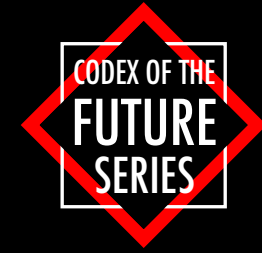


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ANNUAL TRENDS CODEX



3RD ANNUAL EDITION . BOOKLET 2 OF 7

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ABOUT THE AUTHOR

Matthew Griffin, multi-award winning geopolitical advisor, leadership coach, and Futurist, and 15 times author of the smash Codex of the Future series, is described by his clients as a "Walking encyclopedia of the future" and a "Futurist polymath." Matthew is the Founder and Futurist in Chief of the 311 Institute, a global Futures and Deep Futures advisory looking up to 50 years out, as well as the World Futures Forum and XPotential University - two philanthropic organisations whose mission it is to solve global inequality and the world's greatest challenges.

Regularly featured in the global media including the AP, BBC, Bloomberg, CNBC, Discovery, Forbes, Khaleej Times, RT, the Telegraph, ViacomCBS, WIRED, and the WSJ, Matthew's ability to identify, track, and explain the impacts of hundreds of exponential emerging technologies and trends on global business, culture, and society is unparalleled.

Recognised as one of the world's most renowned futurists, disruption, foresight, and strategy experts Matthew is an international advisor and keynote speaker who helps the world's most respected brands, governments, investors, NGO's, and royal households, explore, envision, and shape our collective future.

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PROUDLY BUILDING THE FUTURE WITH ... & MANY OTHERS

ABB

accenture

AXA

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Disney

DP WORLD

NOKIA

NOVARTIS

sky

standard
chartered





WELCOME FROM THE AUTHOR

PEOPLE . PLANET . PURPOSE . PROSPERITY

THE SKELETON COAST . NAMIBIA . 19.9873° S, 13.2605° E

I chose this striking image to represent this section because in many ways it's representative of many of today's realities: The Skeleton Coast is complex and unpredictable, but home to an amazingly adaptable ecosystem, yet it's also representative of the stark contrast between the have and have nots, those with water and other resources and those without, our increasingly polarised society, and even the contrast between our habitable blue planet and the desolation of space. The desert and the sea are also relentless, just like the human spirit, and given the right conditions they can overcome everything in their path, just as humanity can when we work together for the benefit of everyone to create a brighter future for all of us.

THE **311 Annual Trends Codex** contains explicit details about hundreds of trends that affect everything you care about - whether that's you, your business, your industry, your country, our planet, or all of them. Designed to be a one stop shop for everything that's trendy and trending it also contains everything you need to run your very own strategic foresight programs, model scenarios, and develop actionable initiatives and strategies to help you rule the future like a boss.

Furthermore, as our main trends Codex grows exponentially larger I've taken the liberty of splitting it into separate **Minibooks**, like this one, that make it easier for you zero in and focus on only the categories of trends that matter to you.

Most trends are like tides - relentless forces that are hard to control or influence. And, just like tides they can impact a great many things - both directly and indirectly. Having written Codexes that cover the latest emerging technologies and the latest disruptive business thinking, innovation, and strategy, I felt that creating the trends Codex was a natural next step to compliment them, and ergo provide you with a valuable expert set of resources that contain everything you need to design, debate, create, and shape your own future.

This Codex, like all my others, is a living book, it's always being updated with the latest trends and information so that you always have access to the

latest insights and research, but perhaps its biggest benefit is that you can see every trend for everything in one place. This is important because since everything in our world is connected, as I've shared many times during my keynotes, this convenience allows you to easily stay abreast of changes in individual regions or sectors, technologies or trends - any one of which could impact the things you care about, even if the changes occur in areas that at first you don't think are relevant to you.

A simple but powerful example of this are the changes we see in the Energy sector where new energy generation and distribution technologies and trends are impacting everything from the business models and product development in the Transport sector, corporate ESG initiatives and Government policy making, climate change and other environmental trends, as well as the multi-trillion dollar investment portfolios of the global Financial Services sector - and far beyond.

No other trends book puts so many trends across so many categories, lines of business, and sectors in one place, or makes them so accessible, and that you might say is this book's USP. That is, of course, if tens of thousands of insights and statistics at your fingertips aren't enough already!

Explore More,

Matthew Griffin
Founder and Futurist in Chief



USING THIS TRENDS MINIBOOK



WITH SO many trends shaping our world and with more emerging all the time it's easy to get overwhelmed and fail to grasp their individual and collective impact on the things you care about. As a result I've done my utmost to make this Minibook, which is a verbatim extract from my main **311 Institute Annual Trends and Foresight Codex** and that you can download in full from our company website, as easy to use as possible.

In this section you can learn more about how to use the Trend Sheets to get the information you need, and can see the complete list of trends included in this minibook - with more being added all the time.



CLIMATE CHANGE

2ND YEAR ON THE LIST



QUICK TAKE

Scientists saw it coming in the 1950's. They called it out and made films about it in the 1980's. And now, over forty years later individuals, governments, and organisations are starting to take unilateral global action to tackle Climate Change with many scientist arguing that we are now too late to avoid a "life altering" 1.5C increase in average global temperatures, and that we are within years of crossing a climate tipping point which will see its devastating global effects accelerate and create a run away cascade of **Extreme Weather** and devastation.

Data sources: IPCC, National Geographic, WWF, and various.

IMPACT

The impact of Climate Change can be seen everywhere - from the changes of the seasons, and the subtle changes in the flora and fauna in peoples gardens, to the tree covered mountain slopes that used to be buried by glaciers and snow, to the expanding deserts of the Sahara, and the deep of the oceans. It impacts every living thing and every natural system on Earth.

From longer frost free growing seasons, to changes in global rain patterns, longer droughts and more intense heat waves, and more extreme weather, to more powerful hurricanes and higher sea levels, the consequences are as varied as they are acute.

If the world warms by 1.5C then the Arctic Ocean will become ice free once every 100 years, with extreme hot days in the mid-latitudes being at least 3C hotter than pre-industrial levels, and sea levels could rise by up to 0.77m, with a further decrease in global bio-diversity of between 5% and 8%. Meanwhile corals could decline by at least 70% with marine fisheries annual productivity declining by at least 1.5 Million tons. And a 2C rise would be exponentially worse for people and planet.

EXAMPLES

Earth is mission critical for humanity and all life on Earth. And as the rate of Climate Change accelerates we continue to see a variety of records being set and smashed with climactic events that used to be once in a century becoming once a decade, and then the norm. And examples of these are plentiful.

Greenland's ice sheet, the world's second largest after Antarctica, is now melting 12 times faster than in the past 12,000 years and losing over 532 Billion tons of ice a year - and that rate is accelerating. Not only does this melt account for almost 25% of today's sea level rise, but in 2021 the melt rate accelerated even further when, during a time when temperatures in the region were already 18C higher than average, three days worth of rain - where the rain itself was a first for the region - dumped over 7 Billion tons of rain water onto the ice sheet.

And, from the world's biggest, deadliest, and most damaging floods, to the world's biggest, deadliest, and most damaging droughts, heatwaves, hurricanes, and wildfires almost every country on the planet is now feeling the damaging impacts of climate change.

ACT NOW

As we see elsewhere in our universe, from the dust dunes of Mars to the acidic oceans of Venus, our planet will always be able to adapt to new climactic conditions. But life on Earth will find it increasingly difficult as Climate Change accelerates and its effects become more extreme and pronounced. Therefore, ironically, tackling this trend is more about saving humanity's future than the planets.

