Global Warming (Compiled by M. Rivera)
http://www.climatehotmap.org/about/global-warming-causes.html

Global climate change Causes

Global climate change is mostly a problem of too much carbon dioxide (CO2) in the atmosphere, which acts as a blanket, trapping heat and warming the planet. As we burn fossil fuels like coal, oil, and natural gas for energy, or cut down and burn forests to create pastures and plantations, carbon accumulates and overloads our atmosphere. Certain waste management and agricultural practices aggravate the problem by releasing other potent global climate change gases, such as methane and nitrous oxide.

Effects

http://www.climatehotmap.org/global-warming-effects/

Evidence of changes to the Earth's physical, chemical, and biological processes are now obvious on every continent. It's important to understand the ways these changes affect society and the natural environment. Not only are global climate change-induced changes currently underway, but scientists are also expect additional effects on human society and natural environments around the world. Some further climate change is already unavoidable.

On Humans....


As our climate changes, the risk of injury, illness, and death from the resulting heat waves, wildfires, intense storms, and floods rise. Higher temperatures are the change that is most influenced by human behavior. Because winter temperatures are rising faster than summer ones, cold-related deaths are likely to decline, but heat-related deaths will rise. Three key ingredients—sunlight, warm air, and pollution from power plants and cars burning coal and gasoline—combine to produce ground-level ozone (smog), which humans experience as poor air quality. Scientists expect that a warmer world would make it easier for some diseases to spread. Insects previously stopped by cold winters are already moving to higher latitudes (toward the poles). Warmer oceans and other surface waters may also lead to severe cholera outbreaks and harmful bacteria in certain types of seafood.
On Food....

http://www.climatehotmap.org/global-warming-effects/food.html

Climate-related threats to global food production include risks to grain, vegetable, and fruit crops; and to livestock and fisheries. Just as health risks are unequal, nations and individuals do not have equal access to the global food supply. Nations that lose arable land and critical fisheries may not have the resources or climate to pursue reasonable-cost options for maintaining food security. Some nations are also more vulnerable to unfavorable international trade agreements and to regional conflict, which may interrupt food distribution.

Some results of global climate change on food and food supplies may include:

- **Reduced yields**: The productivity of crops and livestock, including milk yields, may decline, because of high temperatures and drought-related stress.

- **Increased need for irrigation**: Regions of the world that now depend only on rain-fed agriculture may require irrigation, bringing higher costs and conflict over access to water.

- **Planting and harvesting changes**: Shifting of seasonal rainfall patterns, more severe rainfall, and related flooding may delay planting and harvesting.

- **Decreased arability**: Prime growing temperatures may shift to higher latitudes, where soil and nutrients may not be as suitable for producing crops, leaving lower-latitude areas less productive.

- **More pests**: Insect and plant pests may survive or even reproduce more often each year if cold winters no longer keep them in check. New pests may also invade each region as temperature and humidity conditions change. Lower-latitude pests may move to higher latitudes, for example.

- **Risks to fisheries**: Shifts in the abundance and types of fish and other seafood may hurt commercial fisheries, while warmer waters may pose threats to human consumption, such as increasing the risk of infectious diseases. Extreme ocean temperatures and ocean acidification place coral reefs—the foundations of many of the world’s fisheries—at risk.
On Human use of Water....

http://www.climatehotmap.org/global-warming-effects/water-supply.html

Humans use water for everything from drinking and bathing to growing crops, supporting livestock and fish farms, shipping goods, generating electricity, and simply relaxing and having fun. Yet climate change is producing profound changes in this precious commodity, threatening water availability, access, and even quality.

Some results of global climate change on human use of water may include:

- **A decline in drinking water.** Declines in both quantity and quality are expected.
- **A decline in irrigation supplies.**
- **Higher shipping costs.** Lower lake and river levels may increase shipping costs for food and other commodities.
- **Disruptions to the power supply.** Lower lake and river levels may threaten the capacity of hydroelectric plants, while higher temperatures may mean that water is too warm to cool coal and nuclear power plants, leading to power brownouts. Shrinking mountain glaciers threaten electricity generation, as well.
- **Effects on recreation.** Reduced snowpack and earlier spring snowmelt put traditional winter sports, such as skiing and snowmobiling, at risk.
- **Loss of mountain snowpack** reduces the amount of water available for irrigation downstream, while earlier spring snowmelt affects the timing.

On Costs


Scientists and economists are beginning to grapple with the serious economic and environmental consequences that will occur if we fail to reduce global carbon emissions quickly. The most expensive thing we can do is nothing!

