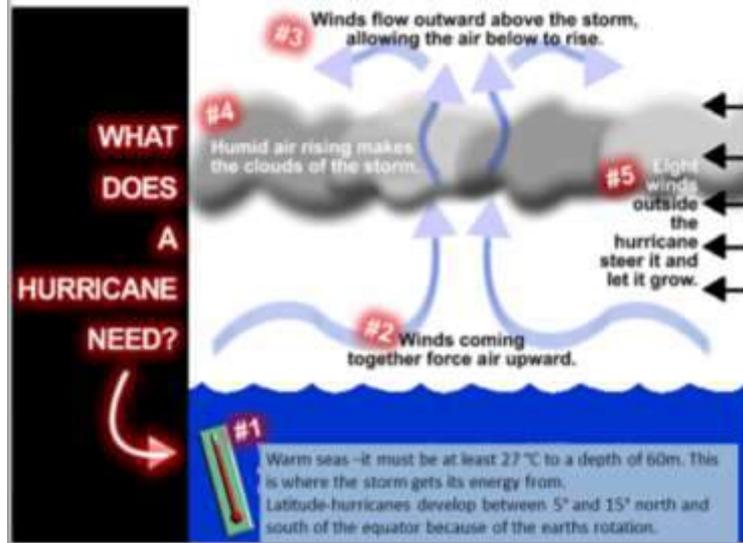


**Hurricane Katrina**

- Impacts**
- Killed 1464 people
  - 1 Million left homeless
  - Nearly everyone became unemployed.
  - Flooded 80% of the city.
  - Cost \$200 billion

- Impacts on groups of people.**
- 80% of residents evacuated before the hurricane hit-generally rich people with cars and a place to go.
  - 20% left behind were poor and elderly.
  - Most of the poor were black Americans

- Responses**
- Evacuation of people away from flooded zones.
  - Providing emergency medical help, shelter and water for victims.
  - Search and rescue teams sent to the affected areas.
  - 25,000 people were given temporary shelter at the Superdome (sports arena)
  - coast guard, police, army fire service and volunteers rescued over 50,000 people.



**How should Tropical Revolving storms be managed?**

- **Prediction** - yrs before plan, 1 year before ran simulation exercises
- Hurricane Pam, an elaborate federally sponsored simulation conducted in 2004, had predicted an eerily similar scenario with tens of thousands of deaths.
- **Plans**
- Levees built around New Orleans
- FEMA (Federal Emergency Management Agency) coordinates and plans
- Deals with huge disaster bigger than the state can cope
- Provide food and water in case of an emergency within 24/48 hours.
- **Monitoring** 24hr monitoring the storms
- **Total Evacuation** Supposed to organised evacuation for people who can't leave.
- In New Orleans 30% would not leave, 300,000. 150,000 did not have transport.

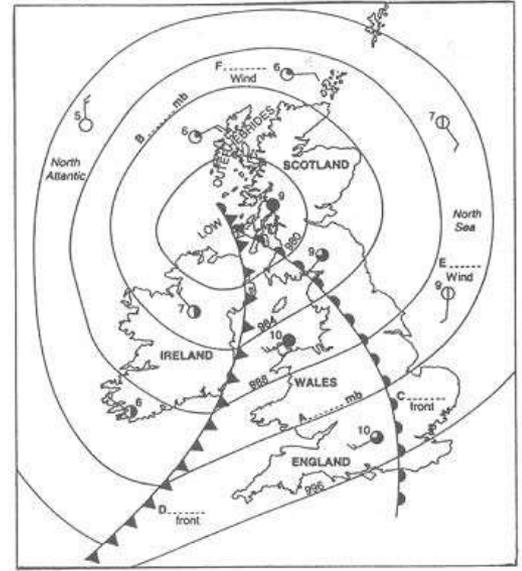
**Wildfires in California 2015,**

The wildfires were the result of a 3 year long drought that affected California between 2012-2015.

A drought is when significantly less rain falls than usual over a prolonged period of time.

**Impacts of Drought**

- 36% increase in wildfires. Property was damaged and wildlife killed. California produces nearly half of the fruits and vegetables grown in the USA. Shortages meant that prices rose by 6% in shops.
- Most HEP dams stopped producing electricity.
- Salmon and trout died in the San Joaquin River Delta. An increase in the river temperature means the water carries less oxygen for fish.



High and low pressure systems shown by synoptic charts.

Synoptic charts have isobars which show areas of the equal pressure. Where the pressure increases into the centre it is high pressure, where the pressure decreases into the centre it is low pressure. An occluded front happens when the cold front catches up to the warm front.

