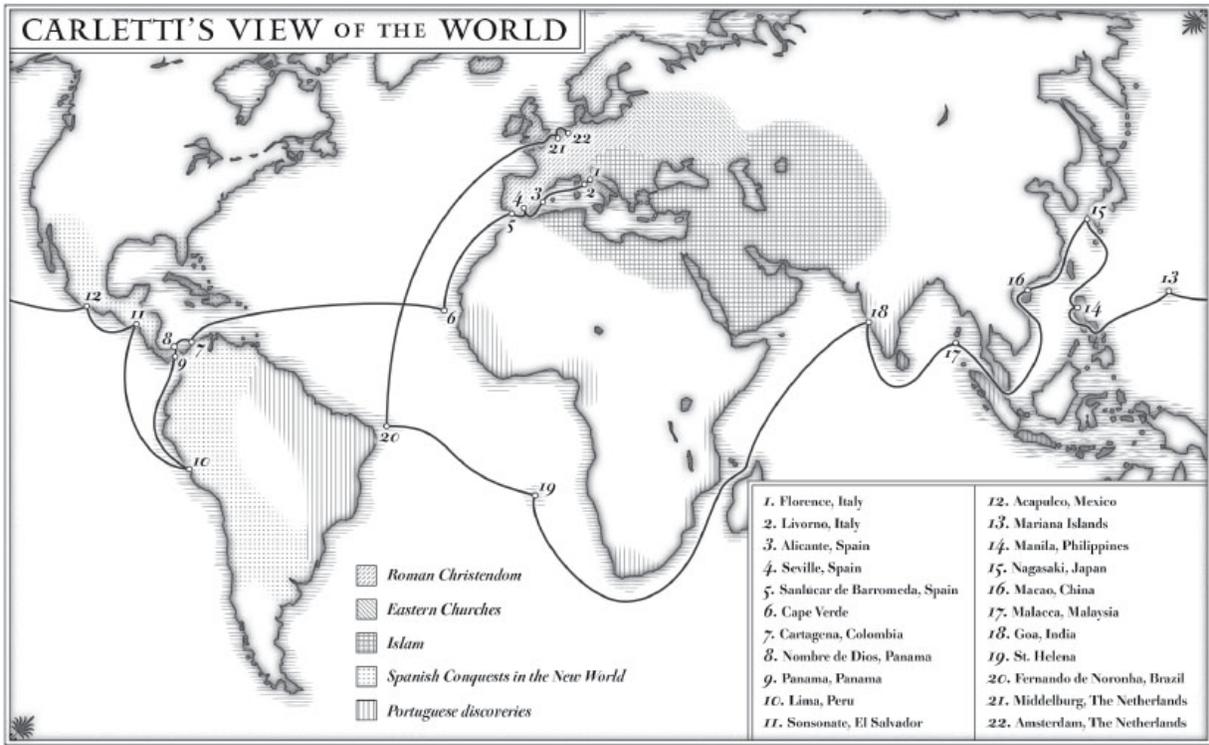
Or all of the above.

When a food empire fails, mobs tear apart the marketplaces, angry over the cost of bread. Governments raise armies to conquer greener, more fertile valleys. People uproot. Forest creeps back over the old fences. Arable land falls into disuse, and society contracts. It happens again and again. And it's happening now.

This book is about how food, economics, agriculture, and human empires are all strands of the same narrative. In following these strands, we've traced two journeys. The first took place at the turn of the seventeenth century, at the dawn of the global marketplace. This was the first time that a merchant could make a circuit of the Earth, jumping on and off ships, buying and selling merchandise in the hope (usually deluded) of getting fabulously rich. Using the journal of one of the first people to ever attempt such a journey, we trace the beginnings of the modern "food empire," the mesh of human arrangements, technology, and

land that binds farmers in Indonesia to banks in Holland, Peruvian fishermen to bureaucrats in Europe.