EXPLORE: 12

- Carbon Capture and Storage
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Government, Manufacturing, Sustainability, Transportation, and Work
- Net Zero Pledges
- Unilateral global accords and coordinated global action

USING THE TREND SHEETS

IN THIS codex we've gone to great lengths to document the major trends affecting all sectors and line of business operations and simplify them for you. Furthermore, we're always surfacing more trends which is why this codex is regularly updated. As a result each trend contains all manner of action points, details, insights, and stats that you can use to your advantage, whether it's developing scenarios and strategies using the frameworks in this and our **other codexes**, or whether it's just exploring the art of the possible. This is the key to the sheets:

1 / UNITED NATIONS SDG NUMBER

The UN SDG most impacted if you act on the trend.

2 / TREND NAME

The most appropriate name for the trend.

3 / YEARS IN THE CODEX

How many years the trend has been listed in our codex since the first edition.

4 / TREND LONGEVITY

● LONG ● MEDIUM ● SHORT

The trends longevity and how long it is expected to have an impact for.

5 / TREND PRIORITY

The higher the number the more attention and weight you should give the trend.

6 / TREND MOMENTUM

⤴ ASCENDING ⤵ FLAT ⤶ DESCENDING

The overall momentum of the trend.

7 / TIMING OF THE TREND

● HERE NOW ● EMERGING ● DISTANT

When the trend is expected to have a measurable and pronounced impact.

8 / RELATED TRENDS

Other trends that either impact the trend or are impacted by it.

9 / DATA SOURCES

A list of our data sources for the trend.

10 / IMAGE

An image to portray the trend.

11 / ACTION

The action we suggest organisations take now based on the available data.

12 / EXPLORE

Other things you can or should explore to better understand the trend and how to solve or use it to your advantage.

13 / DISCOVER MORE

Click or scan the QR code to access more website resources related to the trend.

TRENDS CONTENTS

SECTION CONTENTS

- ... Air Pollution
- ... Bio-Diversity Collapse
- ... Climate Change
- ... Deforestation
- ... Desertificaion
- ... Extreme Weather
- ... Global Sea Level Rise
- ... Global Waste
- ... Ocean Acidification
- ... Ocean Warming
- ... Plastic Planet
- ... Resource Scarcity
- ... Rewilding
- ... Sixth Extinction Event
- ... Warming Planet
- ... Water Scarcity and Stress

**// FOLLOW THE TRENDLINES
NOT THE HEADLINES . //**

- William B. Clinton, 42nd US President

SUMMARY UPDATE

IN THE midst of the still-unfolding anthropogenic environmental crisis, the latest data indicates that our battle against escalating climate change and all its impacts remains significantly challenged. As of now, atmospheric carbon dioxide (CO₂) levels, a critical driver of global warming, have reached an alarming concentration of around 420 Parts Per Million (PPM), up from pre-industrial levels of about 280 ppm. This increase, the greatest in the past 800,000 years, points to the unprecedented rate of human-induced carbon emissions and is responsible for almost 1C of warming since the 1950's.

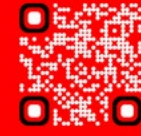
Meanwhile, global greenhouse gas emissions, another dire indicator of the crisis, continue to surge, with a 1.4% increase in 2022 alone to reach 37 Billion tonnes. Such unabated emissions not only threaten the balance of our climate but also our health. According to the World Health Organisation (WHO), air pollution is currently responsible for an estimated 6.7 million premature deaths annually.

Our forests, considered the lungs of our planet, are not faring any better. Deforestation rates, especially in the Amazon rainforest - the largest of its kind - are soaring. In 2022, we lost an area larger than Belgium, exacerbating the already troubling CO₂ levels and endangering countless species, and a 10% increase on 2021.

The cry of our planet resonates from the polar ice caps as well. Data shows that the Antarctic and Greenland ice sheets are melting at the rate of at least 1 million tonnes of ice per minute which could see sea levels rise by 1 meter by 2100, threatening coastal communities worldwide and causing mass migration.

While the data paints a bleak picture, it also underscores the urgency for action. What we do now - the choices we make, the technologies we adopt, the policies we enforce - will dictate the course of our shared future. As we stand on the precipice, it is time to push back against the precipitous decline of our global environment because the stakes have never been higher.

BOOK AN



EXPERT
CALL

STATS THAT MATTER

0.9°C

GLOBAL AVG TEMP
INCREASE SINCE 1950

COPERNICUS EU

37 BN

2022 GLOBAL CO2
EMMISSIONS, TONNES

IEA

4.1 ML

2022 TROPICAL PRIMARY
FOREST LOSS, HECTARES

GLOBAL FOREST

5.3 TR

PIECES OF PLASTIC IN THE
WORLD'S OCEANS, 2023

NAT GEO

421 PPM

GLOBAL ATMOSPHERIC CO2 PPM, 2023

NOAA

5 ML

GLOBAL DEATHS FROM
EXTREME HEAT, 2022

BLOOMBERG

6.7 ML

GLOBAL DEATHS FROM
AIR POLLUTION, 2022

WHO

68%

ANIMAL POPULATION
AVG DECLINE SINCE 1970

WWF

1.6 BILLION TONNES

GLOBAL ANNUAL FOOD WASTAGE OR LOSS PER ANNUM
- ENOUGH TO FEED 3 BILLION PEOPLE

UN FAO

68 BN

GLOBAL ANNUAL TOP
SOIL EROSION, TONNES

UN FAO

ENVIRONMENTAL





AIR POLLUTION

2ND YEAR ON THE LIST



QUICK TAKE

No matter where you live, whether it's at the North Pole or in the middle of the Atlantic, there's no escaping air pollution and particulates that are over PM2.5µm, which then means it just becomes a question of how harmful is it to the environment and your health.

While air pollution is one of the world's leading causes of death the good news is that it's been declining at a global level for decades now, the bad news though is that most of those improvements have been restricted to certain geographies, such as the developed world.

IMPACT

The extent and impact of air pollution on the world is extensive with 99% of the world's population now living in areas where air quality exceeds World Health Organisation (WHO) limits, and the human toll is staggering.

Every year air pollution is the attributed cause of death for more than 11% of all global deaths with over 4.2 Million people dying as a result of exposure to outdoor air pollution and a further 3.8 Million dying from indoor exposure to smoke from dirty cooking stoves and fuels - both of which the **Green Energy Transition** trend is trying to help phase out. It's also unlikely too be a surprise that these death rates are highest in low to middle income countries. And, as if this wasn't bad enough this trend is one of the world's leading risk factors in disease burden and results in increased mortality from COPD, heart disease, lung cancer, strokes, and other acute respiratory conditions, which then contributes to overloading local healthcare providers.

Despite the bad news though in Europe and the US air quality in the past two decades, for some metrics, has improved by as much as 60%.

EXAMPLES

The global pandemic clearly showed the world the impact human activity is having on our air quality, our cities, and our environment, and around the world as factories were shuttered and as air traffic and street traffic ground to a halt countries everywhere saw their air quality especially with respect to CO2, NO2, and SO2 gases and particulates, improve by anywhere between 20% to 61% with France, Italy, Portugal, Spain, and the UK benefiting the most. Furthermore, when we look at the impact the pandemic and lock downs had on particulate matter in the PM10µm and above range again it fell everywhere by between 9% and 30%.

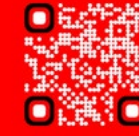
Today though some of the countries with the worst air pollution, where the rates of PM2.5µm in some regions are at least ten times the WHO's safe limits, include China, India, Kazakhstan, Nepal, and Pakistan, and while many of these countries are now curbing emissions by embracing new technologies, introducing new legislation, and shuttering polluting plants, there is still much to be done.

