

## Socio-economic and Environmental sustainability: health impacts of an Environmental Disaster

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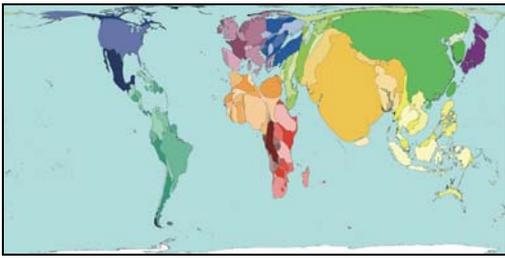
**Abstract:** At this early point in the 21<sup>st</sup> Century a major concern that we face is the future possible effects of people-induced global warming. The predicted effects are severe, but argued by some to be avoidable if we act now. Here we consider the dimensions of another disaster: one for which not only the causes, but also their horrific consequences, are current worldwide. The implicit question is ‘why are we more worried about future disasters than those already occurring?’ The Worldmapper collection of cartograms (where a map is used like a pie-chart to present data) is used to illustrate the extent of international inequalities in health and living conditions, discussed in relation to other aspects of human lives. Though the shape that we can see the world is in is shocking, we can also envisage a positive future. We compare these current global times to more local past times experienced during the ravaging inequalities of Victorian Britain. Using Britain simply as an example. We end by suggesting a further step the current British Prime Minister could make in his thinking. Doing this we can see the potential for environmental reconstruction, which would result (as it did before) in considerable reductions in infant mortality. Our common future is not already mapped out; it is still to be won.

**Keywords:** disaster, inequality, health, world, cartogram, imagination

The year 2006 was a year of wake-up calls about an impending catastrophe. Al Gore starred in his film about this inconvenient truth (Gore, 2006), arguing that *now* is the time for action. In October Sir Nicholas Stern warned Britain “We have the time and knowledge to act but only if we act internationally, strongly and urgently” (BBC NEWS, 2006). Yet the causes and possible effects of this disaster have been taught, even in the curricula of British secondary schools, for at least the past 10 years – so why have these rallying cries only now become mainstream? They come now because we are currently at a peculiar historical point where this ‘future’ environmental catastrophe has been mainstreamed. Those who control the global media increasingly believe they and theirs are at risk and so aim to prevent the problems that this catastrophe is set to cause humans – in particular the more extreme and dangerous weather events, the displacement of people (particularly from the middle and south of the globe), the possible increased spread of diseases (northwards). Health impacts are a major reason for the mainstreaming of concern over environmental disaster (see, for example, Kessel, 2006).

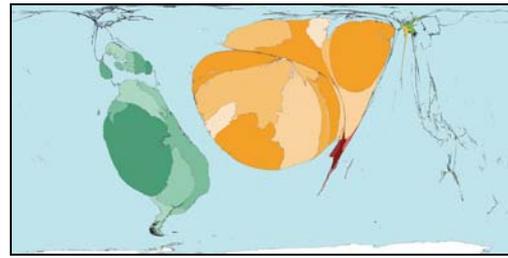
Researchers at the universities of Sheffield and Michigan spent 2006 creating a series of world maps, one for each day that year. Three authors of this paper (a version of which has been published as: Dorling, D., Barford, A. and Wheeler, B. 2007, Health impacts of an environmental disaster: a polemic. *Environmental Research Letters*, 2, 045007. doi:10.1088/1748-9326/2/4/045007) were part of that research team. World maps are often used to help us to think globally about past, current and future catastrophes and disasters, states of health and of the environment (see, for instance, Sacquet, 2002; Smith and Braein, 2004; Kidron and Smith, 1983; Mackay, 2002; Mackay and Eriksen 2002; Pearson, 1998). Worldmapper maps also aim to do this, by reshaping territories (often countries and similar entities). These maps redistribute the area of a map according to the proportion of a variable found there, just like a pie chart (Dorling et al., 2006). If a territory has half of the available global area, this means that half of the variable is found there. These visualizations of (what is usually) United Nations data quickly communicate the worldwide distribution of many relevant variables, including: diseases, forests, water, pollution, resource depletion, housing conditions, transportation, species at risk of extinction and people affected by volcanoes and earthquakes (freely available from [www.worldmapper.org](http://www.worldmapper.org); we also refer extensively to worldmapper maps in the remainder of this paper). Figure 1 shows the distribution of the world’s population in 2002 (Population data are from: United Nations Development Programme 2004 *Human Development Report*). India (shown in mustard yellow) and China (in pea green) appear large on the map because large proportions of the world population live there. Figure 2 shows the distribution of yellow fever cases – yellow fever is found almost exclusively in South America and Northern Africa (Yellow Fever data are from: World Health Organization

2004 *Human Resources for Health*). Both maps show the absolute counts, of people and yellow fever cases respectively.



