

CLIMATE CHANGE IN THE KIMBERLEY REGION



Photographer: Elspeth and Evan



Photographer: Tim J Keogan

What is climate change?

The Earth's climate is not static. Over billions of years the world's climate has changed many times in response to natural causes. When people talk about 'climate change' today, however, they mean the changes in temperature that have occurred over the last 100 years as a result of the activities of humans. Human actions - burning fossil fuels (coal, oil, and gas), agriculture, and clearing land - have increased the amount of greenhouse gases put into the atmosphere. Which in turn has resulted in the warming of the Earth's surface, sometimes called 'global warming'. Over the last 100 years, the global average temperature of the atmosphere has risen by about 0.75 degrees Celsius. In Australia the last decade (ended in 2009) was the warmest decade on record, and since the 1940s each decade has been warmer than the last.

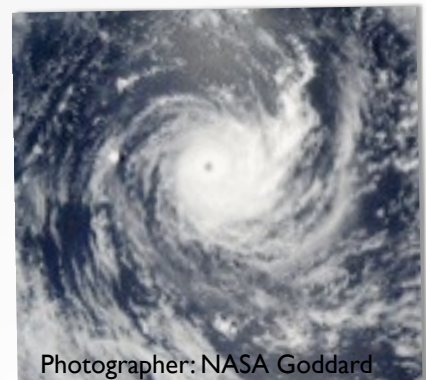
The majority of climate scientists agree that global temperatures will rise further. The rate of warming depends on the activities of humans. Put simply, the more greenhouse gases we put into the atmosphere over the coming years and decades, the warmer the Earth's climate will be. The more temperatures rise, the worse the impacts of climate change will be and the harder it will be to cope with. The sea level will rise and coastal erosion will increase, and there are likely to be stronger and frequent extreme weather events - like heatwaves, floods and tropical storms, and fires.



Photographer: Mundoo



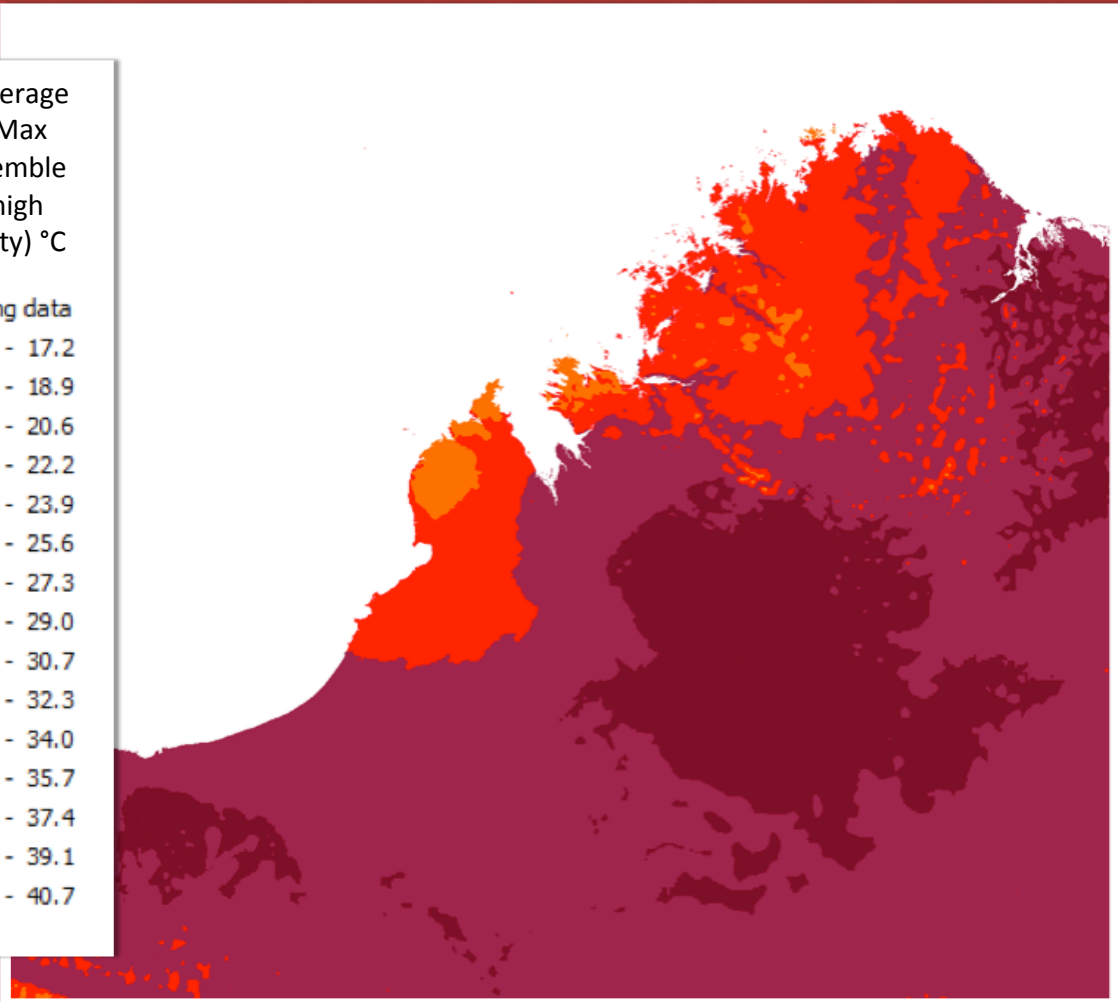
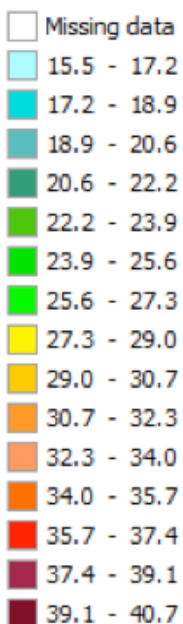
Photographer: UKFREETOUK



