

CLIMATE CHANGE



– 10 –

CLIMATE CHANGE



CO₂



INTRODUCTION

Climate chaos is already upon us, with a lot worse to come. Livestock production is a large and growing source of greenhouse gases, and is the greatest source of short-term emissions.

Slashing short-term emissions give us the circuit-breaker desperately needed to stem global warming – this is clearly demonstrated by studies that look at the warming impact of sector emissions over the next two decades, showing livestock to be the source of half of global emissions.

Slashing livestock numbers and returning grazing lands to native vegetation provides a short term fix and importantly, longer term carbon sequestration, the re-absorption of carbon from the atmosphere. This solution is by far the lowest cost option.

PRESIDENT BARACK OBAMA

“No single event makes a trend. But the fact is, the 12 hottest years on record have all come in the last 15. Heat waves, droughts, wildfires and floods, all are now more frequent and more intense”
-- President Barack Obama



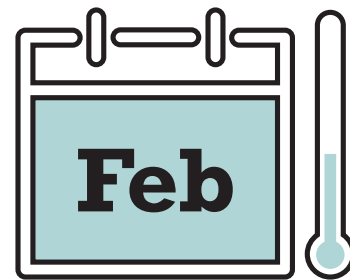
Livescience, 2013



2015 HOTTEST ON RECORD, 1°C OVER PRE-INDUSTRIAL LEVELS

“Global temperatures are set to rise more than one degree above pre-industrial levels according to the UK’s Met Office. Figures from January to September this year are already 1.02°C above the average between 1850 and 1900. If temperatures remain as predicted, 2015 will be the first year to breach this key threshold. The world would then be half way towards 2°C, the gateway to dangerous warming”

BBC, 2015

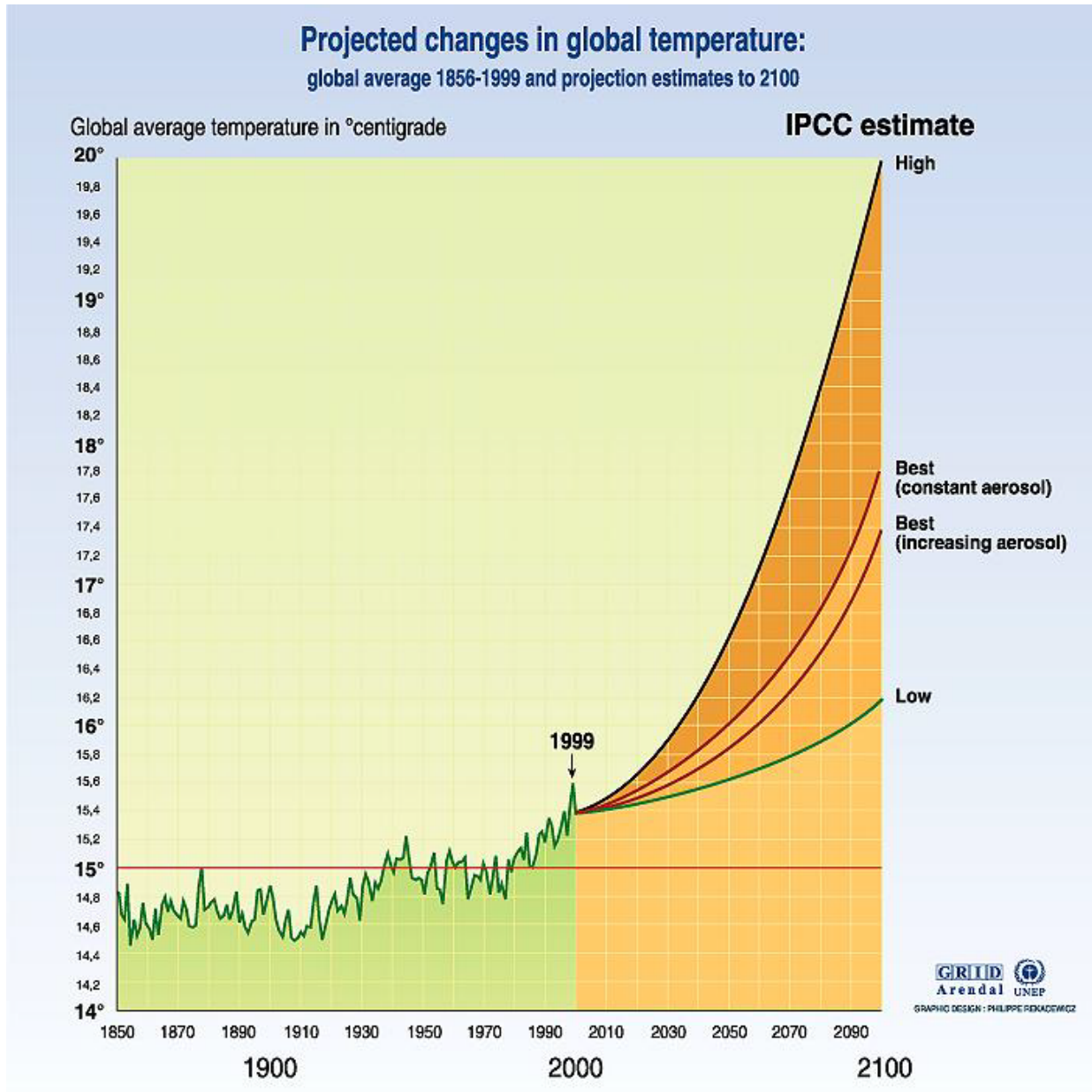


FEBRUARY 2016 SMASHES GLOBAL TEMPERATURE RECORDS

“February smashed a century of global temperature records by a “stunning” margin, according to data released by NASA. The unprecedented leap led scientists, usually wary of highlighting a single month’s temperature, to label the new record a “shocker” and warn of a “climate emergency”. The NASA data shows the average global surface temperature in February was 1.35°C warmer than the average temperature for the month between 1951-1980, a far bigger margin than ever seen before. The previous record, set just one month earlier in January, was 1.15°C above the long-term average for that month”

The Guardian, 2016

PROJECTED CHANGES IN GLOBAL TEMPERATURE



Source : Temperatures 1856 - 1899: Climatic Research Unit, University at East Anglia, Norwich UK. Projections: IPCC report 95.