ACT NOW

While policies such as **Net Zero Pledges**, the global energy transition, and the electrification of homes and industries is helping move the dial on air pollution some of those gains are going to be offset against increases in **Desertification** as well as **Global Population Growth** and other factors. As a result tackling this trend, while apparently simple on the surface of things, is a more difficult than people might imagine and requires a much more comprehensive approach than some countries might think.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Manufacturing, Transportation, and Work
- Policy and regulation reform



BIO-DIVERSITY COLLAPSE

2ND YEAR ON THE LIST



Bleached coral on the Great Barrier Reef

QUICK TAKE

Climate change, human activities, and pollution are just some of the factors having a negative impact on the world's ecosystems with the United Nations citing nature's decline as unprecedented, and species extinction rates accelerating as many warn that we are headed towards the **Sixth Extinction Event**.

Since 1900 the average abundance of native species has declined by at least 20%, with almost all ecosystems and species now deteriorating, shrinking, or vanishing altogether.

IMPACT

While humanity might often believe nature is there to serve us we could easily argue it should be the other way round. After all, we don't just live on this planet it's our home, and unless we develop a more symbiotic relationship with nature then ultimately it is us who will loose out in all manner of ways. However you slice or dice the information the message is the same - we need to do better, faster.

The loss of coastal habitats and natural protections have put over 300 million people at increased risk of floods and extreme weather events, such as hurricanes, and it is estimated that annually over \$577bn worth of crops are now at risk from pollinator loss which will then subsequently lead to reductions in food availability and quality.

Asides from just these two notable impacts bio-diversity loss also has significant direct human health impacts, and indirectly it can affect food availability, income, livelihoods, local migration, water availability, and even cause or exacerbate political conflict and war.

EXAMPLES

While many people need go no further than their window to see a decrease in bio-diversity there is no getting away from the fact that nature is in retreat, and the stats are staggering.

While the following is by no means an exhaustive list it should serve as a stark enough warning: over 75% of freshwater resources are dedicated to agriculture which covers more than 30% of the lands surface; 75% of the world's land and 66% of the marine environment have been significantly altered by human activities; 47% of all land based mammals have been negatively impacted by climate change; 33% of marine fish stocks are being harvested at unsustainable levels; land degradation has reduced the productivity of 23% of the world's land surface; pollution in all forms has increased dramatically since 1980; urban areas have more than doubled in area since 1992; and the number of invasive species per country has risen by over 70% since 1970 ...

ACT NOW

The vast majority of bio-diversity problems have been cause by human factors over a long period of time and reversing them, while not impossible, isn't easy and requires innovative thinking and interventions.

EXPLORE:

- ESG, GRC, policy, and regulation reform
- De-Extinction initiatives
- Environmental monitoring initiatives
- Future of Agriculture
- Genetically engineered organisms
- Invasive species eradication and management strategies
- Sustainable planning initiatives
- Tree planting drone initiatives



CLIMATE CHANGE

2ND YEAR ON THE LIST



QUICK TAKE

Scientists saw it coming in the 1950's. They called it out and made films about it in the 1980's. And now, over forty years later individuals, governments, and organisations are starting to take unilateral global action to tackle Climate Change with many scientist arguing that we are now too late to avoid a "life altering" 1.5C increase in average global temperatures, and that we are within years of crossing a climate tipping point which will see its devastating global effects accelerate and create a run away cascade of **Extreme Weather** and devastation.

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The impact of Climate Change can be seen everywhere - from the changes of the seasons, and the subtle changes in the flora and fauna in peoples gardens, to the tree covered mountain slopes that used to be buried by glaciers and snow, to the expanding deserts of the Sahara, and the deep of the oceans. It impacts every living thing and every natural system on Earth.

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EXAMPLES

Earth is mission critical for humanity and all life on Earth. And as the rate of Climate Change accelerates we continue to see a variety of records being set and smashed with climactic events that used to be once in a century becoming once a decade, and then the norm. And examples of these are plentiful.

Greenland's ice sheet, the world's second largest after Antarctica, is now melting 12 times faster than in the past 12,000 years and losing over 532 Billion tons of ice a year - and that rate is accelerating. Not only does this melt account for almost 25% of today's sea level rise, but in 2021 the melt rate accelerated even further when, during a time when temperatures in the region were already 18C higher than average, three days worth of rain - where the rain itself was a first for the region - dumped over 7 Billion tons of rain water onto the ice sheet.

And, from the world's biggest, deadliest, and most damaging floods, to the world's biggest, deadliest, and most damaging droughts, heatwaves, hurricanes, and wildfires almost every country on the planet is now feeling the damaging impacts of climate change.

ACT NOW

As we see elsewhere in our universe, from the dust dunes of Mars to the acidic oceans of Venus, our planet will always be able to adapt to new climactic conditions. But life on Earth will find it increasingly difficult as Climate Change accelerates and its effects become more extreme and pronounced. Therefore, ironically, tackling this trend is more about saving humanity's future than the planets.

EXPLORE:

- Carbon Capture and Storage
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Government, Manufacturing, Sustainability, Transportation, and Work
- Net Zero Pledges
- Unilateral global accords and coordinated global action



DEFORESTATION

2ND YEAR ON THE LIST



QUICK TAKE

Deforestation, the loss of trees and other vegetation, can have a significant impact on all manner of other trends including **Bio-Diversity Collapse**, **Climate Change**, **Desertification**, land degradation, flooding, **Warming World**, and also create a host of hardships for indigenous people.

Today the rate of deforestation shows no signs of slowing down, and while many people focus on the environmental damage being caused in the Amazon there are many other examples of deforestation that, in some cases, warrant even more attention.

Data sources: Imazon, LSE, NASA, WWF, and various.

IMPACT

In the time it takes to say the word "Deforestation" another chunk of forest the size of a football field is destroyed. That's every two seconds, every day, all day, with the net result being that today there's only about half the number of trees on the planet that there were when humans first evolved. It should also come as no surprise that the fastest rate of forest destruction has been in the past couple of decades with an estimated 15 Billion trees now being cut down every year across the world. Not only is this unsustainable, but it's exacerbating all manner of other issues.

Most deforestation is carried out to clear land for food production with the majority of deforestation being linked to meat, Palm oil, and Soya production, and every year clearing forests contributes 10%, or 1.5 Billion tonnes, of global CO2 emissions. This is a double edged sword though because while deforestation increases emissions those same forests, if left alone, sequester up to a billion tonnes of carbon every decade, and secondary forests - those growing back after deforestation - sequester 40% as much which makes them another important natural climate change solution.

EXAMPLES

Some of the best known examples of deforestation include what's known as "Slash and Burn Agriculture" where trees are cut down and burned to make way for agriculture or livestock which is especially prevalent in the Amazon Rainforest where the rate of deforestation is now faster than its ever been with the rate now exceeding 10,476 square kilometers a year - an area 7 times bigger than London and 13 times the size of New York city.

But the Amazon isn't alone. In Nigeria trees used to cover 50% of the land but more than 90% of those have been felled and the country has less than 1% left of its frontier forests, with 36% of the deforestation happening in the last two decades. Meanwhile, elsewhere in Ghana trees used to cover two thirds of the country, but now that figure is below 10% and nothing remains of the frontier forests, then in Indonesia more trees were felled on Borneo between 1985 and 2000 than all of Africa and South America combined.

Unfortunately, these countries and examples are not unique and there is a long list of similar stats for many more countries.

ACT NOW

With the global rate of deforestation accelerating and showing no signs of letting up, until at least most of the forests are gone, worldwide there is now an impetus to reforest the world and plant a trillion trees by the year 2050. However, while such projects are admirable a better approach perhaps would be to stop the slash and burn culture, and the culture of clearing land for agriculture, by exploring new AgriTech trends, as well as introducing new "Environmental" taxes on goods that have a negative toll on nature and the planet.

EXPLORE:

- Emerging technologies and technology roadmaps
- ESG and green finance
- Future of Agriculture, Financial Services, Leisure and Tourism, Manufacturing, and the Workforce
- Impact assessments
- Policy, regulation, and tax reform



DESERTIFICATION

2ND YEAR ON THE LIST



QUICK TAKE

Desertification is defined as a process of land degradation in arid, semi-arid and sub-humid areas, which account for more than 40% of the Earth's landmass, due to various factors including **Climate Change** and a **Warming Planet**, and other human activities.