Photographer: NASA Goddard

CHANGES IN TEMPERATURE: 2070

2070 Average Annual Max (21 Ensemble – A1FI, high sensitivity) °C



BY 2030, THE ANNUAL AVERAGE TEMPERATURES IN WESTERN AUSTRALIA ARE PROJECTED TO INCREASE BY UP TO 1°C IN SOUTHERN AND COASTAL AREAS, AND UP TO 1.5°C INLAND.

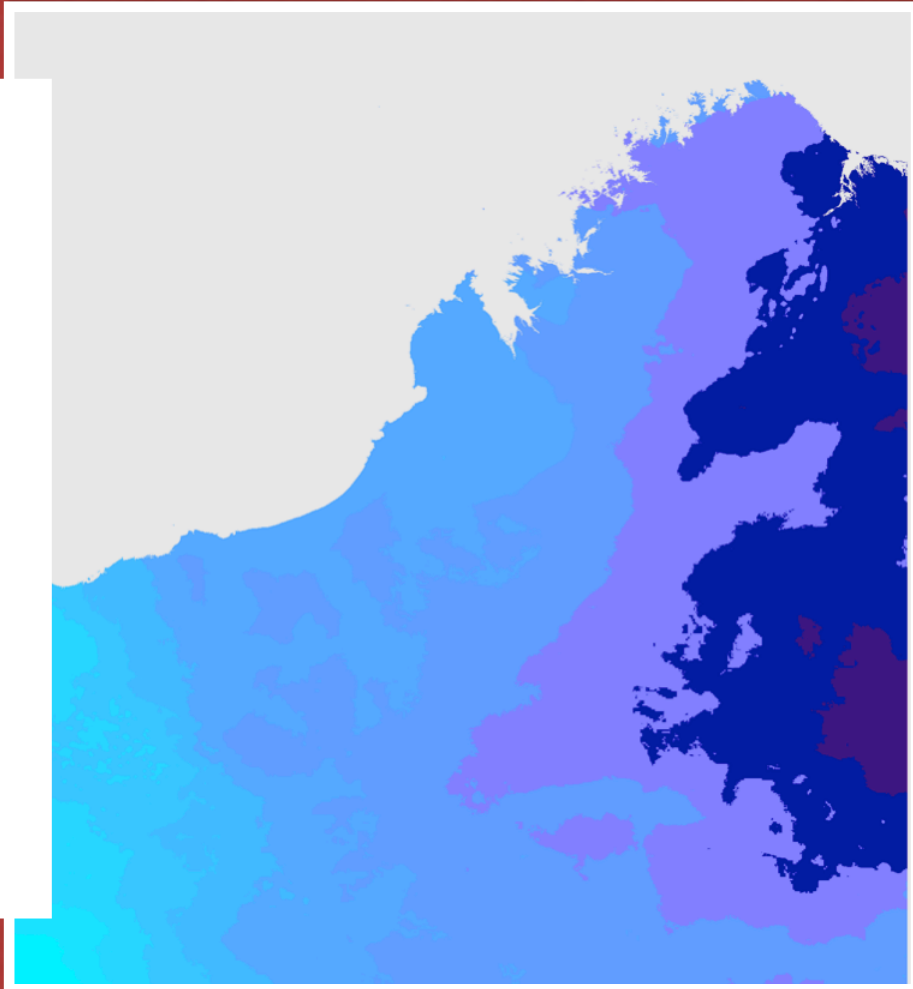
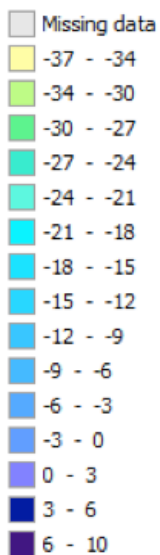
BY 2070 TEMPERATURES ARE LIKELY TO INCREASE EVEN MORE. WE DO NOT KNOW HOW MUCH EXACTLY TEMPERATURES WILL INCREASE. IT IS DEPENDENT ON THE AMOUNT OF GREENHOUSE GASES RELEASED INTO THE ATMOSPHERE. IF GREENHOUSE GASES ARE EMITTED IN LOW LEVELS, TEMPERATURES WILL PROBABLY INCREASE BETWEEN 1.5-2.5°C . IF GREENHOUSE GAS EMISSIONS ARE HIGH TEMPERATURES WILL INCREASE BY APPROXIMATELY 3-4°C.