GRID Arendal / United Nations Environment Programme

– 10 –

Climate Change

PROBLEM

**Climate Change is
Threatening Society**

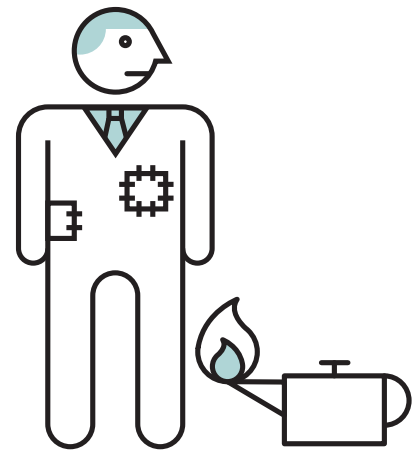


CO₂



“UNLESS THE WORLD TAKES BOLD ACTION NOW, A DISASTROUSLY WARMING PLANET THREATENS TO PUT PROSPERITY OUT OF REACH OF MILLIONS AND ROLL BACK DECADES OF DEVELOPMENT”

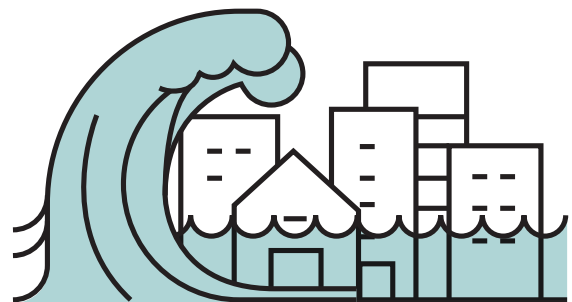
World Bank, 2013



CLIMATE CHANGE IS A THREAT TO NATIONAL SECURITY – THE PENTAGON

“The Pentagon declared climate change an immediate risk to national security and outlining how it intends to protect bases, prepare for humanitarian disasters and plan for global conflicts. Defence Secretary Chuck Hagel unveiled the plan at the Conference of Defence Ministers of the Americas in Peru, where he said defence leaders “must be part of this global discussion” on climate change. Militaries, he added, “must be clear-eyed about the security threats presented by climate change, and we must be pro-active in addressing them”

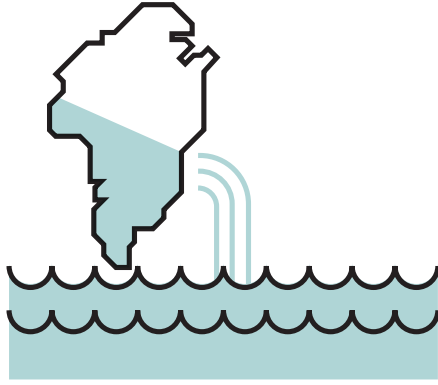
World Bank, 2013



CLIMATE CHANGE IS CHANGING THE WORLD

“Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level”

Intergovernmental Panel on Climate Change, 2007



GREENLAND HAS LOST 9 TRILLION TONS OF ICE SINCE 1900, AND THE RATE OF LOSS HAS DOUBLED BETWEEN 2003 AND 2010

“A massive new study has calculated just how much ice the Greenland ice sheet has lost since the year 1900. The number is [an] astounding: 9,103 gigatons (a gigaton is a billion metric tons). That’s over 9 trillion tons in total. And moreover, the rate of loss has been increasing, with a doubling of annual loss in the period 2003 to 2010 compared with what it was throughout the 20th century”

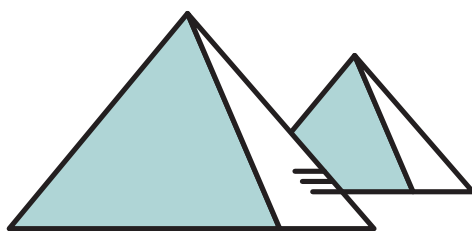
Washington Post, 2015



ALASKA LOSES 75 BILLION TONS OF ICE A YEAR

“Scientists with the University of Alaska at Fairbanks and several other institutions report a staggering finding: Glaciers of the United States’ largest, and only Arctic, state, Alaska, have lost 75 gigatons (a gigaton is a billion metric tons) of ice per year from 1994 through 2013”

Washington Post, 2015



THE GREAT PYRAMID IN GIZA WEIGHS 5.9 MILLION TONNES

“The mass of the [great Egyptian] pyramid is estimated at 5.9 million tonnes”

Wikipedia



Therefore the scale of Greenland’s ice loss is equal in weight to 1,525,423 great pyramids of Giza

– 10 –

Climate Change

CAUSE



CO₂



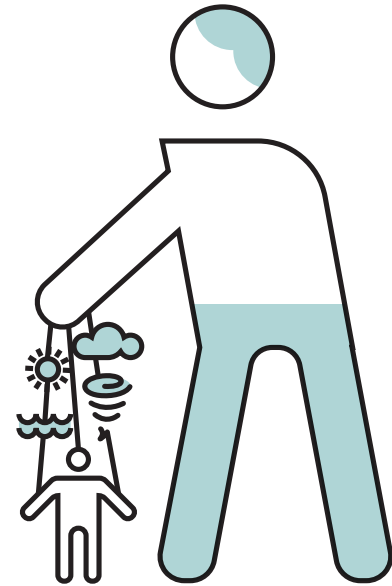
HUMANS CAUSING EXTREME CLIMATE CHANGE

“We know without any doubt that our climate is changing and our weather is becoming more extreme due to human activities”

--Secretary-General Michel Jarraud

United Nations

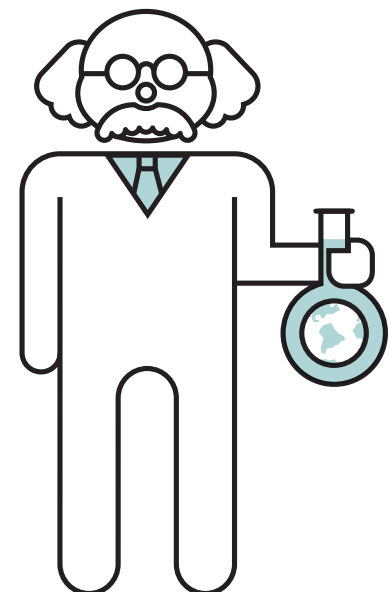
World Meteorological Organization, 2014



97% OF SCIENTISTS SAY HUMANS CAUSE CLIMATE CHANGE

“97% of climate scientists agree that climate-warming trends over the past century are very likely due to human activities, and most of the leading scientific organizations worldwide have issued public statements endorsing this position”

NASA, 2013



– 10 –

Climate Change

PROBLEM

Atmospheric
Greenhouse Gases



CO₂



ATMOSPHERIC GHG CONCENTRATIONS BREAKING RECORDS

“The amount of greenhouse gases in the atmosphere reached a new record high in 2013, propelled by a surge in levels of carbon dioxide”

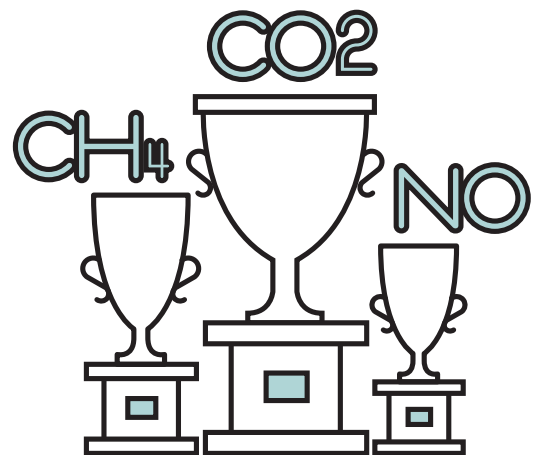
United Nations World Meteorological Organization, 2014