The second journey takes place four hundred years later, in 2008. It's a trip down the Yangtze River in central China, through the heart of an industrial food empire. Many of the themes from the first journey—erosion and transport, the price of fish in one place and of chickens in another—repeat in the second. Large and complex civilizations expand and contract, breathing out and pulling back in a sequence that's been repeating itself since the agricultural revolution. Today, the fertilizers are better, but that's just going to make the contraction all the more abrupt. The shape of the pattern—a gradual rise in comestible wealth, ending in an unpleasant plunge—hasn't changed since the Fertile Crescent turned into a misnomer. All that is old is new again, and the lesson from history is that big civilizations are built on ground no firmer than the mud under their rice paddies. They, and we, are slaves to food.



PART I

THE PRICE OF FOOD

THE THREE GORGES DAM

A brown dusk hangs above the Yangtze River as it drifts, hazy as stale tea, through the concrete warrens of middle China. A few miles upstream, the water still laps against fantastical crags and bamboo forest, but in downtown Yichang, it seeps along a molded channel, as grey and unyielding as the skyscrapers that roost on the paved edge of the stream. A few years ago, Yichang was the Chinese equivalent of a puddle-duck hamlet—a forgotten river city like dozens of others in the valley. Today, it's one of the new cities of the East, a rusting bunker of 4 million people living under a whorl of ozone and carbon dioxide.

You don't see the sun much in Yichang. But you do see traffic. Lane after lane of chrome and plastic and gusting diesel clang past the fluorescent restaurants and brothels, the silent blue television glow from the windows of the apartments, the sad potted trees.

If Yichang were an American or European city, it would rank, in terms of size, in the second tier. In China, it barely registers on the human landscape. But it does register on the economic one. The city stands six hundred miles west of Shanghai, midpoint along the river between the industrial coast and China's vast inland metropolis of Chongqing. That wouldn't matter much if it weren't for a particular trick of geography that would make Yichang the site of humanity's single greatest material act: the construction of the Three Gorges Dam.

The physical reality of the dam squashes the brain's capacity for hyperbole. Like the numerical value of pi or

the distance between stars, it's a concept that can only be encapsulated by numbers. For instance:

The dam contains 986.56 million cubic feet of poured concrete.

It flooded 244 square miles of land.

It's propped up by 256,500 tons of metal supports.

Building it displaced 1.13 million people.

In short, it's a piece of civilization that can only really be thought of in terms of a spreadsheet.

Passing through the shipping locks on the upper section of the dam is like sailing through a steel gate into Brobdingnag. The five lock chambers are each big enough to float twenty large cargo vessels; their 130-foot-high doors are tall enough for cruise ships to putter through like tugboats. Once inside the chambers, the water drains away at a rate of a meter every couple of seconds, leaving passengers craning their necks to see the sky. It takes a boat three hours to pass through the dam, but doing so makes travelers feel like they're crossing a threshold into a changed world, one that's out of scale with everything downstream. A broken flow, leaving behind everything that's ever gone before.

The travelers are right. The Three Gorges Dam unveils a new world that stretches far beyond the cinder-block maze of Yichang.

On the outskirts of the city, the river swells to a width of about a mile and a half. Before the Chinese started to tinker with the river's flow,¹ the water churned with sediment from as far away as the Himalayas, rolling with it down into the flat, squelching miles of the Yangtze Delta to Shanghai. Now much of the grit settles against the concrete filter of the Three Gorges. One local hydrologist (who asked to remain anonymous) says that since the river

ceased replenishing the delta's mud, Shanghai has actually begun to sink.

The Yangtze River cuts the nation in half, both physically and gastronomically. On the northern bank is the beginning of wheat country. To the south lie rice paddies. So long as the river remains navigable, merchant fleets keep the western hinterland connected to Shanghai's markets, and hence to the world. But when the river floods, as it once did with regularity, the catastrophe can be mythic. A Yangtze flood in 1931 killed more than 100,000 people, although this was a mere fraction of the 4 million deaths inflicted by China's rivers in a grisly season that still holds the world record for murderous natural disasters.²