LESS WARMING IS EXPECTED IN COASTAL AREAS.

Reference: CSIRO and BoM 2012
www.climatechangeinaustralia.gov.au

CHANGE IN RAINFALL: 2070

2070 Average Annual Rainfall (% change from baseline) (21 Ensemble – A1FI, high sensitivity)



GLOBAL WARMING IS GOING TO CHANGE RAINFALL PATTERNS IN THE KIMBERLEY REGION. SMALL CHANGES IN RAINFALL PATTERNS ARE PROJECTED TO OCCUR OVER THE NEXT 50 YEARS.

IT IS DIFFICULT FOR SCIENTISTS TO ACCURATELY PREDICT WHEN, WHERE AND HOW MUCH RAIN IS GOING TO FALL WITHIN A SINGLE MONTH LET ALONE OVER THE NEXT 50 YEARS TIME. HOWEVER SCIENTISTS AGREE THAT RAINFALL PATTERNS IN NORTHERN AUSTRALIA, INCLUDING THE KIMBERLEY REGION, ARE GOING TO CHANGE IN THE FUTURE AS A RESULT OF HUMANS PUTTING MORE GREENHOUSE GASES INTO THE ATMOSPHERE.

IN THE FUTURE, RAIN EVENTS ARE PROBABLY GOING TO BE HEAVIER IN THE KIMBERLEY (WITH MORE RAIN FALLING PER RAIN DAY). AS A RESULT, FLASH FLOOD EVENTS MAY BECOME MORE COMMON. LIKewise THERE IS PROBABLY GOING TO BE MORE DRY DAYS (TIME BETWEEN THE RAINS) AND THIS MAY CAUSE WATER SUPPLY PROBLEMS.

Reference: CSIRO and BoM 2012
www.climatechangeinaustralia.gov.au

WHAT ARE THE POTENTIAL IMPACTS OF CLIMATE CHANGE?

CLIMATE CHANGE

1. HUMAN ACTIONS ARE CHANGING THE EARTH'S CLIMATE
2. THE ENTIRE EARTH IS BECOME WARMER
3. SEA LEVELS ARE RISING
4. IN THE FUTURE THE KIMBERLEY REGION WILL BE A HOTTER PLACE
5. HEAVIER RAIN WILL BECOME MORE COMMON IN THE KIMBERLEY
6. WEATHER PATTERNS WILL BECOME MORE UNPREDICTABLE



Photographer: Tim J Keegan



Photographer: Sally Cummings

Extreme weather

- Increase in heavy rainfall events
- Stronger and more destructive tropical cyclones
- Very hot days become more common
- Drought and flood may become common
- Wildfires may be larger

Water resources

- Changes to rainfall: more rain but less often
- Saltwater may get into some freshwater supplies (groundwater and coastal)
- Decreased quality of drinking water
- Greater competition for water resources

Human health

- Increased chance of contracting water and food-borne illnesses
- More mosquitoes which may carry viruses harmful to humans
- Higher chance of injury and death from flooding and storm events

Biodiversity

- Loss of wetlands due to sea level rise
- Loss of important areas for certain plants and animals
- Some animal and plant species may become less common, others more common
- Changes in number and location of fisheries
- Bush foods and seafoods may become less available
- Increased chance of invasive species (feral animals and plants)