**Figure 1:** Total Population (map 002). The size of each territory shows the relative proportion of the world's population living there.

Data source: United Nations Development Programme, 2004, Human Development Report.



**Figure 2:** Yellow Fever (map 236). Territory size shows the proportion of worldwide cases of yellow fever found there, 1995-2004.

Data source: World Health Organization, 2004. *Human Resources for Health*.

We are concerned about the future health effects of the impending catastrophe – but perhaps we should also question how close are we to already experiencing a disaster? And, what is a disaster anyway? The nature, theory and conception of disasters are much debated, and the subject of much academic deliberation (Quaranteli, 1998; Sen, 1981). In simple terms, according at least to the Oxford English Dictionary (2006) a disaster is something of a “ruinous or distressing nature; a sudden or great misfortune, mishap, or misadventure; a calamity.” Perhaps this is something of an over-simplification of a complex concept. However, it is a definition that most people can relate to; severity, speed of onset and magnitude distinguish a disaster from something ‘bad’.

For this conception of a disaster, we consider primarily the effects on people, but which people? At a time when people are living through disasters of many forms, our media, politicians and businesses turn their attentions to the onset of a future environmental disaster. Why do they appear less concerned with current disasters? To answer that we need to consider both the magnitude of current environmental disasters and their distribution: how many are affected and where? What follows is a socio-environmental depiction of the modern world using evidence derived from the United Nations (<http://www.un.org/>), World Health Organisation (<http://www.who.int/>) and World Bank (<http://www.worldbank.org/>), amongst others. We relate the current global picture to the stark inequality of Victorian (19<sup>th</sup> century) Britain. We believe that these images add to a growing wealth of powerful evidence that urgent international political action is needed to address this disaster.

Imagine what the world might look like during a global environmental disaster. It is a strange and distressing image. Nevertheless it is recognisable and becomes increasingly familiar in following the story told by worldmapper maps. It is a world in which over a billion are forced to live in slums (see [www.worldmapper.org](http://www.worldmapper.org); maps 187 and 188), three billion with only the basic sanitation of a communal pit latrine available (see worldmapper map 183), another two and a half billion without even that (see worldmapper map 186), two billion living in homes as overcrowded as last seen in a country like Britain in Victorian times (see worldmapper map 192), well over a billion with access only to dirty water – and that they have to walk for. A world where half the population are crowded into poorly designed cities, a billion more are arriving over the course of a generation and another 888 million more to move to the cities in just the next 14 years (see worldmapper maps 327, 328, 190 and 191).

An environmental disaster might mean over a billion people trying to live on below subsistence levels of income (see worldmapper map 179), additionally over a billion and a half in absolute poverty (worldmapper map 180); over half the population of the world living each day on those goods, services and shelter that a ten dollar bill would buy in the United States. The numbers undernourished are growing (worldmapper map 177); and within a generation from now we should expect those to top a billion, over half being underweight children (worldmapper map 182). Millions of children have to work (worldmapper map 135) and two out of five children do not ever attend a secondary school (worldmapper map 200). The same proportion of babies is born without a midwife or some other person with her knowledge present (worldmapper map 4).

In a disaster situation it is hardly surprising that over 3 million pregnancies a year result in death at birth – almost all where the disaster hit hardest (worldmapper map 259). A further 3 million newborn babies struggle then die in their first week of life (worldmapper map 260), each year there are over ten million children dying a year before their fifth birthday – also almost all where the disaster was most acute (worldmapper maps 261, 264). Almost two hundred and fifty million children of these ages suffer from diarrhoea, mostly in these worse off places and that is where the disease is more often fatal (worldmapper map 233). These are the same places as where the slums have become concentrated, the sanitation does not exist, overcrowding is rife, drinking water is dirty; where billions live in poverty, go hungry and children so much more often than elsewhere, and more often than adults, are emaciated.