China's history is the history of its rivers, and the dam is meant to change that. Official proclamations declare that the Three Gorges is a giant battery of clean, renewable energy, ridding a sorely gassed nation of 100 million tons of carbon dioxide and 2 million tons of sulfur dioxide emissions per year. It's meant to bestow dependable irrigation on millions of peasant farmers. Most importantly, it promises to lessen flooding from once per decade to once per century, shielding 1.5 million hectares and 15 million people from the deadly wash.³ On the other hand, critics are worried that the dam's reservoir will silt up like a clogged drain, making the whole project not only wasteful but dangerous.⁴ Earthquakes, too, are dangled as an apocalyptic possibility, as is terrorism. And then there's the question of obsolescence. With a brave, new climate burning down on our icecaps and glaciers, the twenty-first century is going to be awash in floodwaters. The dam, in short, may prove to be useless or even downright catastrophic, potentially unleashing a gigantic wave of muddy, rolling death on the river valley.⁵ Yichang would be its first victim.

In the meantime, the Three Gorges Dam has risen to an unusual pantheon of human achievement: that of Epochal Engineering, stuff that sums up the human condition of the time. Stonehenge, for instance, reflected the relationship between Neolithic people and the cosmos. The pyramids proclaimed the divine nature of the pharaohs. Now the Three Gorges Dam declares to the world, in the most ostentatious manner possible, that China Is Modern. No longer is it a nation of bent peasants eking out a living among the rice plants. It's now a nation of six-lane highways and lab coats, of hydroelectricity powering the laptops, where something as primitive as a bursting riverbank belongs to the muddy past. And it's especially a nation where no one goes hungry, where even the poor can stalk the refrigerated aisle for a bag of frozen dumplings. In the twenty-first century, the China of the Three Gorges Dam need never fear starvation. It's part of the safe, clean, modern world. Part of the global food empire.

Or so it seems on first glance. In the late 1990s, some Western researchers worried themselves into a tizzy about the effect that a global China would have on the world's food markets. They suggested that a country so populous couldn't possibly feed itself, particularly since its land area under cultivation was shrinking. They thought that China's appetite for imported rice, in particular, would drain the international markets by the year 2030, driving up prices and making trouble for everyone from commodities brokers in Chicago to slum dwellers in Rio.⁶ This hasn't happened. China remains almost entirely self-sufficient, consuming only homegrown rice and mostly homegrown wheat. This would be good news for everyone if it had any chance of lasting.

It doesn't. The Chinese Academy of Sciences recently stated that, due to climate and population change, "cereal production ... [will] fall significantly as the century

progresses.”⁷ This is bad news for everyone, because the Chinese food empire, with its tangle of farms, warehouses, refrigeration cars, corn exchanges, cash registers, and frying pans, is hopelessly intertwined with the rest of the world. Recall the cliché of the butterfly flapping its wings in the Amazon and causing a hurricane: today, we have a shrimp boat hauling up an empty net in the Mekong Delta and sparking a riot in Haiti.

To feed itself, China is resorting to the *deus ex machina* of genetically modified grain—“super-rice” varieties that are twice as productive as natural ones.⁸ What biotechnology giveth, it also taketh away in the form of weird, genetically mutating pests. Super-rice needs super-pesticides, and super amounts of water and chemicals. When the Chinese planted their first strains of these laboratorial wonders, they bathed them in a wash of fertilizers. And these products cost oil. Lots of oil. So they yoked their agriculture, as Westerners did long ago, to the energy market. It’s a devil’s bargain at best. At worst, perhaps in some future, fateful year when the price of oil floats to record highs along with the annual temperatures, it’s going to be hell.

Genetically modified crops may not even promise technological salvation anymore.⁹ One of China’s current experiments is with a strain of rice that produces its own insecticide, a poison tagged for a prowling plant killer called the stem borer. But the stem borer is already yesterday’s villain. Even as this new rice is unleashed on the stem borer, a fresh pest, the brown leafhopper, is replacing the ailing vandal, proving again that ecology is impossible to squash into an engineer’s blueprint.¹⁰ Something unexpected always happens to mess up the prophets.

THE RISE AND FALL OF FOOD EMPIRES, PAST, PRESENT, AND FUTURE

The Three Gorges Dam exists because of the way China gets its food. And China, like all developed countries, is part of the global food empire.

