Climate change, food, poverty and the price of failure to the UK

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Introduction

As the concerned world holds its breath in the run up to the United Nations Climate Change Conference in Copenhagen in December 2009, an analysis of the trends apparent in climate change paint a bleak picture of life in Britain in 2030 and beyond if a strong and fair agreement to limit future greenhouse gas emissions is not reached.

Recent data suggest that since the latest report in 2007 by the United Nations Intergovernmental Panel for Climate Change, the world has been exceeding even the UN's 'worst case' scenario with global greenhouse gas emissions continuing to escalate rapidly.

At the Copenhagen Conference – and in the subsequent meetings that will follow – the world's richest nations must accept that as well as reducing their own greenhouse gas emissions dramatically, they will also have to provide public finance to help developing nations pursue low carbon growth and to adapt to the temperature increases to which the World is already committed.

As well as leading to increased floods and disease, failure to reach a fair and lasting agreement would further intensify the global food crisis and leave a significant part of the UK population struggling to feed their families a healthy diet. Failure will also condemn millions more in the developing world to early deaths.

The response to these threats will require rich country politicians to abandon their ideological obsession with growth at all costs. For example, as a UN sponsored study suggests, it will require a complete reversal from the policies that have forced unsustainable, carbon-heavy intensive agriculture on developing countries and allowed multinational corporations to control the food chain and grab unfair property rights on seeds.

Politicians have yet to grasp the scale of the challenge the world faces or the scale of changes required. As this report illustrates, a failure to do so will cost British people dear; especially the poorest.

About The Author

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THE £6.50 LOAF AND £18 PINT OF LAGER

Climate change, food, poverty and the price of failure

Failure by world politicians to reach agreement at the forthcoming climate change summit in Copenhagen this December could leave millions of **British citizens** struggling to feed their families a healthy diet, wide-scale flooding and sharply increased death rates by the year 2030.

This is the inescapable conclusion following publication and analysis of multiple scientific data modelling the effects of an unchecked build-up of greenhouse gasses in the Earth's atmosphere.

The world's politicians will meet in the Danish capital this December and although most governments understand the need to agree to long-term goals of reducing harmful greenhouse gas emissions, a fair and lasting agreement that leads to rapid action is far from certain. The real tussle in Copenhagen will be between the rich countries, which are responsible for climate change, and the developing nations who are demanding a fair agreement.

Since 1950, **three-quarters of all greenhouse gases** have been emitted by countries in the rich world, (e.g. the USA, Britain and continental Europe)[1]. Newly developing nations like China, India and Brazil are understandably loath to pick up the bill for mitigating the environmental damage caused by others. And the very poorest nations are not only unable

to contribute to the costs of future emissions control; they are already suffering badly from the damaging environmental results of the rich world's industrial pollution.

African nations emit very little greenhouse gases per capita and some African governments are demanding billions of dollars in compensation from the industrialised countries for the damage that climate-warming emissions have done to their climates[2]. They are even threatening to sue the rich nations for $67 billion a year in reparations[3]. Ethiopia's Prime Minister, Meles Zenawi, is to lead a delegation of 53 countries (all of Africa minus Morocco) to the climate-change summit in Copenhagen, in December, where he will lodge this demand.

And small, low-lying island states that face rising sea levels, devastating storms and floods from climate change are urging the rich polluting nations to act swiftly to save their homelands. Leaders of the Alliance of Small Island States, or AOSIS, a group of 42 island countries, have said the rest of the world must agree to agree to cut emissions to limit temperature increases well below 1.5°C (2.7°F) above pre-industrial levels. Temperatures have already risen about 0.8°C from pre-industrial times[4].

AOSIS, which include the Maldives, Tuvalu and Papua New Guinea, are some of the countries most vulnerable to flooding from rising seas as ice melts and seas expand as a result of global warming. They are also among the nations least responsible for greenhouse gas emissions.