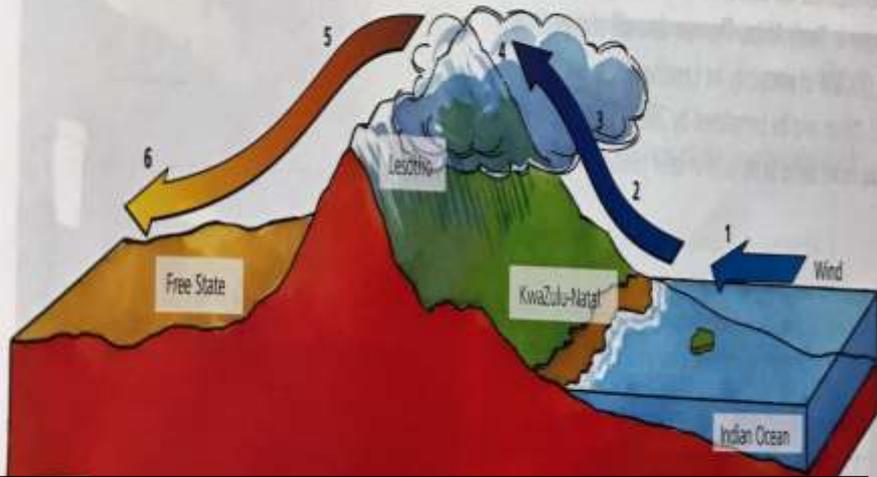
## Responses to the drought

- -Compulsory water restrictions
- -Farmers are bulldozing orchards
- -Farmers have dug several wells to pump groundwater .
- -Developing more solar energy and wind energy

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	The Savanna	
Climate	Distinct wet and dry seasons, high temperature all year round (37°C to 28°C). Highest temperature before the rain.	
Evapotranspiration	This is all the water evaporated and from trees. Water is evaporated from lakes , rivers and soil. Transpiration is all the water released by trees.	
Causes of desertification	Commercial farming	One crop is grown and sold for money. The best land is used to grow a cash crop. Huge amounts of water and pesticides are used.
	Over-grazing	Farmers let their goats eat all the shrubs and vegetation and the soil blows away.
	poor land management	Land cleared using slashing and burn. Farmed for a couple of years. Traditionally left for 8-15 years. This is known as the fallow period. Some villages only leave land for two or three years and the soil doesn't have time to recover. The soil blows away.
	Fire wood	Trees chopped down to build huts, and for firewood. The soil blows away.
Magic Stones & Zai planting	Magic stones – small rock dams built on contour lines every 25m to trap rain water during the wet season and encourage infiltration. Prevents soil erosion. Zai planting-holes are dug during the dry season 30 cm long and deep and 90 cm apart. They are filled with compost to provide plant nutrients. This has proved to be the most efficient way of reversing desertification.	
Drought-tolerant Crops.	Nippon Foundation (NGO) developed drought resistant maize. More expensive than usual varieties.	
Self Help Schemes	Drip Irrigation System-low tech, cheap, easily repaired & helps the poorest people. Problems no water available during dry season, requires refilling three times a day vs using a watering can once a day.	
International Responses-	The Great Green Wall-In 2010 11 countries have agreed to plant a 15km wide strip of land with trees and Shrubs across the width of Africa.	



### Machakos Miracle

-Machakos is a district in the hilly savanna SE of Nairobi, Kenya  
 -Desertification occurs partly due to the savanna climate. High temperatures, over 20 degrees all year round, increase evaporation and water loss and there is a dry season with no rainfall. Population in the area has increased so there is more pressure on trees for building and firewood and the area has been over-grazed  
 -Terraces have been used on slopes to trap rainwater and trees and hedges have been used to reduce soil erosion and replace cleared trees. Manure and compost are added to the soil to make it more fertile. As well as this sustainable land use, cash crops (e.g. coffee to be sold overseas and fruit and vegetable sold in Nairobi) have been grown to bring in money which can be invested in the area.

#### Relief rainfall-

1. Evaporation
2. Air rises
3. Cools Condenses Clouds
4. Precipitation
5. Air sinks ,Warming up.
6. Rain Shadow

### The Lesotho Highlands Water Project (LHWP)

Benefits for Lesotho	Lesotho is one of the worlds poorest countries. Selling water provides 75% of income \$53m. Hydro electricity . Construction created 20,000 jobs
Problems for Lesotho	They borrowed money to pay for the project \$31m. Farm land flooded. Many workers caught aids during construction. Many of the poorest people in Lesotho don't have access to water.
Benefits for South Africa	Capital city Johannesburg gets water for houses and industry.

Lake Chad	What happens when demand for water exceeds supply?
Where	Nigeria, Chad. Niger & Cameroon
What is happening	The lake is only 10% of its size 50 years ago.
Why is lake Chad disappearing	Human Activity and Changing weather patterns. Lack of rain, Dams, used to irrigate crops and fields & over- abstraction.
Impact on People	No safe drinking water, poverty has increased & rise in the support for extremist groups.
Environment	Salinisation, wetland ecosystems dried up, birds and fish have declined.
Economy	Less lake fishing – less income