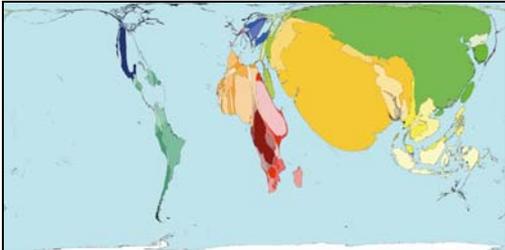


Figure 3: Poor Sanitation (map 183). Territory size shows the proportion of all people without access to basic sanitation (toilets) that live there.  
Data source: United Nations Development Programme, 2004, Human Development Report.

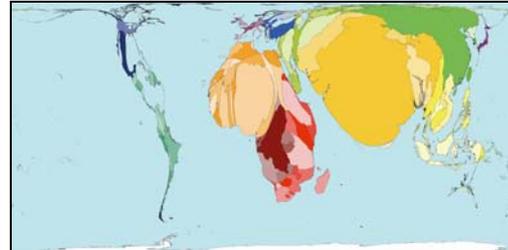


Figure 4: Stillbirths (map 259). Territory size shows the proportion of all stillbirths over 28 weeks of gestation worldwide that occurred there in 2000.  
Data source: World Health Organisation, 2005, World Health Report.

Certain diseases are most concentrated in impact where the environmental damage is greatest. Often these are the same diseases that were common in the overcrowded and unsanitary conditions of Victorian Britain. Cholera is still widespread, with over one hundred and fifty thousand cases a year (worldmapper map 231) resulting in a few thousand deaths every year, despite its susceptibility to treatment and prevention (worldmapper map 232). More than eight million cases of tuberculosis are recorded in the disaster zone annually; there are 72 million cases of malaria (worldmapper map 229) resulting in over one hundred thousand deaths a year (worldmapper map 230). Disease and the resultant premature deaths are the worst outcomes of the disaster. One hundred million very young children died unnecessarily during each of our current decades. Millions more older children and adults are dying young unnecessarily. Considering under five year olds alone, more have died from preventable causes in a dozen years than in all the wars of the twentieth century – these being the most violent wars of all centuries.

This is the twenty-first century environmental disaster. It is not a disaster resulting from rising carbon emissions (worldmapper maps 295-298) even though they have disastrous future implications. It is not a disaster of the greenhouse gases combined (worldmapper map 299), or methane and nitrous oxide emissions (worldmapper map 300), and nitrogen oxides (worldmapper maps 302 and 316), it is not the result of our pumping sulphur into the air (worldmapper map 301), chlorofluorocarbons (worldmapper map 303), even of our dumping nuclear (worldmapper map 304) and other hazardous waste (worldmapper map 305), sludge (worldmapper map 306), and rubbish (worldmapper map 307). This is not an environmental disaster that is the result of our depletion of the planet's energy resources (worldmapper map 312), mineral reserves (worldmapper map 313), or forests (worldmapper map 314). Activity involving all these things contribute to the disaster, but hardly any of the tens and hundreds of millions of premature deaths have been as a result of pollution other than from our own sewage. Our rapid depletion of gas (worldmapper map 319), oil (worldmapper map 320), water (worldmapper maps 101-104), and other resources (worldmapper map 322) beyond the capacity of the land where we live (worldmapper map 321) was not the cause of the crisis. We did not run out of oil power (worldmapper map 111), gas (worldmapper map 112), coal (worldmapper map 113), nuclear energy (worldmapper map 114), although in places the firewood was exhausted long ago (worldmapper 109). This environmental disaster did not result from the World Bank failing to include the costs of this damage in their accounts (worldmapper map 317), nor from the International Monetary Fund's unfair influence (worldmapper map 365) – although that may well have contributed. This disaster is a result of various limits: some of these are fixed limits, many are self-imposed, often unwittingly so. It is the latter that we can alter, along with the horizons of our imaginations. Our ability to think, invent, change, express, and care is not limited.