CO2 NOW 142%, METHANE 253%, AND NITROUS OXIDE 121% OF PRE INDUSTRIAL LEVELS

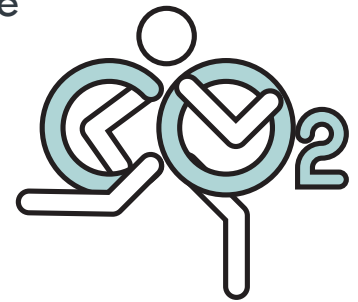
“In 2013, concentration of CO2 in the atmosphere was 142% of the pre-industrial era (1750), and of methane and nitrous oxide 253% and 121% respectively”

United Nations World Meteorological Organization, 2014



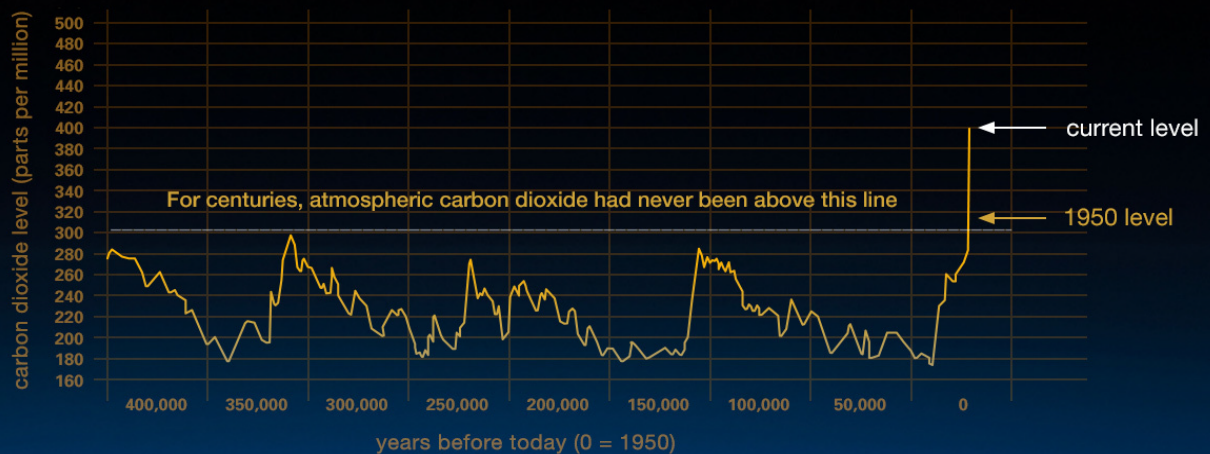
ATMOSPHERIC CO₂ INCREASE FASTEST IN 30 YEARS

“Far from falling, the concentration of carbon dioxide in the atmosphere actually increased last year (2013) at the fastest rate for nearly 30 years. We must reverse this trend by cutting emissions of CO₂ and other greenhouse gases across the board. We are running out of time” -- Secretary-General Michel Jarraud



United Nations World Meteorological Organization, 2014

“Climate Change: How Do We Know? For 650,000 years atmospheric carbon dioxide has never been above this line, this graph, based on the comparison of atmospheric samples contained in ice cores and more recent direct measurements, provides evidence that atmospheric CO₂ has increased since the Industrial Revolution”



NASA, 2001

– 10 –

Climate Change

CAUSE



CO₂

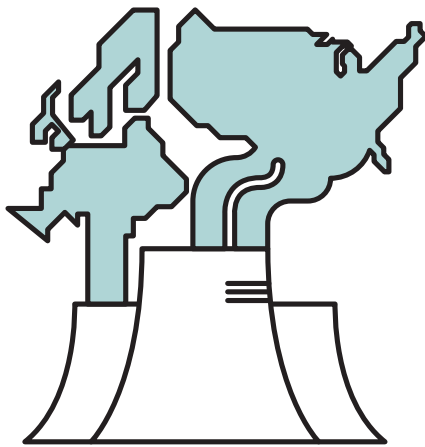




AGRICULTURE GHG BREAKDOWN; 9% CO₂, 40% METHANE, 50% NITROUS OXIDE

“Globally, about 9% of emissions in the entire agricultural sector consist of CO₂, 35% to 45% of methane and 45% to 55% of nitrous oxide”

UN Environment Programme, 2012



SINCE 1950 DEVELOPED NATIONS HAVE CREATED 72% OF CO₂ EMISSIONS

“Environmentally, developed nations account for about 72% of total carbon dioxide emissions that accumulated in the atmosphere between 1950 and 2000. Thus, to the extent cumulative CO₂ may be contributing to global warming, developed nations bear the preponderant responsibility”

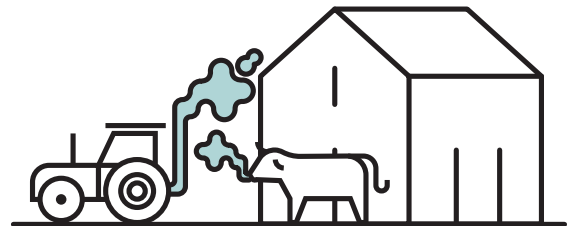
Federation of American Scientists, 2008



DEVELOPED NATIONS CREATE THE MOST GREENHOUSE GAS EMISSIONS

“A few countries account for most greenhouse gas emissions: in 2000, the United States led by emitting 19% of the world total, followed by China with 14%; no other country reached 6%; the top seven emitters accounted for 52% of the 185 nations’ emissions”

Federation of American Scientists, 2008



AGRICULTURAL CO₂ DERIVES FROM ENERGY USAGE, ANIMAL RESPIRATION, DEFORESTATION, AND GRASSLAND CONVERSION

“CO₂ is also produced on farms from fossil fuels and energy usage and, as some authors highlight, by the exhalation of animals, which is generally not taken into account. Additionally, deforestation and conversion of grassland into agricultural land releases considerable quantities of CO₂ and N₂O [nitrogen oxide] into the atmosphere, as the soil decomposes carbon rich humus. In Europe (the EU-27), for example, enteric fermentation was the main source (36%) of GHG emissions in the livestock sector, followed by N₂O soil emissions (28%)”