But the rich nations are going to Copenhagen unwilling to pay fully for the damage done by their past emissions, unwilling to pay for low carbon growth in developing countries and unwilling to cut their own emissions sufficiently[5]. To reach a fair and binding treaty on future global emissions reductions, it is clear that the rich nations **must contribute public finance to the developing nations and must transfer clean-energy technologies free of charge**.

Not only have rich countries failed to cut their emissions in response to scientific warnings dating back to the 1970s, but they are now compounding this failure by suggesting that they should be able to 'offset' emissions from any future commitments.

Rich countries are trying to 'hardwire' this arrangement into any agreement by linking finance to offsetting by proposing the establishment of 'carbon markets' to deliver the finance needed by developing countries.

However, carbon offsetting markets are not scientifically credible, as scientific modeling carried out for the IPCC mandates both cuts in emissions in rich countries and reductions in growth rates in poorer countries. It does not suggest a choice between one or the other as does the proposed concept of carbon offsetting markets.

And linking funding to offsetting indicates to poorer countries that if the rich countries do succeed in cutting their own emissions then the poorer countries won't get any money after all. **In reality, the rich countries need**

to reduce their own emissions by at least 40 percent by 2020 as well as providing the public finance needed by developing countries.

Recently, the estimated annual cost of implementing global policies to reduce the world's output of greenhouse gases has been increased dramatically. The United Nations Framework Convention on Climate Change originally proposed that between £25 and £105 billion would be needed each year. But recent research by the International Institute for Environment and Development at Imperial College, London estimated it will cost more than triple that amount per annum – up to £300 billion annually[6].

Then, in September 2009, the UN produced its own revised estimate which is closer to the figures produced by the Imperial College researchers. It now suggests that it will cost between £305 billion and £366 billion every year for the next ten years to help developing nations to continue economic growth using renewable energy resources, instead of relying on dirty fuels that emit large quantities of greenhouse gases[7].

But as staggering as these annual sums are, the financial and environmental cost of doing nothing to mitigate the buildup of greenhouse gases in the Earth's atmosphere would be even higher.

The British 'Stern Report'[8] published in 2007 was graphic about the long-term consequences of a failure by world governments to reach agreement to cut emissions.

Stern argues that if the world does not reduce carbon emissions quickly, there is a 75 percent possibility of temperatures rising over the next fifty years by two to three degrees Celsius and a 50 percent chance of an increase of five degrees. In either scenario the effects on the world's ecosystem, economy and human population would be devastating

In the worst case, says economist Lord Stern, the global economy could shrink by a massive 20 percent as a direct result of the effects of climate change over the next century. Extreme weather conditions alone would reduce global GDP by one percent. And depending on by how much global temperatures rise by, GDP could be reduced by up to 10 percent.

In another influential report called 'OECD Environmental Outlook to 2030'[9] the Organisation For Economic Co-operation and Development modelled the changes the planet would suffer by the year 2030 if no binding global agreement to reduce greenhouse gas emissions is reached:

> 'By 2030, annual emissions will have increased by more than fifty percent, compared to 2000. By 2050, they will have increased by almost seventy percent.
>
> 'Together with previous emissions, the ongoing build-up of atmospheric concentrations keeps global warming going at a rate of almost 0.3°C every ten years. Biodiversity keeps deteriorating. Once plentiful land resources (for agriculture, energy crops and carbon sequestration, urban uses and transport, leisure and nature) will be squeezed.'

Even more alarming than these grim statistics is a recent warning from Britain's Met Office Hadley Centre that global temperatures may become 4°C hotter during the middle of the century if current greenhouse gas emissions trends continue. The study, which was echoed a recent U.N. report, found that climate changes were **outpacing the worst-case scenarios** forecast in 2007 by the U.N.'s Intergovernmental Panel on Climate Change (IPCC) [10].

But despite all this alarming evidence **less than half of Britons believe climate change will affect them during their lifetime** and fewer than a fifth think it will disturb their children, a government survey found as recently as October 2009.

In a YouGov poll for the Department of Energy and Climate Change, 69 percent of UK-based respondents said flooding would be the most likely consequence in Britain, but only 26 percent believed the country was already feeling the impact of climate change[11].