On Freshwater


A warmer climate spurs the evaporation of water from land and sea and allows the atmosphere to hold more moisture, thus setting the stage for more extreme precipitation. While some regions are likely to get wetter as the world warms, other regions that are already on the dry side are likely to get drier. This especially threatens *land ice*, which includes any form of ice that lasts longer than a year on land, such as mountain glaciers, ice sheets, ice caps, and ice fields. Shrinking land ice is wreaking havoc across the globe.
On Oceans


Higher seas endanger coastal communities and threaten groundwater supplies. Two major mechanisms are causing sea level to rise. First, shrinking land ice, such as mountain glaciers and polar ice sheets, is releasing water into the oceans. Second, as ocean temperatures rise, the warmer water expands. Higher seas endanger coastal communities, where 40 percent of the world's population lives, and threaten groundwater supplies. Polar sea ice melts each summer and reforms each winter. Loss of sea ice accelerates climate change, threatens animals and peoples living in the Arctic, and raises global security concerns. The world's oceans are becoming more acidic, threatening sea life. Acidification occurs when the oceans absorb CO2 from the atmosphere; the acidification of the oceans due to climate change impairs the ability of coral reefs and shelled organisms to form skeletons and shells.

On Ecosystems


Global climate change and climate change can alter where species live and how they interact, which could fundamentally transform current ecosystems. Climate change is already beginning to affect plants and animals that live in freshwater lakes and rivers, altering their habitat and bringing life-threatening stress and disease. Rising temperatures and shifting precipitation patterns are changing the geographic areas where mammals, birds, insects, and plants that live on land can survive, and are affecting the timing of lifecycle events, such as bud bursts, leaf drop from trees, pollination, reproduction, and bird migration. Although marine species are more difficult to observe and have been studied less than land and freshwater species, they are known to be experiencing some of the same effects from global climate change.

On Air Temperature


Rising air temperature brings heat waves, spreads disease, shifts plant and animal habitats, and causes extreme weather events, from drought to blizzards. Warmer oceans put coastal communities at risk, increase infrastructure costs, endanger polar creatures, and threaten coral reefs and fisheries. Perhaps most alarmingly, rising ocean temperatures accelerate the overall climate change trend. Warmer lakes, rivers, and streams threaten aquatic species by disrupting reproductive cycles, displacing cold-water species, and creating dead zones in deep lakes. As permafrost (frozen ground) thaws, it releases heat-trapping gases into the atmosphere, which accelerates global
climate change. It also alters local ecosystems and destabilizes infrastructure, necessitating costly repairs.

Solution


There is no single solution to global climate change, which is primarily a problem of too much heat-trapping carbon dioxide (CO2), methane, and nitrous oxide in the atmosphere. The approaches outlined below are all needed to bring down the emissions of these chemicals.

- **Boosting energy efficiency**: The energy used to power, heat, and cool our homes, businesses, and industries is the single largest contributor to global climate change. Energy-efficient technologies allow us to use less energy to get the same or higher level of production, service, and comfort. This approach has vast potential to save both energy and money, and can be deployed quickly.

- **Greening transportation**: The emissions from transportation have increased at a faster rate than any other energy-using sector over the past decade. A variety of solutions are at hand, including improving efficiency (miles per gallon) in all modes of transport, switching to low-carbon fuels, and reducing vehicle miles traveled through smart growth and more efficient mass transportation systems.

- **Revving up renewable**: Renewable energy sources such as solar, wind, geothermal and bio-energy are available around the world. Multiple studies have shown that renewable energy has the potential to meet the majority of our energy needs. Renewable technologies can be deployed quickly, are increasingly cost-effective, and create jobs, while reducing pollution.

- **Phasing out fossil fuel electricity**: Dramatically reducing our use of fossil fuels, especially carbon-intensive coal, is essential to tackle climate change. Key action steps include: not building any new coal-burning power plants; initiating a phased shutdown of coal plants, starting with the oldest and dirtiest; and capturing and storing carbon emissions from power plants. There is technology to store carbon emissions underground. The technology has not been deployed on a large scale or proven to be safe and permanent, but it has been demonstrated in other situations such as oil and natural gas recovery.

- **Managing forests and agriculture**: Taken together, tropical deforestation and emissions from agriculture represent nearly 30 percent of the world's heat-trapping emissions. We can fight global climate change by reducing emissions from deforestation and forest degradation and by making our food production practices more sustainable.

- **Exploring nuclear**: Because nuclear power results in few global climate change emissions, an increased share of nuclear power in the energy mix could help reduce global climate change, but nuclear technology poses serious threats to our security. The question remains: can the safety, production, waste disposal, and cost barriers of nuclear power be overcome?
• **Developing and deploying new low-carbon and zero-carbon technologies:** Research into and development of the next generation of low-carbon technologies will be critical to reductions in global emissions. Current research on battery technology, new materials for solar cells, harnessing energy from novel sources like bacteria and algae, and other innovative areas could provide important breakthroughs.