Today 75% of the world's landmass is already degraded and the rate of desertification is now 35x the historical rate with a total of 1.61 million square miles of land, or 4.18 million square kilometers, being degraded every year, with Africa and Asia being the most affected.

Data sources: National Geographic, UNESCO, United Nations, World Bank, and various.

IMPACT

In short desertification is when land that was of another type of biome turns into a desert biome because of a variety of changes, and it's an increasingly serious issue for an increasing number of countries and economies.

While overgrazing is the major cause of desertification globally other factors that can also cause desertification include climate change, **Deforestation**, **Extreme Weather**, **Rapid Urbanisation**, **Water Stress** and **Scarcity**, and agricultural practises that make soils more vulnerable to wind.

Not only does desertification affect groundwater reserves and topsoil, and increase surface run off, but it also has a number of negative impacts on communities including loss of earnings, which contributes to **Wealth Inequality**, as well as harming human health by contributing to **Air Pollution** and exacerbating food insecurity. Today it's estimated that a third of the world's landmass is at risk of desertification, and that up to 2 Billion people could be affected by it, and that by 2030 over 50 Million people could be displaced by it, which in turn will affect **International Migration** patterns.

EXAMPLES

As global temperatures rise and as **Population Growth** gains momentum today the planet is more vulnerable to desertification than ever before. However, while desertification is an issue, if the world hits 2C of warming then it's also estimated that up to 30% of the world's surface is also prone to **Aridification**, or drying out, which would mean, for example, that southern Spain would become a desert from 2050 onwards, so we shouldn't forget that these two phenomenon are linked.

When it comes to desertification specifically though the biggest areas being affected include the Sahel Region in Northern Africa, a 5,900km wide transitional strip between the Sahara Desert and the African savannah, which has been in an almost permanent state of desertification now for more than five decades because of drought and over grazing, and which is now warming 1.5x faster than the global average. Then, we have the Ningxia Hui province in China which has already seen desertification on an alarming scale with over 57% of it's 3 Million hectares already having been devoured by deserts, displacing 3 Million people, and there are many other examples.

ACT NOW

Desertification has many impacts on the people and the planet, but it's not an irreversible phenomenon. With initiatives such as the Big Green Wall, which aims to create a 15km wide green barrier between the southern edge of the Sahara Desert and the Sahel, and other innovative solutions including new Hydrogel based soils, countries have been able to show that we can make progress to tackle it. The danger therefore comes when no action is taken, at which point the impact of this trend becomes more wide ranging and severe.

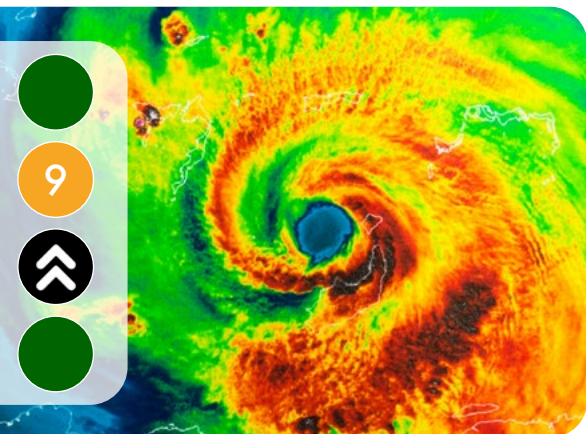
EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Agriculture, Communications, Energy, and the Workforce
- Small farm initiatives
- Policy and regulation reform
- Re-Greening incentives



EXTREME WEATHER

2ND YEAR ON THE LIST



Satellite image of a Category 5 hurricane

QUICK TAKE

Extreme weather events, which are likely related to human activity, are extreme weather events that include unexpected, unusual, severe, or unseasonal weather - whatever its form.

Data consistently shows that all manner of events are becoming more frequent and intense, with almost everywhere experiencing hotter heat extremes and less frigid cold extremes, as well as more severe and persistent drought and precipitation events. There is even debate in Japan, for example, about adding a Cat 6 hurricane ranking ...

IMPACT

Extreme weather events can lead to substantial impacts including damage to agricultural production, buildings, and infrastructure, loss of life and natural capital, as well as a myriad of longer term economic impacts including increased human migration and an increase in human stress and illness.

In 2020 the 10 most destructive extreme weather events alone cost an estimated \$140bn, with the number of events causing losses in excess of \$1bn increasing from an annual average of 7.1 between 1980 to 2015 to 16.2 by 2020, with a record breaking 44 recorded in 2020 alone.

Furthermore, since the year 2000 over 7,000 extreme weather events have claimed the lives of over 1.23 million people, affected more than 4.2 billion people, and caused over \$2.93tn worth of damage. And that excludes the indirect impacts ...

Meanwhile, observations of weather extremes show the expected long-term trend is in line with the increase in global average temperatures, which mean they will get even more frequent and even more extreme.

EXAMPLES

Finding examples of extreme weather events with global or continental level impact, as well as that incur costs of over \$1bn is, unfortunately, simple.

The most extreme recent events include the record breaking Atlantic hurricane season and a rare five storm system; the Chinese floods which caused over \$32bn in damage and caused the evacuation of 1.2 million people; the Indian floods which affected over 42 million people; the worst drought in South Africa in over a century; the 2018 US wildfires which incurred \$149bn or 0.7% of GDP's worth of direct and indirect damages ...



A helicopter battles fires in California, USA

ACT NOW

Solutions to negate and reduce the severity and impact of extreme weather events vary. While some organisations are focused on trying to mitigate their impact on society others are focused on trying to solve the problems driving the trend.

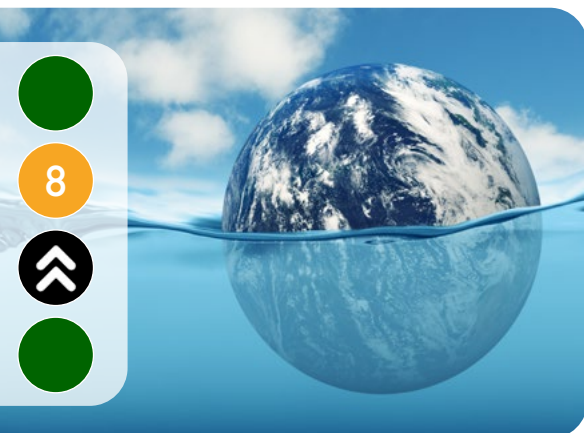
EXPLORE:

- Reviewing regulations affected by extreme weather including building codes, urban planning, and H&S
- Direct Air Capture, geo-engineering, and other mitigation solutions
- Incorporating the indirect costs of extreme weather in government investment and policy formulation
- Industry de-carbonisation and the adoption and enforcement of sustainable business practises
- De-investing in organisations harming the environment
- Unilateral global accords and coordinated global action



GLOBAL SEA LEVEL RISE

2ND YEAR ON THE LIST



QUICK TAKE

Long term Global Mean Sea Level (GMSL) measurements and satellite data show that sea level has risen by an average of 3.6mm per year over the last decade, with 0.8mm a year of that being attributable to **Ocean Warming**. And that rate of increase has more than doubled in the past few decades.

In fact, sea levels have risen faster in the last 100 years than the last 3,000 and this acceleration is expected to continue, because of **Climate Change** and other contributory factors, with a further 15 to 25cm sea level rise expected by 2050.

IMPACT

When sea levels rise as fast as they have been even a small increase can have a devastating impact on society and the environment.