THE COST OF FAILURE FOR BRITAIN

Food Price Rises, Food Shortages and Food Poverty

The world has already seen the early impact of climate change on food production and food prices, which coupled with other drivers has driven prices upwards at an astronomical pace.

The World Bank points out that global food prices have risen by 75 percent since 2000, while wheat prices increased by a massive 200 percent before falling back recently. The costs of other staples such as rice and soya bean have also hit record highs, while the price of corn is expected to continue to rise far into the future[12].

These price increases result from a complex mix of drivers, including; the new demand for biofuels in the EU and US (rather than demanding radical new car fuel efficiency standards), the global growth in meat consumption, liberalisation of agriculture, declining state support for food production, rising fertiliser costs (as a result of higher oil prices), and poor harvests in countries hit by drought as a result of climate change.

As population growth raises demand for food, climate change will sap the world's capacity to produce it. Also, climate change is reducing agricultural productivity in many parts of the world especially in the developing world and coastal flooding is reducing the amount of land available for agriculture[13].

Ironically the food system used and driven by rich countries is a major contributor to climate change, producing between a third and a half of total emissions through its use of fertilisers and energy, and especially through deforestation for production of animal feeds and fuels.

On one hand our food system is causing climate change and on the other it will suffer from it. A four-year assessment of global agriculture – sponsored by the UN, World Bank, World Health Organisation and conducted in the name of 58 nation states, recognised the damage caused by industrial agriculture and last year called for a move towards more sustainable, integrated production methods[14].

Global prices will continue to rise as resource constraints intensify and the world population grows – estimated by the UN to reach over eight billion by 2030[15] – and as climate change reduces agricultural output.

A report published in the journal *Science* in January 2009 concluded that yields of staple crops like rice and corn could drop by as much as 40 percent in tropical and subtropical regions by the end of the century, based purely on the impact of increasing peak temperatures during growing seasons[16].

In India, climatologists are already proclaiming that there will be no more reliable monsoons on the sub-continent. In 2009 rainfall in India was down by 25 percent and crop yields down by between 20 percent and 40 percent[17].

And the world has never faced such a predictably massive threat to food production security as that posed by the melting mountain glaciers of Asia[18].

China and India are the world's leading producers of both wheat and rice – humanity's food staples. China's wheat harvest is nearly double that of the United States, which ranks third after India. With rice, these two countries are far and away the leading food producers, together accounting for over half of the world harvest[19].

As food shortages unfold, China is almost certain to try to hold down domestic food prices by using its massive dollar holdings to import grain, most of it from the United States, the world's leading grain exporter. Even now, China, which a decade or so ago was essentially self-sufficient in soybeans, has joined Europe in being one of the biggest importers of soybeans, importing 70 percent of its supply, and along with Europe is helping drive world soybean prices to an all-time high[20]. As irrigation water supplies shrink, Chinese consumers will be competing with Americans for the U.S. grain harvest. India, too, may try to import large quantities of grain, although it may lack the economic resources to do so, especially if grain prices keep climbing as a result of reducing output coupled with increased meat consumption by the wealthy.

Professor Anthony Costello, of the University College London Institute for Global Health, published a report in 'The Lancet' in May 2009 in which a team of multi-disciplinary researchers warned that food, water and sanitation will be under considerable pressure as climate change progresses. The report states that there is now evidence that crops are more sensitive to temperature than scientists originally thought, with estimates suggesting a rise of just 1°C can reduce yields by as much as 17 percent. The report

added that falling crop yields in the next 20 or 30 years could trigger a significant rise in food prices[21].

And the UK government's chief scientist, Professor John Beddington, has warned that by 2030 unchecked climate change and the demand for resources will create a crisis with dire consequences – 'a perfect storm', in his words. He said that **demand for food and energy will jump 50 percent by 2030** and for fresh water by 30 percent, as the global population tops eight billion. Professor Beddington added that the looming crisis of climate change and dwindling resources would match the severity of the recent crisis in the banking sector[22].