UN Environment Programme, 2012

– 10 –

Climate Change

TIMELINE

**Agricultural Productivity
Threatened**

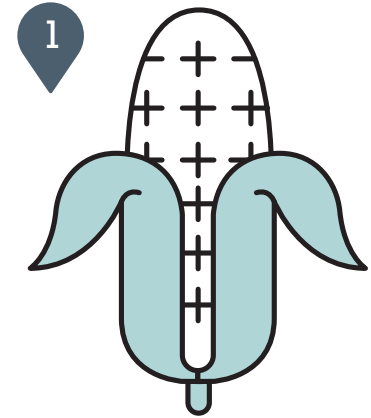


CO₂

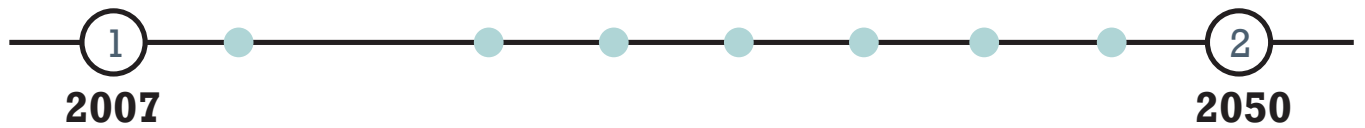


CEREAL CROP YIELDS TO DECREASE 10% TO 15% WITH 1°C TO 2°C WARMING

“On average, in cereal-cropping systems, adaptations such as changing varieties and planting times enable avoidance of a 10% to 15% reduction in yield, corresponding to 1°C to 2°C local temperature increases.”

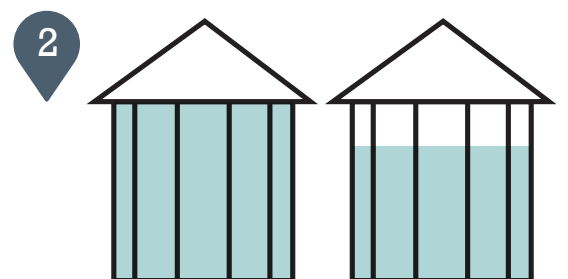


IPCC, 2007

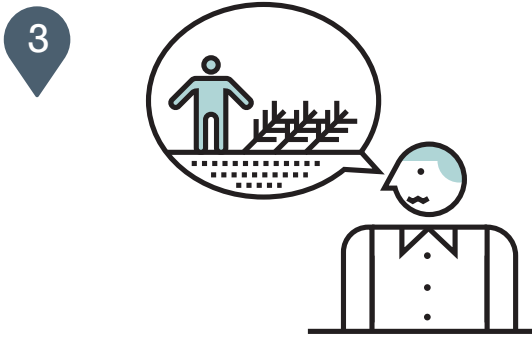


GLOBAL CROP YIELDS TO FALL 25% FROM 2050

“[Increasing global temperatures will be an increasingly negative impact of climate change on crop yields from the 2030s onwards. The impact will be greatest in the second half of the century, when decreases of over 25% will become increasingly common”

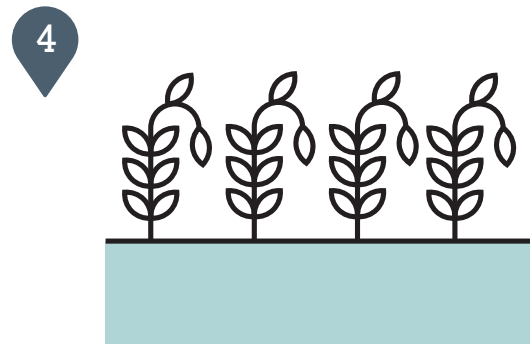


Leeds University, 2014



**“WE MUST AVOID
A 4°C WARMER WORLD.
THE FUTURE OF OUR
CHILDREN DEPENDS ON US
TAKING ACTION”**

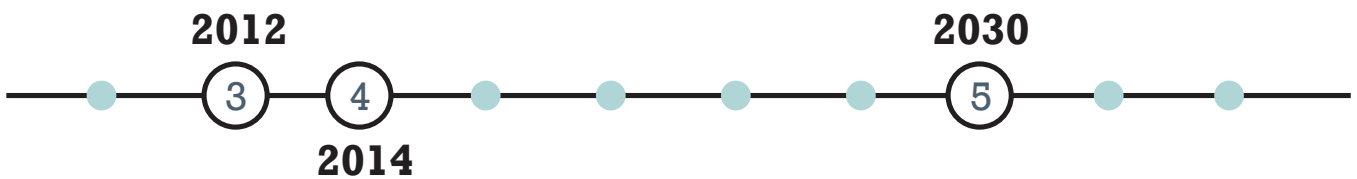
World Bank, 2012



**WARMING OVER 4°C
WOULD DECIMATE
AGRICULTURE**

“If the warming were to go beyond 6°F to 7°F (4°C) we would see extensive changes in agriculture”

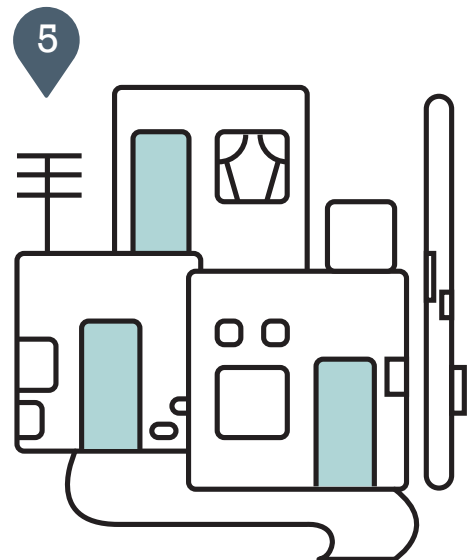
National Geographic, 2014



100 MILLION FACE EXTREME POVERTY BY 2030

“Climate change could force more than 100 million people into extreme poverty by 2030”

Worldbank, 2015



– 10 –

Climate Change

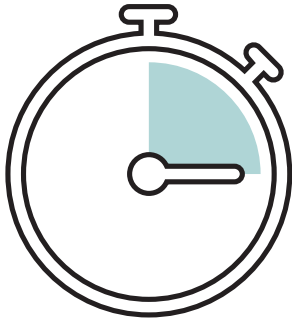
PROBLEM

**Extreme Weather Caused
by Climate Change**



CO₂

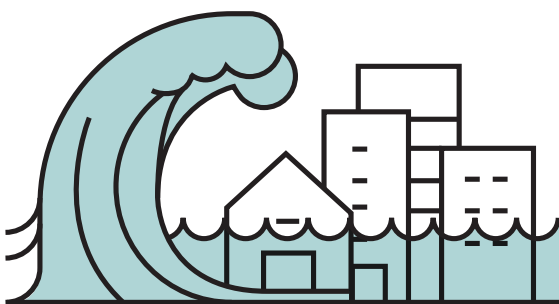




THE WORLD HAS ONLY A FEW YEARS TO STOP CATASTROPHIC WARMING

“The world is not ready for the impacts of climate change, including more extreme weather and the likelihood that populated parts of the planet could be rendered uninhabitable, says the planet’s leading body of climate scientists in a major new UN report. The 772 scientists who wrote and edited the report argue that world leaders have only a few years left to reduce carbon emissions enough to avoid catastrophic warming, which would produce significant sea level rise and large-scale shifts in temperatures that would dramatically disrupt human life and natural ecosystems”