On the one hand saltwater ingress can contaminate important freshwater aquifers and farm land with toxic salts, affect and destroy inland habitats and flood wetlands, and cause destructive erosion. But, on the other, they can completely obliterate low lying communities and countries and trigger mass human migration events.

The impact of sea level change is even more pronounced in many coastal cities - especially those built on or near river deltas - many of which are not only experiencing higher sea levels but also record levels of subsidence of up to 10mm a year.

Today, over 600 Million people live in around 570 low lying coastal cities that are less than 10 meters above sea level, and 2.4 Billion people live within 100 km of the coast, and not only could increases in sea levels drown some of those cities, but it will create economic and social havoc.

EXAMPLES

Cities on America's East coast, for example, are especially vulnerable to sea level rise. When Hurricane Sandy struck New York in 2012 coastal floods, which were the highest ever recorded, affected over a million buildings, cut power to 2 million people, and caused over \$19 Billion worth of damage.

In Miami the sea level has risen a staggering 8 inches since 1981 and is projected to rise by a further 40 inches by 2070. And while the city is confident it can adapt by spending over \$4 Billion on new coastal defences since 2000 tidal related flooding has increased by 352% with Miami Beach now being dubbed "Ground Zero" for sea level rise.

However, while cities like Miami build defences, 275 Million other city dwellers won't be as fortunate with cities including Alexandria in Egypt, Mumbai in India, Osaka in Japan, and Rio de Janeiro in Brazil, expected to be under at least 3 feet of water by 2070. And, as for the Maldives they'll vanish - which is why their government became the first in the world to announce they're building the world's first ocean city to re-home their citizens.

ACT NOW

Sea level rise is just one in an increasingly long line of challenges facing the world, and it's impacts are accelerating. It's also a challenge that doesn't have any single solution and needs a co-ordinated global response. However, it's also a prime example of how inaction by governments and organisations in the short term will have huge economic and social consequences in the long term as countries, especially those in Asia, have to grapple with mass migration and flooded cities that become uninhabitable.

EXPLORE:

- Climate Migration
- Coastal defence strategies
- Future of Construction, Energy, Manufacturing, Smart Cities, and Sustainability.
- Ocean cities
- Unilateral global accords and coordinated global action



GLOBAL WASTE

2ND YEAR ON THE LIST



QUICK TAKE

In 2022 the world produced 2.1 Billion tons of solid waste, but driven by **Population Growth** by 2050 this is expected to rise to 3.4 Billion tons, with each person on average generating 0.74Kg of waste per day - with a range of between 0.11Kg and 4.45Kg depending on the country. While the world's high income countries account for 16% of the worlds population they produce 34% of all the worlds waste, and recycle a third, compared to East Asia which produces 23% and recycles just 4%. Then, looking ahead, by 2050 Africa's waste is expected to triple and West Asia's to double.

Data sources: WHO, World Bank, and various.

IMPACT

Waste comes in many forms, 50 to be precise, from food waste and **Global E-Waste** to **Ship Scrapping**. Food waste represents 44% of all solid waste, fibrous waste 17%, plastic 12%, glass 5%, metal 4%, and then the remainder, but of all these plastic waste the most problematic to deal with and accounts for more than 242 Million tons. Then, looking at liquid waste every year we produce over 400 Million tonnes of hazardous waste - almost 13 tonnes per second and a 400 fold increase in just one generation. And that's a lot.

However, while we talk stats, the impact of all this is on human society and the environment especially when we factor in the impact that burning waste has on **Air Pollution**, the impact that waste by-products leaching into the soil has on **Soil Degradation** and **Water Scarcity**, and the impact that 13 Million tons of plastic flowing into the oceans every year has on our **Plastic Planet**, is immense. And that's before we factor in the impact of decomposing waste which, in the case of landfills accounts for 91% of global Methane emissions which impacts our **Warming Planet**. Then, on the human healthcare front, well, I need more pages ...

EXAMPLES

Today this trend means we all live with more than 700 man made chemicals in our bodies which aren't supposed to be there. But perhaps most worrying is the fact that we only have safety data on 14% of them despite the evidence that they can cause everything from cancer and reproductive problems to birth defects, DNA damage, and more.

Our waste problem is also growing in front of our faces - literally. Today, the world's largest landfills stagger belief with the Las Vegas Apex dump being the world's largest covering over 2,200 acres and holding more than 50 Million tons of municipal garbage. However, while not the largest Mexico's Bordo Poniente landfill is the fastest growing with over 4.4 Million tons of garbage being added to it annually.

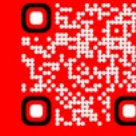
And, as for the consequences, from people in Indonesia having to leave their homes as landfills grow, to toxic fumes literally leaving locals in Delhi gasping for breath, to contaminated ground water killing millions, and the growing dumps supporting opportunistic organised crime groups there appears to be no upside to this trend.

ACT NOW

The environmental and human impact of this trend is increasingly becoming incalculable as humanity's growing waste problem changes animal behaviour, and affects the health and well being of every living thing on the planet, and even the planet itself as this trend helps exacerbate **Climate Change**. A global crisis in need of a truly global solution no one can turn a blind eye to this trend and no one is immune from its consequences.

EXPLORE:

- Business and impact assessments
- Circular Economy, recycling, and Sustainable Procurement
- Emerging technologies and technology roadmaps
- ESG best practises, policy reform, rankings and ratings
- Materials innovation
- Partner ecosystems and solutions
- Zero Waste Pledges



OCEAN ACIDIFICATION

2ND YEAR ON THE LIST



QUICK TAKE

Ocean acidification is the ongoing decrease in the pH value of the Earth's oceans and it's mostly caused by the increased uptake of Carbon Dioxide from the atmosphere which has now reached historic levels.

Not only does this reduce the amount of carbonate in the oceans, which is a key building block in seawater, but it makes it much more difficult for marine organisms, such as corals and some plankton, to form their shells and skeletons which then has negative consequences for the wider marine ecosystem, including fisheries.

Data sources: EPA, Europa, NOAA, and various.

IMPACT

Over the past 20,000 years the acidity of the world's oceans has remained relatively stable, but with rapid increases in the levels of Carbon Dioxide in the Earth's atmosphere, which are now 40% higher than their pre-industrial levels, ocean acidity has increased by over 30%, from a pH of 8.11 to 8.06, in the same period.

To put this into perspective this decrease in pH has occurred at a rate about 100 times faster than any change in acidity experienced during the last 55 million years and without any changes in global greenhouse gas emissions it is estimated it will take the oceans thousands of years to rebalance themselves.

Not only does ocean acidification have an impact on the marine life that live in the oceans but it also has an impact on those that rely on the oceans for food and resources. And while increasingly acidic ocean water dissolves the shells and skeletons of living marine organisms, such as the Australia's Great Barrier Reef corals, it also prevents the formation of them in the first place which then has longer term consequences on the rejuvenation and replenishment of these vital ecosystems.

EXAMPLES

Dissolving shells and skeletons which are made out of Calcium Carbonate is one thing, but when you change an organisms living environment it also increases their levels of stress which then has negative impacts on their health and their ability to reproduce and survive.

For example, scientists have found that clams, crabs, mussels, and sea urchins start to dissolve their protective shells to counter elevated acidity in their body fluids, so even if an organism can adapt to survive increasing acidity its overall health can be impaired.

Additionally, many marine organisms have complex life cycles, spending their early lives as larvae and their small size makes them even more sensitive to increased acidity which, in the case of oysters and sea urchins often means they don't develop properly. And, in the case of coral polyps ocean acidification has led to between a 52% to 73% decline in new reef building.

Elsewhere larval fish lose their ability to smell and avoid predators, so even in cases where marine organisms are able to reproduce the survivability of their offspring is reduced.

ACT NOW

When you increase the acidity of any environment it affects the balance and health of that environment, but in the case of oceans correcting the imbalance will take Eons by which time it will be too late to save many of the species that call the oceans their home.