In Britain, which currently imports 42 percent of its food, a global food shortage would drive up import costs and make most domestically produced food more expensive. Some parts of the U.K. are predicted to become less able to grow crops as higher temperatures become the norm. Most climate models suggest the south-east of England will be especially vulnerable to water shortages, particularly in the summer[23].

Even global supplies of fish, which are already threatened by over-exploitation, will be severely damaged by unchecked climate change. Fish populations in the tropics could fall by as much as 40 percent over the next half century because of global warming, jeopardising a vital food source for the world, a recent study by the Sea Around Us project found[24].

For British citizens the price of staple foods is certain to rocket if climate change remains unchecked, and if other drivers are not reduced or reversed.

The World Bank has already observed that wheat prices trebled in the last ten years. Now a new report from the International Food Policy Research Institute (IFPRI) predicts that food prices could more than triple by the middle of this century as the climate changes.

The report, 'Climate Change: Impact on Agriculture and Costs of Adaptation', was developed for inclusion in two reports for the World Bank and the Asian Development Bank in October 2009. Drawing on climate models and crop models projecting changes in production, trade and consumption of the world's major crops, IFPRI predicts a much worse scenario. It forecasts wheat prices to rise 170 to 194 percent, rice prices 113 to 121 percent, and maize to go up 148 to 153 percent[25].

The report's authors point out:

> 'In developing countries, climate change will cause yield declines for the most important crops. South Asia will be particularly hard hit.
>
> 'Climate change will have varying effects on irrigated yields across regions, but irrigated yields for all crops in South Asia will experience large declines.
>
> 'Climate change will result in additional price increases for the most important agricultural crops–rice, wheat, maize, and soybeans. Higher feed prices will result in higher meat prices. As a result, climate change will reduce the growth in meat consumption slightly and cause a more substantial fall in cereals consumption.'

Applying both the World Bank's historic price observations and the new models on future food pricing developed by the International Food Policy

Research Institute, it is possible to project the following price hikes[1] for British consumers if global climate change is not mitigated and other drivers are not reduced or reversed:

	2009	2030
Thick white sliced loaf, 800 gram	**£0.72**[26]	**£6.48**[27]
Pure corn oil – 1 litre	**£1.99**	**£17.91**
Basmati rice – 1 Kgram	**£1.69**	**£15.21**
Fusilli pasta, 500 gram	**£0.78**	**£7.02**
Corn flakes, 500 gram	**£0.80**	**£7.20**
Weetabix-style cereal, 24 x 18 gram	**£1.78**	**£16.02**
Home brewed cup of tea (exc.energy)	**£0.01**	**£0.09**
Pint of Pilsner lager	**£2.05**	**£18.45**

(NB. Inflation over 20 years would normally suggest a doubling in the price of food commodities.)

The price of a cup of tea – Britain's national drink – is already increasing as drought has hit Kenya hard in the past year, as well as Sri Lanka and India, which is the world's biggest producer of tea. The price of tea on the world market has risen over 30 percent in one year, although the price in UK shops has at least temporarily been held down by retailers[28].

And evidence on the prospects for future crop yields in tea and coffee is provided by a new report from the Adaptation for Smallholders to Climate Change[29]. This study reports that there has been a drought-driven record spike in Kenyan tea prices in 2009 and steep falls in coffee harvests across the world, ranging from 28 percent in Ethiopia to 50 percent in Nicaragua,

[1] It is not possible to identify prices increases in fruit and vegetables due to a lack of research in this area.

due to ‘extreme weather’. The reports authors also suggest that climate change will render many of the areas in which tea and coffee are grown currently unsuitable for cultivation

And the prospect of the £18 pint of lager is brought closer by reports from scientists at the Czech Hydrometeorological Institute who say that the quality of Saaz hops - the delicate variety used to make pilsner lager - has been decreasing in recent years. They say the culprit is climate change in the form of increased air temperature[30].