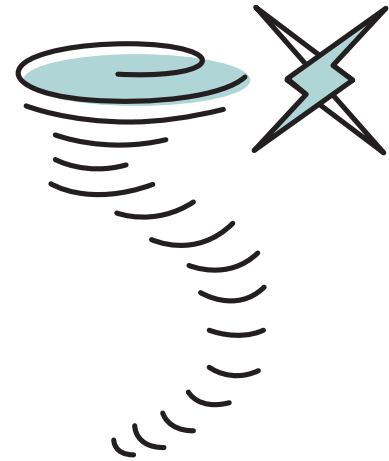
National Geographic, 2014



DISASTERS INCREASE FIVE FOLD SINCE 1970’S

“Disasters including storms, floods and heat-waves have increased fivefold since the 1970’s, United Nations finds”

The Guardian, 2014



GLOBAL WARMING HAS DISPLACED 26 MILLION & COSTS \$125 BILLION ANNUALLY

“Earth’s gradual rise in temperature has resulted in 26 million people displaced, \$125 billion in annual economic losses and more than 300,000 yearly deaths, as climate change speeds desertification and magnifies scourges from malnutrition to flooding”

Time Magazine, 2009



EVERY 1°C RISE = 20X MORE GLOBAL CONFLICTS

“Every one-degree rise in temperature means a 20-fold increase in global conflicts”

United Nations, 2013

– 10 –

Climate Change

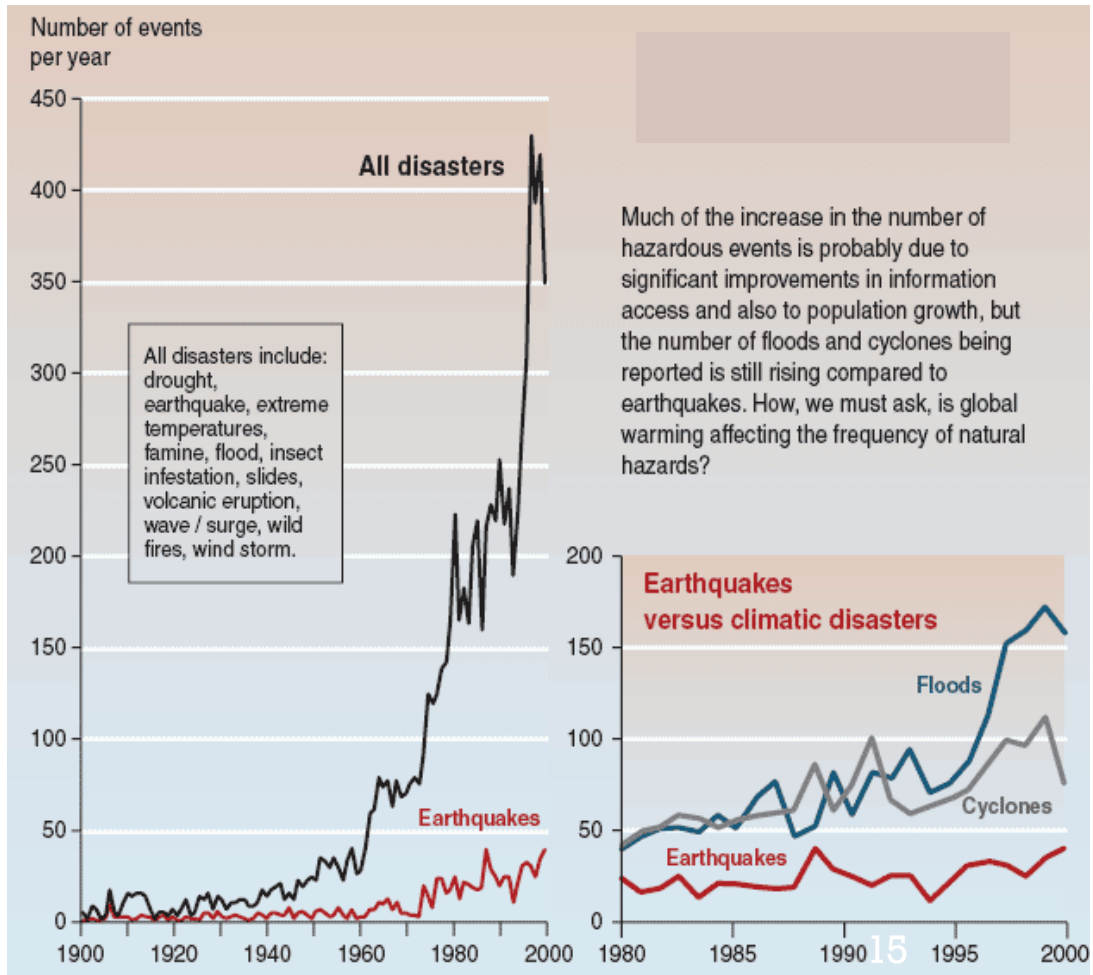
CAUSE



CO₂



“TRENDS IN THE NUMBER OF REPORTED HAZARDOUS EVENTS”



GRID Arendal / United Nations
Environment Programme

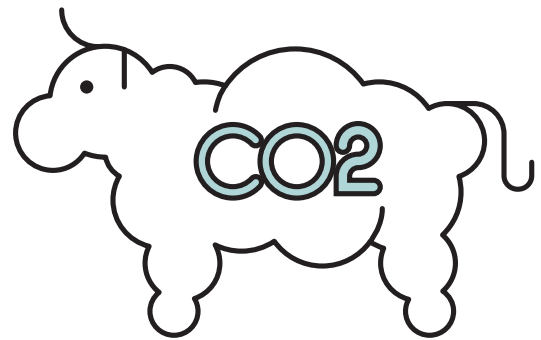
"We can no longer hold back from speaking out on the silent suffering of millions worldwide"
— Kofi Annan, UN Secretary-General



Time Magazine, 2009

IGNORING METHANE AND NITROUS OXIDE, LIVESTOCK EMIT 7.1GT CO₂ A YEAR (WARMING IMPACT OVER 100 YEARS)

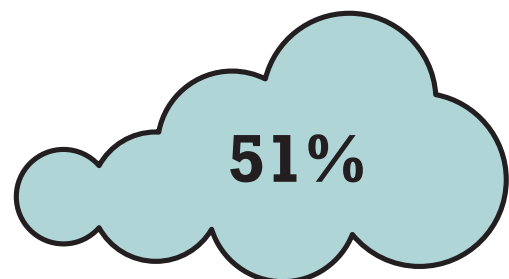
“Food systems emit 30% of all human greenhouse emissions... Livestock is responsible for 7.1 GtCO₂ estimate a year of greenhouse gas emissions, just under 15% of the global total, and equivalent to tailpipe emissions from all the world’s vehicles”