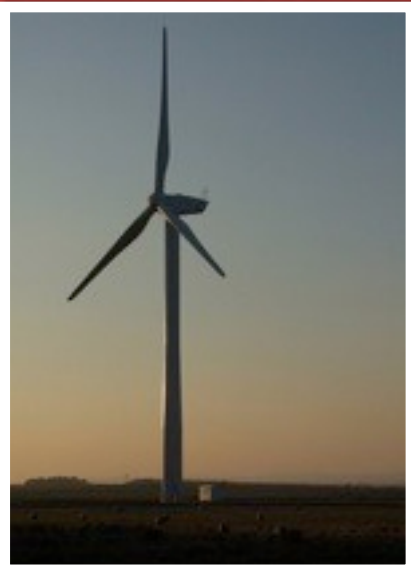
Settlements and infrastructure

- Increased damage to buildings and infrastructure from floods, storms, sea level rise, and coastal erosion
- May be more difficult to travel around the region
- Increased costs to government and individuals to maintain and protect houses and infrastructure from damage

Coastal communities

- Sea level rise may cause buildings and infrastructure to be covered in water (inundated)
- Erosion of coastlines will increase
- Cultural heritage sites may be vulnerable to damage

KEY TERMS



Photographer: Chris Parker

MITIGATION

MITIGATION IS ABOUT REDUCING THE AMOUNT OF GREENHOUSE GASES (INCLUDING CARBON DIOXIDE, CARBON MONOXIDE) PUT INTO THE ATMOSPHERE. MITIGATION EFFORTS INCLUDE:

- RENEWABLE ENERGY (HYDROELECTRIC, WIND FARMS, SOLAR)
- REDUCING PETROL, DIESEL, AND COAL CONSUMPTION
- MANAGEMENT OF WILDFIRES IN ARNHEM LAND
- PLANTING TREES
- PUTTING A TAX ON CARBON (ON USE OF FOSSIL FUELS)



Photographer: Chris Hoving



Photographer: Alex Indigo

ADAPTATION

ADAPTATION IS ABOUT HOW WE PREPARE FOR CLIMATE CHANGE. IT IS FOCUSED ON HOW WE CAN REDUCE THE HARMFUL EFFECTS OF CLIMATE CHANGE ON US AND OUR ENVIRONMENT, AND MAKE USE OF NEW OPPORTUNITIES. EXAMPLES OF ADAPTATION INCLUDE:

- IMPROVING EMERGENCY MANAGEMENT PLANS AND HELPING EMERGENCY SERVICES COPE WITH MORE FREQUENT AND STRONGER STORMS, FLOODS AND BUSHFIRES
- CHANGING THE SPECIES OF CROPS GROWN AND LIVESTOCK RAISED
- CHANGING BUILDING CODES TO MAKE SURE OUR ROADS, BRIDGES, AND OTHER ESSENTIAL INFRASTRUCTURE CAN COPE WITH GREATER HEAT, STORMS AND FLOODING
- RELOCATING SETTLEMENTS TO AREAS AT LESS RISK FROM STORMS, SEA LEVEL RISE AND FLOODING
- TRAINING HEALTH PROFESSIONALS TO COPE WITH MORE PEOPLE GETTING HEAT STRESS AND VECTOR, FOOD AND WATERBORNE DISEASES

Why focus on adaptation?

A certain amount of warming is now impossible to prevent. Even if we cut the amount of greenhouse gases now and stabilise the atmosphere, warming will still continue as a result of the amount of gases already in the atmosphere.

Adaptation and mitigation work together. Adaptation is required to manage and prepare for the impacts of climate change on our society and natural environment. Mitigation is essential to reduce the likelihood and intensity of further impacts.

Communities throughout Australia need to prepare for climate change, as well as help mitigate global warming by reducing greenhouse gas emissions.

Questions to consider when thinking about adaptation to climate change:

What are the most significant impacts of climate change for you and your community?

What actions need to be taken now (in the short-term)?

What actions should be taken in the future (in the long-term)?

WHAT LESSONS CAN WE LEARN FROM PAST EXPERIENCES OF EXTREME WEATHER EVENTS THAT CAN HELP US PREPARE FOR CLIMATE CHANGE BOTH NOW AND IN THE FUTURE?



Photographer: Ryan's Well Foundation

EXAMPLES



Photographer: CGIAR Climate

GROWING NEW CROPS



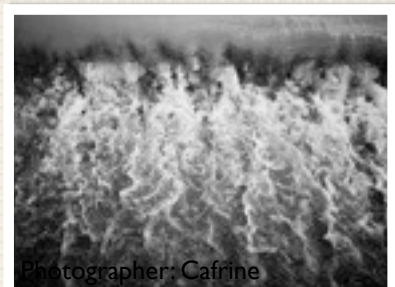
Photographer: Drancophylla

CONSERVING NATURAL RESOURCES



Photographer: Alecatonic Consonance

MANAGING DROUGHT



Photographer: Cafrine

COASTAL MANAGEMENT