If such dramatic food price rises as these were forced on UK citizens by the world’s export markets millions more could face food poverty. Food poverty today is not the poverty faced by the Victorians where large swathes of the population were unable to eat. Instead it is connected to both the availability of healthy food and the ability to buy it. But price does matter. Researchers have shown that five percent of adults cannot afford fresh fruit daily and one in twenty mothers goes without food to meet the needs of their children.

The poorest in society have the least ability to respond to soaring food prices as they already spend a greater proportion of their income of food than higher income groups and they will also suffer disproportionately from much higher fuel bills.

In 2000 the Joseph Rowntree Foundation said four million people lived in food poverty[2] and, as a result, are far more likely to suffer from diet-related diseases such as cancer, diabetes, obesity and coronary heart disease[31]. With food price growth increasing many times faster than in the past it is likely that many millions more will face food poverty unless wages and benefits for the poorest in society are increased at a similar rate.

Even More Flooding

What happens if your home is flooded repeatedly? Insurance premiums go through the roof and eventually your property becomes uninsurable.

The Royal Institution of Chartered Surveyors warns that if you can't get insurance for your house, you're in serious trouble. Mortgage lenders won't lend on houses that are uninsurable and as a result affected properties could fall in value by up to 80 percent[32].

This is the prospect that could face 800,000 home owners by 2035 according to a recent report from the UK Climate Impact Programme (UKCIP)[33].

UKCIP says that the estimated number of homes at risk of flooding in Britain is likely to be about 800,000 within 25 years because of rising sea and river levels.

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[22] In the UK, the poorer people are, the worse their diet, and the more diet-related diseases they suffer from. This is **food poverty**. Poor diet is a risk factor for the UK's major killers of cancer, coronary heart disease and diabetes. Yet it is only in the past few years that the immense contribution it makes to poor health has been quantified: poor diet is related to 30 percent of life years lost in early death and disability.

The average value of a house today is around £224,000. Wiping 80 percent of the value from 800,000 homes (at today's prices) suggest a loss of around £143 billion as a result of rising sea levels caused by climate change.

But what happens if your own house is located in a region vulnerable to flooding over the next 25 years? The Environment Agency provides a web site that allows citizens to assess their current risk[34] and future risk is assessed on an interactive map prepared by Britain's Meteorological Office[35].

In a recent essay Laurence C. Smith, professor of earth and space sciences at the University of California, Los Angeles explains why global warming is **guaranteed to create more storms and flooding** over the next few decades:

> 'Water vapor in the air will also increase, in obedience to the Clausius-Clapeyron equation, which states that the water-holding capacity of the atmosphere must go up 7 percent for every 1°C rise. Because water vapor fuels weather systems, the frequency of extreme precipitation events — and therefore floods — will go up right along with it[36].'

Today five million people in Britain live in properties that are liable to flooding from the rivers, the sea or from extreme rainfall and flash flooding. By 2030 the UK Climate Impact Programme suggests **this number will be ten million**. As always, the impact of flooding will be most serious for the poorest people – as evidenced by those still remaining homeless after the devastating floods in Hull[37] in the UK and in New Orleans[38] in the USA.

Disease And Mortality Rates

Climate change can kill you. A recent report, 'The Human Impact of Climate Change' published by the Global Humanitarian Forum concludes that climate change already kills an estimated 300,000 people per year, equivalent to the number of deaths caused by the 2004 Indian Ocean tsunami. Over 90 percent of these deaths are in the developing world[39].

But it would be a mistake to think that the impact of climate change on human health is limited only to the poorest parts of the world. In the report 'Making Climate Change Part Of Global Health' a team led by Professor Anthony Costello (see above) took as a starting point the Intergovernmental Panel on Climate Change (IPCC) projections that go from an optimistic average rise in global temperature of 2°C to a catastrophic 6°C rise and considered a number of different ways that this could affect health[40].

They concluded that tropical and endemic diseases such as malaria and dengue fever would spread far more widely, with major impact on patterns of disease and death rates around the world. They pointed out that in 2003, the heatwave in Europe killed 70,000 more people a year than usual, which shows how vulnerable human beings are to heat extremes of the sort expected to become far more common by 2030[41].