In Victorian Britain the poor within the cities of the rich were imagined to be of another race, destined to short and destitute lives. Slightly further-a-field, affecting almost the entire population, famine was tolerated, even sustained, as long as it occurred overseas – even if that stretch of water in the case of one set of Isles was as narrow as the Irish sea. Famines in much of the rest of the world were prevented by pre-colonial administrations such as those in India (until the British East India Company’s intervention in the eighteenth century; Davis, 2000) and in China until the opium wars of the nineteenth century (Davis, 2000), or Brazil (where twentieth century famines have their antecedents in British financial interventions, Davis, 2000). As Victorian times ended, infants died in British cities in the worst of hot summers at a rate that surpassed that to be found almost anywhere else in the world today. They died because of the limits of the horizons of our imaginations. Because infant death then in England was not seen as a social problem – but explained as an act of god. At that time infant mortality was considered a fate that could not be prevented. And then it was. Between the time when our grandparents were born and our children’s births, infant mortality rates for the well-off in Britain fell one hundred-fold. This illustrates human capacity for rapid improvement, and ability to change something that was previously thought to be inevitable.

From Victorian times onwards the horizons of the British public’s imagination have widened. To see most other people in our cities as people, to tolerate no child dying of neglect near where we live; to see famines, at least those nearby, as wholly avoidable. Our horizons have extended to not view colonisation of almost all the peoples of the world as a civilizing influence. However, we Brits still accept that some children are malnourished, even on our own streets if we do not see them as the same as us (the baby of a refugee, for instance, is legally entitled to less food through welfare in Britain; see Dorling, 2006). Concern is currently transfixed by our own self interests such that we see the car as a necessity for the tenth of people worldwide with cars (see worldmapper map 31), and ignore the million deaths a year that result (see worldmapper map 243).

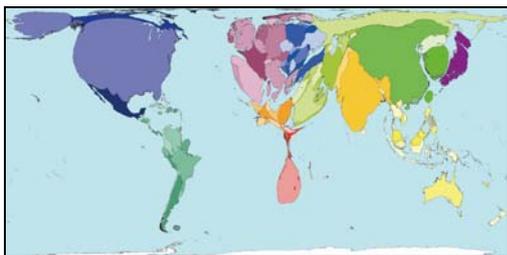


Figure 5: Nitrogen Oxides (map 302). Territory size shows the proportion of all nitrogen oxide emissions that come from there.  
Data source: United Nations Statistics Division, 2005.

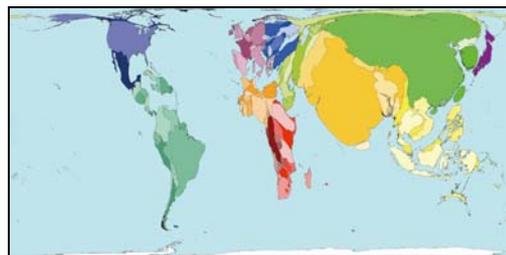


Figure 6: Road deaths (map 243). Territory size shows the proportion of all road traffic accident deaths worldwide that occurred there.  
Data source: World Bank, 2005, World Development Indicators.

We are obsessed over access to crude oil (worldwide annual US\$320 billion exports: see worldmapper map 75), or that one day soon we will not be able to fly as often and far as we do now (25 billion km each year and rising; worldmapper map 28), and are as concerned by climate change as we once were by AIDS, and before that nuclear winter, and before that world war, before that revolution – before we thought we were safe from each concern and moved on to worry about the next. The wars never ended (see worldmapper map 287); the nuclear weapons remain (see worldmapper map 289), over thirty million people have HIV (see worldmapper map 227) and three million a year are dying of AIDS – but largely out of sight and over the limits of our imagination now that that disease is no longer pandemic “at home”. Now imaginations in the rich part of the world turn to scares over a return of an influenza outbreak that could kill us or ‘ours’ (see worldmapper map 238); worrying about our diets (see worldmapper map 239), giving up smoking (worldmapper maps 241 and 242) and recycling (worldmapper map 308). What will concern us in a decade?

Meanwhile – elsewhere acute disasters are still the experience of millions a year (worldmapper map 245); and thousands are killed (worldmapper map 246) by earthquakes (worldmapper map 247), volcanoes (worldmapper map 248), droughts (worldmapper map 249), floods (worldmapper map 250), storms (worldmapper map 251), landslides (worldmapper map 252), heat waves (worldmapper map 253), and pestilence (worldmapper map 254). But for every death attributed to such a disaster, at least one hundred

more (mostly infants) die relatively quickly and quietly from largely undocumented poverty, as they did in that first modern city, Manchester, at the time when Queen Victoria died.