*Chatham House,
The Royal Institute Of International Affairs, 2016*

LIVESTOCK CREATE 51% OF GHG EMISSIONS WARMING IMPACT OVER 20 YEARS

“Livestock and their by-products actually account for at least 32.6 billion tons of carbon dioxide per year, or 51% of annual worldwide GHG emission”



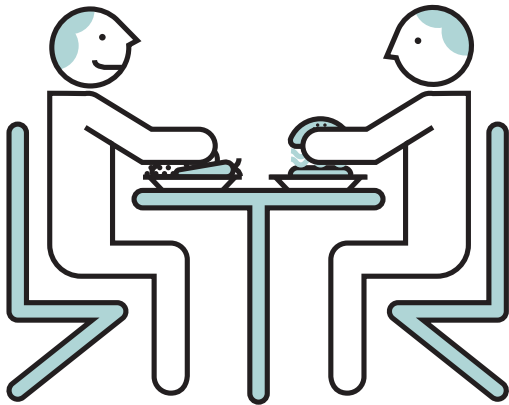
Worldwatch Institute, 2009



LIVESTOCK CAUSE 50% OF GHG EMISSIONS IN AUSTRALIA

“Beyond Zero Emissions in Australia found that livestock produced almost half the national emissions when accounted over 20 years”

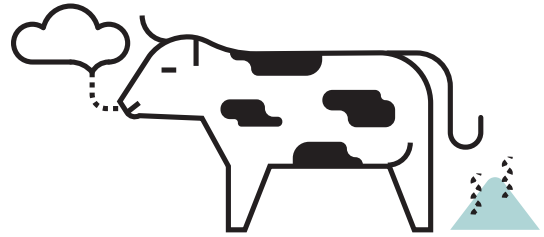
The International Journal of Climate Change: Impacts and Responses, 2015



MEAT EATERS CREATE 100% MORE GHG EMISSIONS THAN VEGANS

“Dietary GHG emissions in meat-eaters are approximately twice as high as those in vegans”

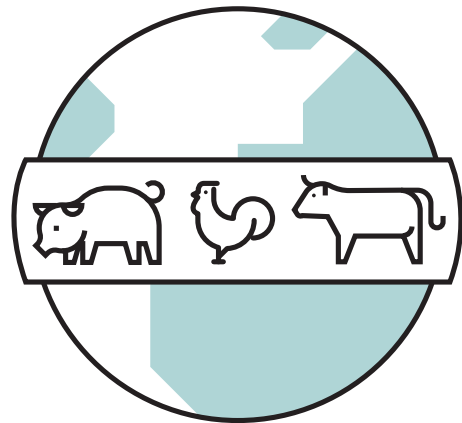
Springer Link, 2014



LIVESTOCK CAUSE 65% OF NITROUS DIOXIDE EMISSIONS

“Livestock is responsible for 65% of all emissions of nitrous oxide, a greenhouse gas 296x more destructive than carbon dioxide and which stays in the atmosphere for 150 years”

Food and Agriculture Organization of the United Nations, 2006



LIVESTOCK OCCUPY 30% OF EARTH'S SURFACE

“Livestock presently use 30% of the earth's entire land surface”

Food and Agriculture Organization of the United Nations, 2006

– 10 –

Climate Change

TIMELINE



CO₂



1

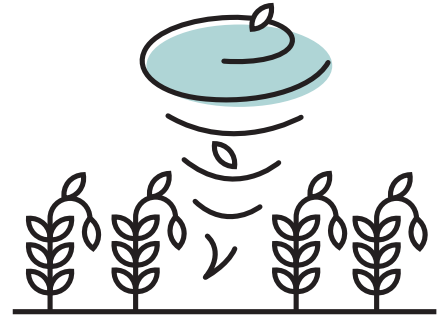


BY 2029 CLIMATE CHANGE WILL AFFECT 1 IN 10

“Within the next 20 years, 1 in 10 of the world’s present population could be directly and seriously affected by climate change”

Time Magazine, 2009

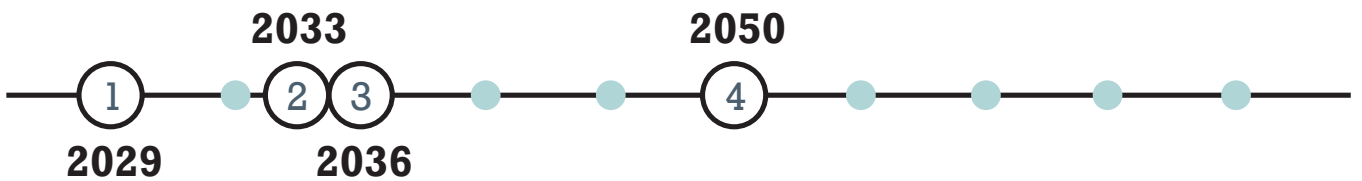
2



BY 2033 WIDESPREAD FOOD SHORTAGES, UNPRECEDENTED HEAT WAVES AND CYCLONES, WILL BE COMMONPLACE

“If the world warms by 2°C, warming, which may be reached in 20 to 30 years, will cause widespread food shortages, unprecedented heat waves, and more intense cyclones”

World Bank, 2013



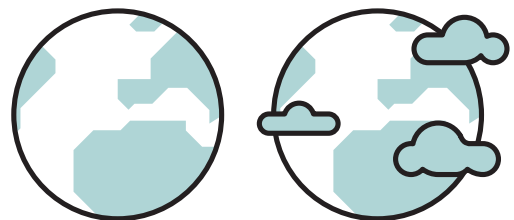
3



“THE WORLD WILL CROSS A THRESHOLD INTO ENVIRONMENTAL RUIN BY 2036”

Scientific American, 2014

4



BY 2050 GHG EMISSIONS WILL INCREASE BY 80%

“By 2050 global agricultural greenhouse gas emissions are projected to increase by 80%”

Nature Journal, 2014

DROUGHTS TO AFFECT 25% OF THE WORLD'S CEREAL REGIONS BY 2050

“Climate change will increasingly take effect by 2050 and may cause large portions of the Himalayan glaciers to melt, disturb monsoon patterns, and result in increased floods and seasonal drought on irrigated croplands in Asia, which accounts for 25% of the world cereal production”

GRID Arendal / United Nations Environment Programme, 2009

5



2050

5,6,7

6

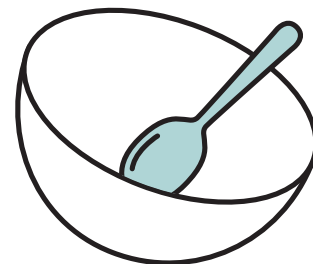


150 MILLION CLIMATE REFUGEES BY 2050

“Global warming could create 150 million climate refugees by 2050”