Food empires are the subject of this book. They are what urban societies create to feed themselves. In their simplest formation, they're webs of farms and trails, rivers and vegetation, all of which function to deliver food from a piece of tilled land to a cluster of interested eaters. To do this well, more food must be created than the producers themselves wish to eat. The food must also be preserved and shipped on the winding journey from farmer to diner. And the food empire needs a mechanism for exchanging the food between these parties.

These three functions—surplus, storage/shipping, and exchange—are the pillars of every food empire from ancient Egypt to Victorian England. Just as there is no life without food, so there is no civilization without a food empire.

Driving a wagon of grain into a legionnaire camp; measuring hops into a beer keg destined for sale to a village on the other side of a forest; packing tea leaves in the hold of an Indiaman for the voyage around the Cape of Good Hope. Such is the daily bustle of food empires. The engineers who poured the concrete for China's cyclopean water projects were likewise working on behalf of our staggeringly complex modern food empire, one that feeds everyone who buys groceries from a store. Which, unless you're a subsistence farmer or some recluse with a fishing spear and a headful of Thoreau, means all of us.

Despite its seeming triumph over the technological strictures that hobbled its predecessors, today's food

empire is cracked with very old fissures. We're making the same mistake our ancestors did, and the result is a system as delicate as a ripe sheaf of emmer wheat. One brusque stroke and the grains will fall away.

The mistake of the modern food empire is to accept three apparently self-evident assumptions. The first is that the Earth is fertile. For the last eighty years, human beings have been plowing, sowing, and reaping with a fury that the planet's soil has never before experienced. Past food empires farmed as frantically as they could, but modern advances put them to shame. Today's bumper crops, even more so than historical harvests, deplete the earth, drawing down what ecologists call "natural capital." By spending our geological endowment, we've been able to feed billions of human beings. But we haven't replaced the fund. When older food empires depleted their soil, they either expanded onto fresh ground or concocted new technologies to resuscitate the land. Then, when these strategies inevitably faltered, the food empires had to retreat, leaving abandoned cities and memories of wealth.

Our own food empire has yet to stall. For a hundred years, we've beefed up our soil with clever fertilizers and planted it with breeds of engineered crops. The question that bubbles under the Bunsen burners of the world's agricultural laboratories, though, is whether we can indefinitely cook up new biochemical fixes. Farming does violence to nature. Will we always have enough Band-Aids on hand?

The second undermining assumption for the stability of food empires is that the forecast calls for sunny, mild weather, with possible showers. That's the sort of weather we've enjoyed for generations, but it's a historical blip. Human-induced changes aside, our planet's climate is hardly static. During the Roman Warm Period, a string of pleasant centuries boosted Europe's wheat harvests and

swelled her vineyard grapes. The seventeenth century, on the other hand, was entirely less comfortable, with a Little Ice Age stunting diets across the world and driving the irritable masses to war.¹¹

Food empires, on the whole, grow bigger when the sun and rain cooperate. This was the case with our modern system, which didn't undergo any significant climatic shocks between the Dust Bowl in the 1930s and the droughts in the 1990s. All the truly horrific famines of the twentieth century (China, Bengal, Russia, Ethiopia, etc.) were political or economic evils. They had less to do with weather than with policy.¹² If past examples are any guide, though, when the storm clouds come, we ought to look not only to our umbrellas, but to our larders. Cities have a tendency to shrink with the grain yields.

Our third mistake is to assume that it's good business to do one thing well. The modern food empire is a patchwork of specialized regions producing large amounts of a very few commodities. This is sound economics but terrible ecology. A specialized agricultural region is fragile in the face of a particular insect or spore or an untimely spell of dry skies. Nature is most resilient when it's diverse. And since all our specialty patches depend on one another to constitute our food empire, none of them can exist alone. None are self-reliant. Remove one and the whole system unravels.