We gave to charity then and we still do – doling out food aid (worldmapper map 363) in almost direct proportion to our consumption of burgers (worldmapper map 364). But we no longer expect children in cities in the rich world to rely on charity (at least outside of the United States we don't). Our horizons are widening: we can talk around the world (worldmapper maps 331-334), the internet explodes (worldmapper maps 335 and 336). Most children are now literate (worldmapper map 195), one hundred million are at university (worldmapper map 203), and millions of people, disproportionately the young, are willing and now able to demonstrate in numbers never seen before (worldmapper map 361) and to vote (worldmapper map 360), strike (worldmapper map 358), organise (worldmapper map 357), and to understand how the world works (worldmapper map 353) and does not work (worldmapper map 356).

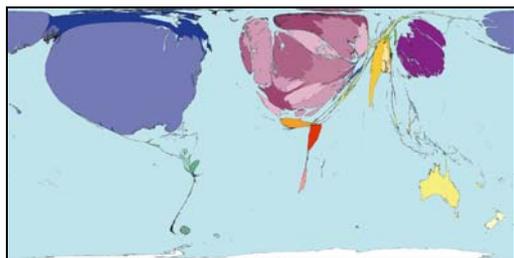


Figure 7: International Food Aid

Territory size shows the proportion of all contributions to international food aid programmes that come from governments there.

Data source: World Food Programme, 2005, Annual Report.

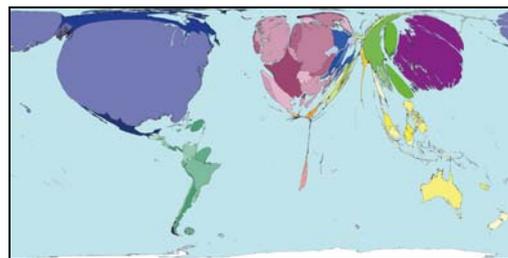


Figure 8: International Fast Food

Territory size shows the proportion of all McDonalds restaurants that were open in 2004, that were found there.

Data source: McDonalds corporation.

The global environmental disaster is here, now (worldmapper map 174). Billions are living in environmental conditions of our making that are the main detrimental impact on human health. Worldwide inequalities in health are rising and living standards are polarising. There are places where general living standards are falling (worldmapper map 176), and where absolute incomes are falling (worldmapper map 172). Most people will never fly; more do not have access to a car with every year that passes; and material production has come to be concentrated on one side of the planet (worldmapper map 38), making us reliant on a single source of fuel for bulk transport (worldmapper map 39) to the other side of the planet (worldmapper map 58). Although the product of this labour may allow near universal electricity access in China (worldmapper map 346) it cannot result in the spreading of standards of living acquired largely as a result not of labour but of earnings from mercantilism (worldmapper map 95), finance (worldmapper map 97) and royalties (worldmapper map 99), that are less than zero-sum in world aggregate (a few benefit at the expense of the majority). Simultaneously 71% of the plant species of China are threatened with extinction (worldmapper map 271) while the highest numbers of animal and plant species extinctions overall are found in the United States (worldmapper map 267): the results of past environmental disasters and those yet fully to come.

The global datasets that give us such vertiginous world views do not allow us to illustrate the detail in the *flows* of global goods and bads between territories, which result in disastrous inequities. The images shown here and on the Worldmapper website are so dramatic because inequities are so vast, and their implications so serious. In considering their implications it is worth taking into account the parallels between the worse-off places in Victorian Britain and the world today. The enclosure of land in Britain, and the appropriation of common land and rights worldwide, often preceded environmental disaster in both cases despite these being very different times (Personal communication, comments from Noel Castree at seminar given, department of geography, university of Manchester, 21 February 2007). The counter to the enclosure of land in Britain was when the large estates were reclaimed as they were “donated” to the National Trust (appropriated by an arm of government). Nationalisation of common ground continues to this day in Britain as yet more land is made accessible; more children are allowed into what were once hallowed colleges, and, at the other end of the age range, a few more normal folk made members of a House of Lords. There is, of course, no need for a House of Lords. Nevertheless, as the old Lords look out over their gardens at a few more common people tramping across their grounds they symbolise that one of the most capitalist of nations contains contemporary and positive examples of possible ways into a better future...