Institute for Environmental Management and Assessment, 2009

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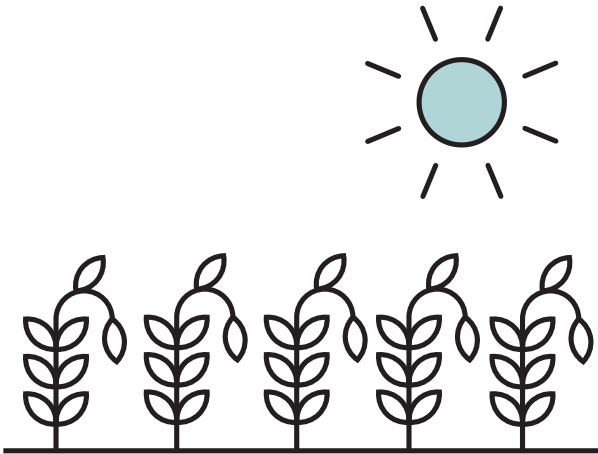


UNDERNOURISHED TO INCREASE BY 25% TO 90% BY 2050

“With warming of 1.2°C to 1.9°C by 2050, the proportion of the population undernourished is projected to increase by 25% to 90%”

World Bank, 2013

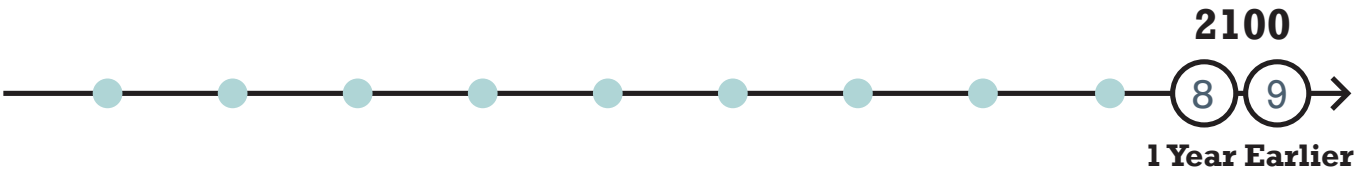
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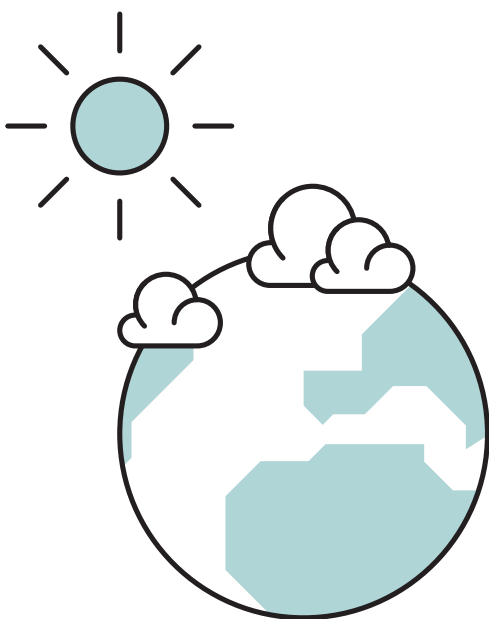
66% CHANCE OF 4.2°C TO 6.5°C WARMING BY 2100

“There is a 66% likelihood that emissions will lead to a warming of 4.2°C to 6.5°C, and a remaining 33% chance that warming would be either lower than 4.2°C or higher than 6.5°C by 2100”

World Bank, 2013



9



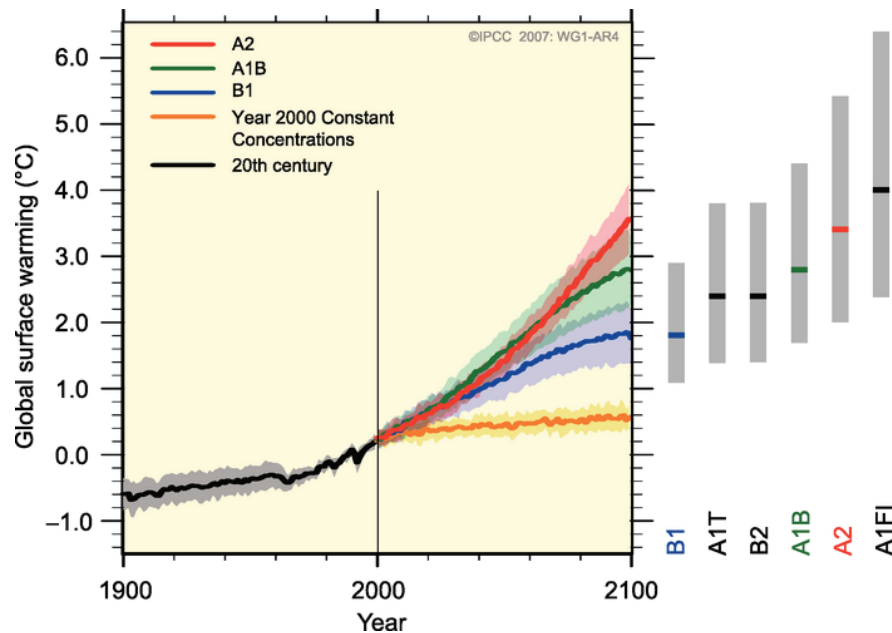
WE ARE ON COURSE FOR 3.5°C TO 4°C WARMING BY 2100

“The current United Nations Framework Convention on Climate Change emission pledges and commitments would most likely result in 3.5°C to 4°C warming by the end of this century”

World Bank, 2012

MULTI-MODEL AVERAGES AND ASSESSED RANGES FOR SURFACE WARMING

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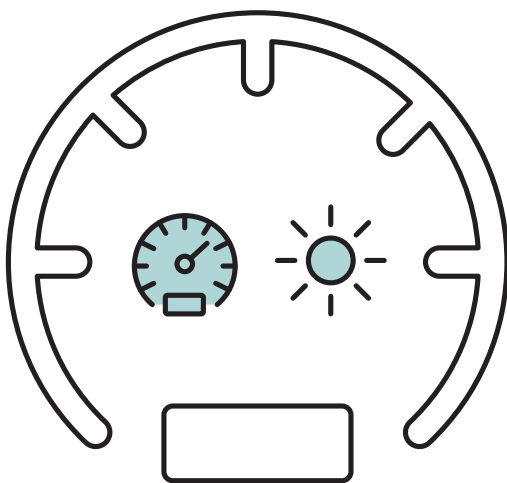
Intergovernmental Panel on Climate Change, 2007

2100

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11

WARMING IS AN UNPRECEDENTED 20X FASTER



“Models predict that Earth will warm between 2°C and 6°C in the next century. When global warming has happened at various times in the past two million years, it has taken the planet about 5,000 years to warm 5°C. The predicted rate of warming for the next century is at least 20 times faster. This rate of change is extremely unusual”