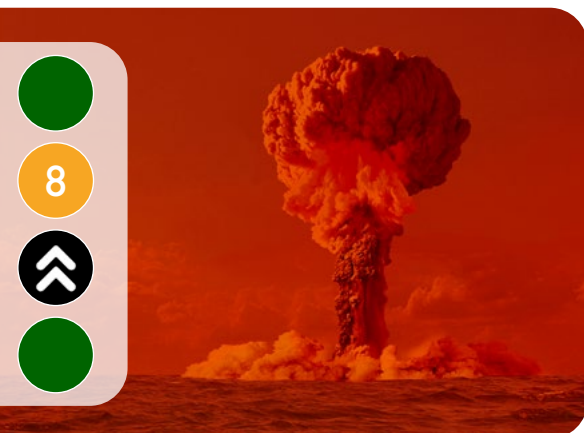
EXPLORE:

- Circular economy
- Civil education
- Reducing Greenhouse Gas Emissions and Net Zero policies
- Sustainable water management policies
- Unilateral global accords and coordinated global action



OCEAN WARMING

2ND YEAR ON THE LIST



QUICK TAKE

Increases in Global Greenhouse Gas (GHG) emissions have caused **Global Warming**, increasing global surface temperatures by over 1C, but only 1% of that trapped heat has stayed in the atmosphere with over 93% of it being absorbed by the world's oceans. And, because water takes much more energy to heat up than air this has resulted in an average ocean temperature increase of 0.13C per decade.

However, while that sounds insignificant oceans are now warming up 24% faster than a few decades ago with big consequences ahead.

IMPACT

Today, the world's oceans which cover over 321 Million cubic miles of the Earth's surface, are shielding humanity from some of the worst consequences of climate change because they are absorbing the equivalent of 5 50 megaton Atom bombs of heat from the atmosphere every second. Putting this in context that's over 1,100,000 Trillion Joules of energy every second which is a phenomenal number by any measure.

While most of this heat is absorbed by the upper part of the ocean, down to about 250ft, two thirds of it is absorbed by the upper 2,300ft of the ocean, and the rest is absorbed by the depths.

The net result of all this is that the oceans have been warming up by on average 0.13C every decade since the 1900's, and because warm water takes up more space than cool water this phenomenon alone has helped add an extra 0.8mm to Mean Sea Level (MSL) every year since records began in 1970 - or an extra 750 Gigatons worth of water. It's also having a significant impact on the rate of global ice melt, marine life, ocean oxidation and pH levels, the world's climate, and, by association, all of us.

EXAMPLES

The consequences of ocean warming are being felt by almost every human and natural system on Earth, including effects on coastal communities and coastal erosion, crop yields and fisheries, extreme weather, and even an increase in water borne diseases such as Cholera and toxic algal blooms that cause neurological diseases like Ciguatera. It's also one of this generations greatest hidden challenges.

Powerful hurricanes have increased by 30%, polar and tropical marine ecosystems are migrating into cooler waters up to 10 degrees latitude closer towards the poles, ocean dead zones are doubling every decade, and 90% of the world's corals are at risk.

Also, compounded by over fishing and warming oceans sustainable fish stock yields have fallen by 35%, deadly algal blooms have increased by 40%, marine heat waves have increased by 54% since 1925, coral bleaching events that used to be once every 30 years are now once every six years, and coastal erosion, which leads to increased flooding, habitat destruction, and salt-water intrusion into important freshwater supplies, has also increased significantly.

ACT NOW

The threat posed to humanity by warming oceans is arguably one of the world's greatest hidden challenges that very few people talk about, and very few policies tackle. It also has an oversized impact on many of the issues we are facing today as a society, from food and water scarcity, to extreme weather and beyond.

EXPLORE:

- Circular Economy
- Coastal protection initiatives
- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Sustainability, and Transportation
- Net Zero



PLASTIC PLANET

2ND YEAR ON THE LIST



QUICK TAKE

Originally hailed as a multi-purpose miracle material in 1907 when it was created, but now labelled as one of the world's greatest scourges, plastic has had an interesting and precipitous fall from grace.

It's used in almost everything we consume, takes hundreds of years to completely break down, litters our cities and coastlines, kills wildlife, and has been a scourge for decades - but it has only been the past few years that the world has really sat up and taken notice. So we have a lot to do before we can say that this trend is behind us.

IMPACT

Plastic is arguably one of the most defining materials of the modern age. It's used in everything from food packaging to pace makers, to cars and computers - and hundreds of millions of other products. And it can take up to 400 years to break down completely.

Since its invention it's estimated over 8.3 Billion tons has been manufactured, with only 9% of that having ever been recycled. Furthermore, over half of all the plastic ever manufactured was made in the past 15 years, with production increasing exponentially from a mere 2.3 Million tons in 1950, to over 450 Million tons in 2015. And by 2050 that figure, without any interventions, is expected to double.

Every year consumers consume over 1 Trillion bags, 500 Billion plastic bottles, 4.5 billion plastic straws, and around 13 Million tons of plastic waste enters the world's oceans - an equivalent of a truck load every minute. Now, with an estimated 5 Trillion pieces of plastic floating around, it's also estimated that 87% of all seabirds, 50% of all marine mammals, and 30% of turtles have ingested plastic of some sort. All of which is the tip of the plastic mountain.

EXAMPLES

One of the most stunning, and sad, examples of plastic pollution and its impact on the world is the Pacific Gyre, a 20 Million square kilometre ocean vortex in the mid Pacific that's so contaminated and full of plastics and ocean debris that it can be seen on satellite images, and has been dubbed the Great Pacific Garbage Patch.

Larger than Texas and with an estimated 80,000 tons of plastic and 1.8 Trillion pieces of micro-plastics caught in the vortex's grip, with an estimated 46% of that by volume being plastic fishing nets, it contains six pounds of plastic for every pound of plankton, and you can find up to 70 Kg of additional plastic per square kilometer on the ocean floor beneath it. And as for the amount of straws in the patch, which are used to front so many campaigns, they account for less than 0.025%.

Of the remaining 79% of plastics that aren't recycled or end up in our oceans an estimated 12 Billion metric tons of ends up in landfill, with on average only 12% being incinerated, and the rest taking over 100 years to degrade. And there are plenty more examples I could share ...

ACT NOW

By the year 2050 it is estimated that the amount of plastic pollution could triple and that global consumption could increase exponentially unless action is taken to develop and move to more sustainable materials

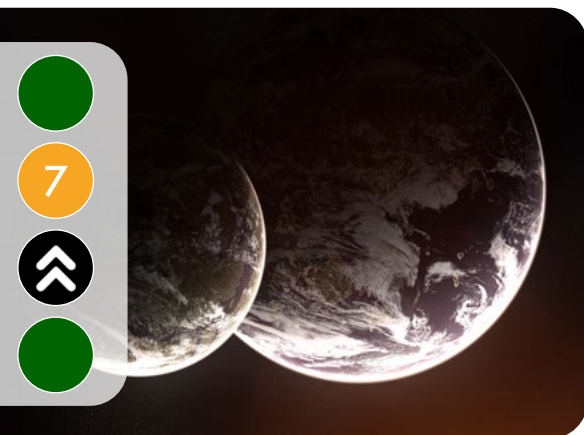
EXPLORE:

- Alternative materials
- Circular Economy
- Future of Food, Materials, and Sustainability
- Policy and regulation reform
- Recycling solutions



RESOURCE SCARCITY

2ND YEAR ON THE LIST



QUICK TAKE

By 2030 it is estimated that humanity will need two Earths to support our lifestyles as we deplete resources including coal, fish, helium, land, lithium, phosphorous, natural gas, oil, rare Earth elements, water, and wood, among others, in many cases fifty percent faster than they can be replenished - if they can be replenished at all that is. And, as the world's population continues to grow it is increasingly clear that this status quo is, by any measure, simply unsustainable.