Returning to the concerns of Al Gore and Nicholas Stern, amongst others, there is an obvious answer to their fears. Most of us, the world population that is, live with relatively small impacts on the earth (WWF, 2006) (this is linked to a lack of 'entitlement' to resources, to enclosure and appropriation of the common land, as much if not much more than to any local environmentalism). Some of us enjoy overheated homes, mini breaks from London to the Alps, New York to LA, the luxury of eating imported meat and giving each other presents of air-freighted (or industrially greenhouse-grown) flowers. Will this small group sacrifice even a small part of its undeserved and largely unneeded privileges to tackle not just the environmental disaster that looms in the future, but also the disastrous situations of the present? Those with power have started to see the disaster as an emergency and to tell another inconvenient truth.

"... I have come to New York - to the city where the world convenes - to support the Secretary-General's call and to tell the truth: the goals the world has set are not being met and we face an emergency - a development emergency - and we need emergency action if we are to meet them. ... As the UN Secretary General said earlier this month pointedly and persuasively 'millions of lives quite literally hang in the balance'. ... The calendar says we are half way from 2000 to 2015. But the reality is that we are a million miles away from success. ... So it is time to call it what it is: a development emergency which needs emergency action. If 30,000 children died needlessly and avoidably every day in America or Britain we would call it an emergency. And an emergency is what it is. ... So when the need is pressing, when it is our generation that has made historic commitments, when the time to meet them is now short, the simple questions that - to paraphrase the words of an American president - we must ask are: If not now, when? If not us, who? If not together, how?" (Speech by Gordon Brown, at the United Nations headquarters in New York. 31 July 2007. Transcript available at: <http://www.number-10.gov.uk/output/Page12755.asp>)

The implied first step has somewhat biblical undertones: treat and respect others as you wish for your friends, your family and yourself to be treated. If we can extend a genuine caring attitude to people far beyond those we know, then this is the first step towards thinking our way out of disaster. Live in fear of others for what they might take away from you, and you limit the horizons of your imagination. Another step yet to be taken by people in positions like that of the British Prime Minister (despite his 'prudence') is to consider what affluent people might more realistically need. See others as less deserving than you, as less intelligent, as less civilized, less human, less important and you will find it very hard at all to imagine a world in which 9 billion people will be alive when our children's grandchildren ask why their ancestors did not recognise and prevent the disaster (12 Population Year 2300. Data are from: United Nations 2004 *World Population Projections*). If we fail, the answer that may be given to the far fewer than 9 billion survivors may be that we were too limited in our collective imaginations. If we believe we should only act when our actions have direct consequences upon ourselves (or just our children), then we will fail. If we ignore the environmental disaster that kills well over a million of us every month now, we will fail. If we are only just learning that other people within our countries are human too, it may be already too late. Not too late to save us from future global warming, but too late to save us from what we have already become. For instance, if many in the United States could not already see as fully human the people forced to crowd inside the Louisiana Superdome in August 2005 - their own neighbours and fellow citizens - why should we expect horizons of the imagination to widen much any time soon? The premise for the film, an inconvenient truth is a very narrow self-interest:

"What changed in the US with Hurricane Katrina was a feeling that we have entered a period of consequences" (Al Gore's words quoted on the website promoting his film, *An Inconvenient Truth*, website: <http://www.climatecrisis.net/>)

Not enough will have changed until we understand that we have been in a period of consequences for many decades, if not centuries, and until we recognise who we are within these times. The (geographical and social) small-mindedness that exists now is epitomised in the quotation below, sourced from the evangelical Christian, Tony Campolo.

"I have three things I'd like to say today. First, while you were sleeping last night, 30,000 kids died of starvation or diseases related to malnutrition. Second, most of you don't give a shit. What's worse is that you're more upset with the fact that I said shit than the fact that 30,000 kids died last night."  
Tony Campolo (2007).

Although many millions more say they care now, than did just a few years ago, the current shape of the world may be a more accurate gauge of our real current shared concerns – and lack of real concern. This can change, as it has at least locally in Britain since Victorian times and in a multitude of other loci of past human induced environmental disaster. However, the horizons of our imagination will need to be stretched far wider than before if we are to overcome our current disaster.

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