NASA, 2012

– 10 –

Climate Change

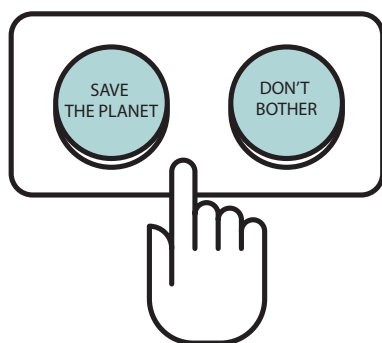
SOLUTION

Change in Diet



CO₂

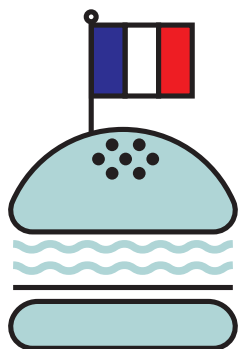




KEEP WARMING BELOW 2°C TO SAVE THE PLANET

“We have the knowledge and we have the tools for action to try to keep temperature increases within 2°C to give our planet a chance and to give our children and grandchildren a future. Pleading ignorance can no longer be an excuse for not acting”
 -- Secretary-General Michel Jarraud

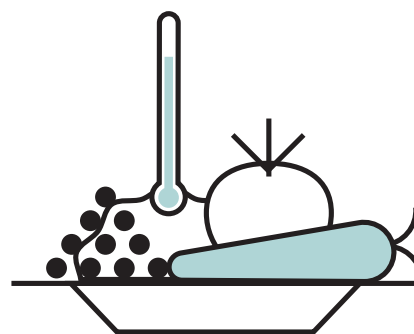
United Nations World Meteorological Organization, 2014



REDUCING MEAT CONSUMPTION FIRMLY OFF THE TABLE AT PARIS CLIMATE CONFERENCE

“As of 21 October, commitments to reducing emissions from the livestock sector appear in only 21 of the 120 national plans submitted in advance of the Paris climate conference. Reducing meat consumption appears in none”

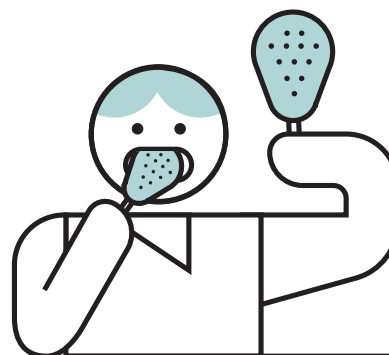
BBC, 2015



HEALTHY DIET NEEDED TO MEET 2°C TARGET

“Global adoption of a healthy diet would see a yearly emissions saving of 6 GtCO₂e in 2050, almost all of which would result from reduced consumption of meat and dairy produce. As a consequence, the predicted emissions gap between proposed mitigation measures and the two-degree scenario could be reduced by a quarter”

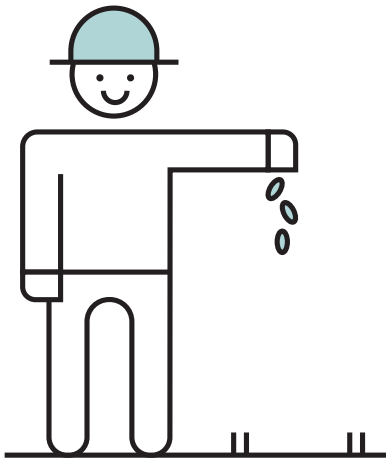
National Geographic, 2015



OVER-CONSUMPTION OF MEAT WILL STOP ANY CHANCE OF PREVENTING 2°C WARMING

“Without concerted action to address over-consumption of meat, it will be near impossible to prevent global warming from passing the danger level of 2°C”

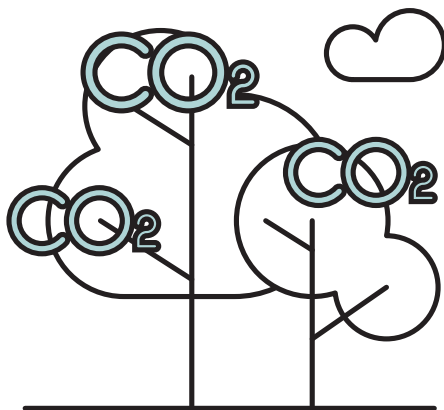
BBC, 2015



REPLANT FORESTS TO ABSORB CARBON

“A global food transition to less meat, or even a complete switch to plant-based protein food would have a dramatic effect on land use. Up to 2,700 mega hectares of pasture and 100 mega hectares of cropland could be abandoned, resulting in a large carbon uptake from re-growing vegetation”

Netherlands Environmental Assessment Agency, 2009



CONVERTING GRAZING LAND INTO FOREST IS THE CHEAPEST CO2 MITIGATION OPTION

“A global transition to a low meat-diet as recommended for health reasons would reduce the mitigation costs to achieve a 450 ppm CO₂-eq. stabilisation target by about 50% in 2050”

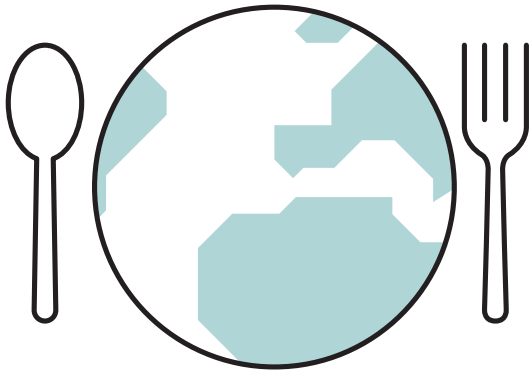
Netherlands Environmental Assessment Agency, 2009



TREES VERSUS GEO-ENGINEERING

“Growing trees is less expensive and risky than carbon capture and storage or geo-engineering”

Netherlands Environmental Assessment Agency, 2009



REDUCE WARMING IMPACTS WITH PLANT BASED DIET

“A substantial reduction in climate change impacts would only be possible with a substantial worldwide diet change, away from animal products”

United nations Environment Programme, 2010



DROPPING GLOBAL DEMAND FOR MEAT AND DAIRY IS CENTRAL TO ACHIEVING CLIMATE GOALS, PREVENTING 2°C WARMING IS HIGHLY UNLIKELY WITHOUT THIS

“Shifting global demand for meat and dairy produce is central to achieving climate goals... Recent analyses have shown that it is unlikely global temperature rises can be kept below two degrees Celsius without a shift in global meat and dairy consumption”

Chatham House, The Royal Institute Of International Affairs, 2014



REDUCING MEAT BY 20% IS EQUAL TO CHANGING YOUR CAR

“The geophysicists Gidon Eschel and Pamela Martin have estimated that if every American reduced meat consumption by just 20%, the greenhouse gas savings would be the same as if we all switched from a normal sedan to a hybrid Prius”

Time Magazine, 2008



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