IMPACT

Needless to say the impact of humanity's consumption on the Earth and her resources is both damaging and unsustainable.

On the one hand there is the impact that increasing scarcity will have on human diet, health, and longevity, as well as on the availability and cost of the energy and goods we consume, and on the other there is the impact that going deeper and further to secure resources have on the world's bio-diversity and biosphere.

Resource scarcity will continue to cause critical, and to a certain extent, irreversible environmental damage, and it will also impact the global economy by causing market prices to rise and changing the dynamics of industry.

When we look to 2030, if the world's consumption and population continues to increase at current rates, we will need 35% more food, 40% more water, and 50% more energy - all during a period when factors like climate change will have an outsized impact on everything from food production to water availability. In short, we are pushing the planet beyond its limits to cope.

EXAMPLES

Global energy consumption is one of the biggest and easiest trends to call out as a key contributor to resource scarcity, but it's not the only one. Last year alone, for example, the world consumed more food than it produced between all of 2000 and 2007, and between 1960 and 2007 the amount of arable land per capita halved from 0.39 to 0.21 hectares, with increasing demand on it for biofuels, cattle feed, cities, conservation, food, and pulp.

Switching to water, many areas of the world are already drawing far more potable water than is being replenished and it's estimated that by 2030 over 129 countries will experience extreme water scarcity, with 2.3 Billion people currently living in water stressed countries. Then, when we switch to wood by 2050 it's estimated global demand will triple with current shortages alone increasing the cost of building the average single family home in America by \$24,000 - although that figure will ultimately flex as supply volumes alter. And then we're seeing similar situations with respect to the availability of cobalt and lithium which underpin the new electric vehicle and energy revolution, and many more ...

ACT NOW

As they say: There is only Planet A, there is no Planet B. Unless, of course, you include Elon Musk's plans to colonise Mars, which to all intents and purposes is currently an impractical solution to this challenge. This then means that we have to, as we have always supposed to, find ways to live within our means, and to do this we need to change attitudes and cultures, and find new solutions that meet both the needs of humanity and our planet.

EXPLORE:

- Circular economy and recycling initiatives
- Future of Energy, Materials, and Sustainability
- Policy, regulation, and tax reform
- Sustainable living initiatives
- Unilateral global accords and coordinated global action



REWILDING

2ND YEAR ON THE LIST



QUICK TAKE

Rewilding is a progressive approach to conservation and nature. It's about letting nature take care of itself, enabling natural processes to shape land and sea, repair damaged ecosystems and restore degraded landscapes with the aim of creating more bio-diverse and resilient habitats, and tackling the climate and extinction crises.

Other advantages of rewilding include the direct and indirect impacts on flooding and flood risks, food chains, as well as improvements in human socio-economic, health, and well being.

Data sources: IUCN, Royal Society, WFF, and various.

IMPACT

While individual rewilding projects all have their benefits up until recently there was no official way to measure and report the how successful different rewilding programs were which was why different groups and academics came together to create the Rewilding Scale.

A conceptual framework that measures human inputs and outputs against ecological integrity the scale finally gave people a way to measure the impact of their restoration projects and assign them a rewilding score.

Broadly the framework considers the so called "Cultural Energy" whereby the "unnaturalness" of an ecological system can be quantified by the amount of human associated energy inputs required to maintain it in its current state.

While different projects have different levels of success overall most well managed rewilding projects have, ironically, been wildly successful, and either halted or completely reversed humanity's impact on those local ecosystems.

EXAMPLES

Perhaps one of the most famous examples of successful rewilding has been Yellowstone which in 1995 re-introduced Canadian wolves into the environment, among other initiatives. Today, there are over 100 wolves which have had a significant impact on keeping the local Elk population in check which then, in turn, had a dramatic impact on the amount of over grazing in the park, and led to an overall increase in bio-diversity of at least 50% for the entire park.

Elk populations declined from 15,000 at their peak to 6,000, which then led to a 100% increase in Aspen growth, and a 12 fold increase in the Beaver population, which then led to a 75 fold increase in riparian, or streams and rivers, bio-diversity. And as for Coyotes, as their population came into balance there was a corresponding increase in the number of small mammals that provided food for other avian and mammalian predators.

Other similar success stories have been witnessed in Romania, with the reintroduction of Bison, Beavers in the UK, Giant Tortoises in the Galapagos, tigers in South Korea, and many more.

ACT NOW

As nature comes under increasing stress, and as we see declines in both the number of species and bio-diversity, as well as the continued degradation of the land and sea, it is increasingly important that communities and governments support and undertake rewilding projects.

EXPLORE:

- Assessment and measurement of the bio-diversity of natural ecosystems
- Future of Sustainability
- Rewilding case studies and initiatives
- Rewilding Scale
- Species selection



SIXTH EXTINCTION EVENT

2ND YEAR ON THE LIST



QUICK TAKE

Increasingly we are being told that we are now entering the Sixth Extinction Event, and that the mass extinction of species is accelerating. Today, more than 500 species are on the brink and expected to be lost in the next 20 years - the same number we lost in the past century, and a number that would have taken thousands of years if nature was left to its own devices.

Likened to sawing the tree branch off while we're sitting on it by scientists this trend has a significant impact on **Bio-Diversity Collapse** and on human health and well being.

Data sources: IUCN, and various.

IMPACT

Caused by a variety of contributory factors including, but not exclusively **Deforestation, Desertification, Global Warming, Global Waste**, as well as all manner of other human related activities, especially agricultural, the term mass extinction refers to the point in time when a high percentage of biodiversity or distinct species dies out, and today the stats are worrying. Of over 29,400 species examined over 500 species now have fewer than 1,000 individuals left with the worst affected groups being amphibians, birds, mammals, and reptiles, especially in tropical and sub tropical regions.

Ultimately experts believe this trend could lead to the total collapse of many of the natural ecosystems we rely upon to survive, with just one example of this being the collapse of bee populations which many soon have a serious impact on global food production. More broadly though the loss of Apex species and so called "valued" species, which are often replaced by invasive species, not only has an impact on human well being but has also contributed to everything from fires and pandemics to decreased carbon sequestration and a general loss of ecosystem services.

EXAMPLES

While there are many examples of this trend we'll start top down. It's believed elephants could be extinct by the end of our lifetimes and if this did happen then it would dramatically change ecosystems across Africa and Asia. After all, elephants through their foraging and dung help foster the growth of plants and trees that bats, birds, and other animals rely on for food and shelter. Furthermore, they also dig waterholes on which many animals rely on for water.

Elsewhere the extinction of other plant eating apex species such as Wilderbeast whose populations plummeted after the Rinderpest virus in the 1800's often brings with it renewed plant growth - an over abundance of which increases the chance of wildfires. Then, turning to the pollinators over 75% of the world's food crops are pollinated by insects "Colony Collapse" could not only decrease seed and fruit production, but also lead to the extinction of many valuable plants.

Even krill and plankton, which form the basis of almost every oceanic food chain aren't immune, so I could go on and on.

ACT NOW

Nature is like an orchestra, when everything is in balance the music is sublime, but when things get out of balance, well, the audience flees for the exits. Only in our case there are no exits. As we continue to see species around the world threatened with extinction the impact of losing them on humanity and our planet will become increasingly stark and obvious with consequences that none of us like or want. It is therefore down to us to try to reverse this trend, which we can, but it's hard given all the other trends.