There's a fourth assumption that affects the first three, but since it's unique to our modern food empire, we have no historical lesson to glean. Just logical ones. Our food supply, like everything else in our civilization, takes cheap fossil fuels for granted. We use oil to power everything from water pumps to meat freezers; the factories that synthesize fertilizer in chemical vats use natural gas. Without a predictable, affordable flow, we can't grow and refrigerate the dizzying quantities of food eaten by our

metropolises. Bargain-priced energy is the reason we've been free to breed and feed our population past the 6 billion tally. Remove the energy, and those billions, too, will be taken away.

Of course, these are a lot of assumptions on which to base something as important as the feeding of our species. They assume no pendulum swings in the price of energy. No global warming. They place existential faith in the scientists trying to mask chronic soil degradation by inventing new seeds and fertilizers. And they assume no political renegeing on trade agreements—like, for instance, when India banned the export of non-basmati rice in 2008 in a panicked attempt to smother its domestic prices.¹³ (Places that had long depended on having this rice to eat themselves, like Bangladesh and parts of Africa, quickly brokered exceptions and side deals that secured their imports. But what if India had really run out of food?)¹⁴

To be mistaken in one colossal assumption about our food empire may be a misfortune. To be mistaken in all four seems like something worse than carelessness. It seems like willful disregard for the truth. When we finally shed these assumptions, we'll realize the genuine price of the way we produce, distribute, and consume food.

Our food empire began to totter alarmingly in the spring of 2008. Initial stories quietly noted a drought in Australia and a swing in the value of the yuan. Then the headlines grew excited. Violence in Burkina Faso. Rice quotas at U.S. Walmarts.¹⁵ Biofuel stealing the corn from our mouths. Violence in India. The World Bank declaring an international crisis. Violence in Mexico.¹⁶

Panic wasn't really an unreasonable reaction. Worldwide food prices, which were already up by 25 percent compared with the first half of the decade, spiraled out of daily affordability and into the realm of luxury. Robert B. Zoellick, president of the World Bank, proclaimed in April

2008, “Since 2005, the prices of staples have jumped 80 percent. Last month, the real price of rice hit a 19-year high; the real price of wheat rose to a 28-year high and almost twice the average price of the last 25 years.”¹⁷ That spring, another 75 million people slipped off the statistical precipice into the wretched classification of “hungry.”¹⁸

In the hysteria, not many people noticed that 2008 was the single most bountiful year in the history of agriculture. Never before had farmers coaxed such plenty from the earth, never had harvests been so lush. The weight of the global breadbasket was 2.24 billion tons, a robust 5 percent increase over the previous year. Yet food prices utterly detached themselves from the fact that we had reaped the best harvest in the entirety of human existence. That’s because our assumptions had finally started to wear thin.

History has a talent for ruining comfortable ideas. In the nineteenth century, at the height of Victorian industry and the flowering of mechanization, 45 million people died when well-reasoned, generally wellintentioned British colonial policies blended, murderously, with the weather of El Niño.¹⁹ If a true environmental catastrophe had struck the world in 2008—a drought in the American Midwest or a bad case of European corn borer in the Ukraine—it would have been an awful lesson in history. That’s the negative side of the food empire. The bonds that link our pantry shelves to the wages of tractor drivers on the North China Plain are real, for both good and bad.

So even though malnutrition and hunger are inconceivable to many of the world’s inhabitants, the only difference between a bond and a shackle is perspective. The U.S. Congress passes a law on biofuel subsidies, and Bangladeshis can’t buy rice. A dry summer sends an Australian cattleman into bankruptcy, and Senegalese storefronts are smashed. It’s no different from the way that

toxic mortgages in the United States caused economies to topple in Europe.

But while a financial crisis ruins lives, a food crisis ends them. No parents ever watched their child's teeth fall out from scurvy on account of a vanishing 401(k) plan. A collapsing food empire, on the other hand, is an existential matter.

For a hundred years, our industrial food empire has been astoundingly successful, but all empires stumble and fall, with or without a few buffering centuries of decay. The Three Gorges Dam—an edifice that's almost godlike in the liberties it takes with geography—is either a symbol of our salvation or a symptom of our coming collapse. It's the high water mark of a food system in which billions of farmers, workers, and consumers (all of them eaters) are connected, and it's a reminder that, while technological leaps and commodity profits have a global effect, so do blades of grass.