And the UK Climate Impact Programme report also adds that average summer temperatures in the south of England will rise by 2°C by 2040 and

up to 6.4°C by 2080, increasing the risk of skin cancers and insect-borne diseases in Britain[42].

The World Health Organisation is unequivocal about the risks to human health and well-being posed by un-arrested climate change:

> 'The health effects of a rapidly changing climate are likely to be overwhelmingly negative, particularly in the poorest communities, which have contributed least to greenhouse gas emissions. Some of the health effects include:
>
> - Increasing frequencies of heatwaves: recent analyses show that human-induced climate change significantly increased the likelihood of the European summer heatwave of 2003.
> - More variable precipitation patterns are likely to compromise the supply of freshwater, increasing risks of water-borne disease.
> - Rising temperatures and variable precipitation are likely to decrease the production of staple foods in many of the poorest regions, increasing risks of malnutrition.
> - Rising sea levels increase the risk of coastal flooding, and may necessitate population displacement. More than half of the world's population now lives within 60km of the sea. Some of the most vulnerable regions are the Nile delta in Egypt, the Ganges-Brahmaputra delta in Bangladesh, and many small islands, such as the Maldives, the Marshall Islands and Tuvalu.
> - Changes in climate are likely to lengthen the transmission seasons of important vector-borne diseases, and to alter their geographic range, potentially bringing them to regions which lack either population immunity or a strong public health infrastructure[43].'

At home, Britain's Department of Health (DOH) in 2008 identified three problems resulting from unchecked climate change: increased rainfall (over short periods) leading to increased numbers of bacteria in surface water; increased water temperature leading to an increase in algal blooms in reservoirs; and a decrease in the efficiency of chemical coagulation: a major method of removal of microbes from drinking water

Climate change could lead to a heatwave in the south-east of England killing 3,000 people within the next decade, says the DOH report. It put the chances of a heatwave of that severity happening by 2017 at 25 percent.

Without preventative action, the report adds that a nine-day heatwave, with temperatures averaging at least 27 degrees over 24 hours, would cause **3,000 immediate deaths**, with another 3,350 people dying from heat-related conditions during the summer.

The climate in the UK will continue to change as greenhouse gases build up in the atmosphere. Though concentrations of a number of important pollutants are likely to decline over the next half-century, the concentration of ozone is likely to increase. This will increase attributable deaths and hospital admissions. The increases are likely to be significant: with the least constraining assumptions up to about **1,500 extra deaths and hospital admissions** per annum might be expected.[44].

And looking further into the future the Department of Health 2008 report added that beyond 2030 heatwaves such as that of 2003 can be expected much more frequently, becoming increasingly more severe in intensity and duration after 2060.

In Conclusion

Almost all the politicians meeting in Copenhagen understand that climate change is a serious issue that requires serious attention. But the lack of progress in the negotiations so far must suggest that they either unaware of

the severity and urgency or they are unable to contemplate the scale of change needed.

The World responded to the global banking crisis with unprecedented spending. Rich countries now need to make large-scale changes to prevent millions of deaths in the developing world and avoid much higher levels of food poverty, flooding and disease in the UK and elsewhere.

The response has to involve unprecedented spending on mitigation and adaptation in both rich and developing countries, funded by the rich countries that have caused climate change.

In terms of food, it is possible to feed the world if temperatures do not increase too much. But it will require a sustainable global food system and it will require a fairer distribution of food rather than today's food network that leaves over a billion of poor subsistence farmers hungry and half a billion people in the rich world obese. Most importantly it requires decarbonising an agricultural and food system that is responsible for a third to a half of all greenhouse gas emissions.

In the UK food poverty will increase significantly unless global emissions are curtailed fast and the other drivers of increasing food prices are tackled.

Even if this is achieved there is still a need to reduce food poverty in the UK. This requires a number of policies including better access to nutritious food for those currently living in 'food deserts' and income growth for the poorest in society that at least match food price increases.

Ends

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