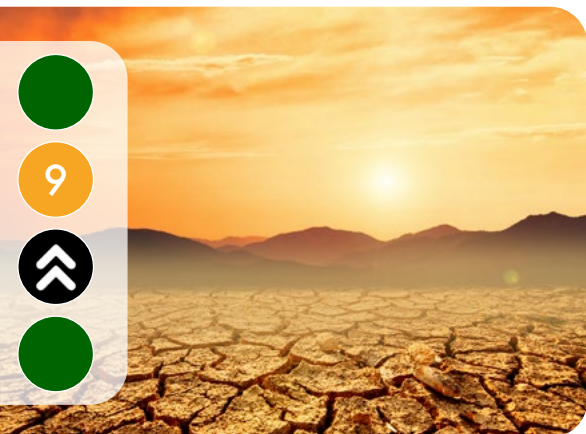
EXPLORE:

- Business and impact assessments
- Emerging technologies and technology roadmaps
- ESG best practises
- Future of Agriculture
- Global accords, and policy and regulation reform
- Rewilding initiatives



WARMING PLANET

2ND YEAR ON THE LIST



QUICK TAKE

The world has been through many cycles of cooling and warming in its long history. Today though we're experiencing one of the fastest rates of warming in Earth's history, and whether you're a **Climate Change** denier or believer there's no disputing the evidence that shows global temperatures have been creeping up now for over century and fuelling trends such as **Climate Resilient Infrastructure, Extreme Weather, Global Sea Level Rise, International Migration, Ocean Acidification, Ocean Warming, Water Scarcity and Stress**, and many others.

Data sources: IPCC, Monash University, NASA, WEF, and various.

IMPACT

Since the pre-industrial age, 1850, it's widely believed that human activities have caused anthropogenic warming of the world's atmosphere of at least 1C and that it's currently increasing by 0.2 C per decade as global emissions of gases such as CO and CO2 continue to exceed 31.5 Gt per year and climb past 412 ppm - 50% higher than when the Industrial Revolution began.

Unless the trend is reversed, or at the very least halted, experts now believe we're on track to realise a world that's 1.5C warmer between 2026 and 2042, with a central estimate of 2030 to 2032, and that we could exceed the 2C threshold between 2038 and 2072 with a median of 2052 - at which point the world will look a very different place for all of us. And not in a good way.

From **Bio-Diversity Collapse** and the melting of the global ice sheets, which themselves will cause sea levels to rise by 10m or more and literally change the world map, to increasing food insecurity as well as human security, and the impact on all the other afore mentioned trends for a whole variety of reasons this, it seems, is a future we don't want to see.

EXAMPLES

A warming planet has many implications for the environment and humanity especially when it comes to extreme weather, from producing hurricanes that are so powerful the Japanese government wants to add a new Category 6 scale to the Saffir-Simpson Hurricane Wind Scale, to initiating more severe droughts and heat waves that spawn even worse fires, and more intense precipitation events which increases the intensity of floods.

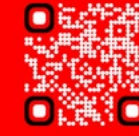
Asides from these though this trend will also turn cities and **Megacities** into giant sweltering death traps. Today extreme heat and cold are responsible for over 5 Million deaths per year, or 9.4% of all deaths and 74 per 100,000, and as the planet warms it's believed the number of deaths attributed to cold will fall and those attributed to heat will increase significantly with people living in cities faring the worst - especially in Africa, Asia, Europe, and the Middle East which already experience extreme heat. And all of this is before we've discussed the loss of high altitude snow caps, which will affect downstream water supplies, coral bleaching events, and many other potentially deadly and society changing outcomes.

ACT NOW

There is no question that humanity has disturbed the planets natural balance in all manner of different ways. Some of those are reversible and some aren't. However, as difficult as it is this is a trend that can be reversed but it will take technology, time, and unity, the embrace of trends such as **Circular Economy, Net Zero Pledges, Zero Waste Pledges**, and others, and most of all action.

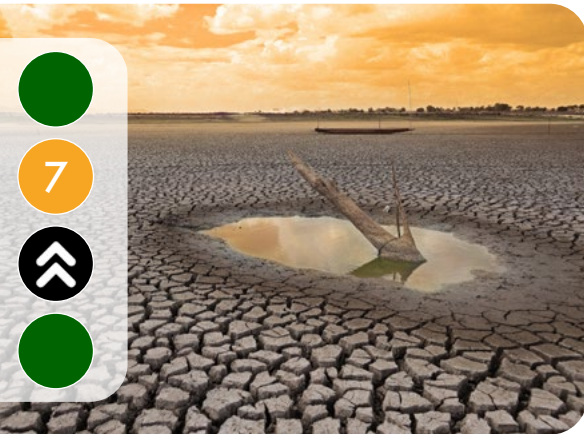
EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Agriculture, Construction, Energy, Manufacturing, and Transportation
- Policy and regulation reform



WATER SCARCITY AND STRESS

2ND YEAR ON THE LIST



QUICK TAKE

A complex issue global water scarcity and stress are both sides of the same coin, and they're both compounded by a combination of different factors that include everything from climate change, farming practises, ocean health, and the overall societal pressure on water sources, all the way through to poor water management strategies and pollution.

The net result of this is that in many regions the supply of fresh, safe water is becoming increasingly scarce and that local populations are having to go to increasingly extreme lengths to obtain it.

IMPACT

The increasing cost and lack of access to sources of fresh, safe water that can be used for domestic, industrial, and recreational consumption is becoming such a global issue that the phrase "Future wars will be fought over water" has now entered popular culture. The future lack of water has even caught the eyes of investors and speculators who are hedging tens of billions of dollars betting that in the future water prices will increase as it becomes increasingly scarce and sought after - a trend that's got governments and institutions around the world worried as they see water becoming an increasingly privatised commodity.

Today 72% of all water withdrawals are by agriculture, 16% by domestic, and 12% by industrial sources, and when a region withdraws more than 25% of its renewable water resources it's said to be water stressed. As a result 2.3 Billion people now live in water stressed countries, 3.2 Billion people live in agricultural areas with very high water scarcity, and 4 Billion people now experience severe water scarcity at least once a year. And, by the year 2030 it is estimated that over 700 Million people will be displaced by water scarcity.

EXAMPLES

Farming arguably has the greatest negative impact on water availability because not only is it the biggest user of water, with irrigated agriculture being by far the largest user of water globally, but it's also one of the biggest polluters and causes of desertification and land degradation. Furthermore, driven by a growing global population who in 1964 consumed an average of 2,000Kcal per person per day and by 2030 will reach over 2,700Kcal - with an increasing percentage of that coming from meat which creates its own issues - it is clear that agricultures need for water in the future, and therefore its impact on water scarcity, will continue to increase.

It's also easy to think of water scarcity as just a Third World issue, but in California, which is arguably one of the world's most modern and technologically sophisticated societies, over 88% of the state is now in Extreme drought conditions, with 47% of it experiencing Exceptional drought. Not only is this leading the state to ration water, but it's also causing farms to fail, helping fuel some of the world's worst wildfires, and as hydro-electric reservoirs run low it's causing severe energy shortages as well.

ACT NOW

When a civilisation runs out of water it goes extinct so, as you can see, water scarcity isn't just problematic, it can trigger extinction level events. And, while that might sound apocalyptic it's also very hard to argue against. As a result water, and water scarcity, could be one of the greatest and most pressing challenges of our time, and as such requires immediate action.

EXPLORE:

- Emerging technologies and technology roadmaps
- Future of Agriculture, Energy, Industry, Sustainability, and Water
- Policy and regulation reform
- Precision agriculture and sustainable modern farming methods, including Clean Meat and vertical farming
- Water desalination, direct air capture, reclamation, recycling, and other solutions
- Unilateral global accords and coordinated global action

Notes:

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An astronaut in a white spacesuit is floating in space, with Earth's clouds visible below and a starry galaxy in the background. The astronaut's helmet reflects the Earth. The text "THIS IS NOT THE END . EXPLORE MORE ." is overlaid on the top left.

THIS IS NOT THE END . EXPLORE MORE .

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UK311-211123-DOC01