• **Ensuring sustainable development:** The countries of the world, from the most to the least developed, vary dramatically in their contributions to the problem of climate change and in their responsibilities and capacities to confront it. A successful global compact on climate change must include financial assistance from richer countries to poorer countries to help make the transition to low-carbon development and to help adapt to the impacts of climate change.

Adapting to changes already underway: The impacts of the world’s climate change are already being felt by people around the globe. If climate change continues unchecked, these impacts are almost certain to get worse. From sea level rise to heat waves, from extreme weather to disease outbreaks, each unique challenge requires locally suitable solutions to prepare for and respond to the impacts of global climate change. Unfortunately, those who will be hit hardest and first by the impacts of a changing climate are likely to be the poor and vulnerable, especially those in the least developed countries. Developed countries must take a leadership role in providing financial and technical help for adaptation.

**Solutions to Global climate change in North America**


Solutions to global climate change in North America include reducing coal emissions, increasing the use of energy efficiency and renewable energy, greening transportation, and helping developing countries reduce deforestation.

The United States is often noted as the being the most significant contributor to historical emissions of global climate change pollution. Most of these emissions occur when power plants burn coal or natural gas, and when vehicles burn gasoline or diesel. The U.S. should act now to reduce emissions of heat-trapping gases. "The longer the nation waits to begin reducing emissions, the harder and more expensive it will likely be to reach any given emissions target."

**Examples**

**Auto Emissions:** The smog put out by older vehicles and large vehicles like hummers and semis.

**Glaciers Melting:** As the ice disappears, tiny sea creatures called krill are dying – and so are the many fish, birds, and whales that eat them. Polar bears spend most of their time on the sea, ice hunting seals and other sea animals. As the ice melts, the bears’ hunting season is shortened, and female bears, with lowered body weights, can’t seem to produce cubs.

**Pressurized Products:** Using old hair spray, spray paint, or other items that may be pressurized with a gas that contains chlorofluorocarbons, which dissolve the protective Ozone Layer that surrounds our atmosphere.
Questions and Answers

- **Global climate change Causes**

  Q: What is the primary problem?
  
  A: Too much carbon dioxide (CO2) in the atmosphere—which acts as a blanket, trapping heat and warming the planet

  Q: What are fossil fuels?
  
  A: Coal, oil, and natural gas/methane. Nitrous oxide is released when fossil fuels are burned.

- **Global climate change Effects**

  Q: What are some ways global climate change affects society and the natural environment?
  
  A: Sea levels are rising and glaciers are shrinking; record high temperatures and severe rainstorms and droughts are becoming increasingly common.

  Q: What are some ways it affects people?
  
  A: Risk of injury, illness, and death from the resulting heat waves, wildfires, intense storms, and floods rises. Because winter temperatures
are rising faster than summer ones, cold-related deaths are likely to decline, but heat-related deaths will be on the rise.

Q: What are some climate-related threats to global food production?
   A: Lower production from grains, vegetables, and fruit crops, livestock, and fisheries

Q: What are some ways it affects freshwater?
   A: Extreme Wetness – A warmer climate spurs the evaporation of water from land and sea and allows the atmosphere to hold more moisture.

   Extreme Dryness – Although some regions are likely to get wetter as the world warms, other regions that are already on the dry side are likely to get drier.

   Land Ice – Shrinking land ice is melting glaciers and raising the sea level.

Q: What are some ways it affects oceans?
   A: Rising sea Level, Higher seas endanger coastal communities and threaten groundwater supplies Sea Ice, Polar sea ice melts each summer and reforms each winter. Loss of sea ice accelerates warming, threatens animals and peoples living in the Arctic, and raises global security concerns. Ocean Chemistry, Oceans are becoming more acidic, threatening sea life. Acidification occurs when the oceans absorb CO2 from the atmosphere; the acidification of the oceans due to climate change impairs the ability of coral reefs and shelled organisms to flourish.

Q: What are some ways it affects Ecosystems?
   A: Global warming and climate change can alter where species live and how they interact. It affects plants and animals that live in freshwater lakes and rivers, altering their habitat and bringing life-threatening stress and disease. Rising temperatures and shifting precipitation patterns are changing the geographic areas where mammals, birds, insects, and plants that live on land can survive, and are affecting the timing of lifecycle events.
Q: What are some ways it affects Temperature?

A: It brings heat waves, spreads disease, shifts plant and animal habitats, and causes extreme weather events, from drought to blizzards. Warmer oceans put coastal communities at risk, increase infrastructure costs, endanger polar creatures, and threaten coral reefs and fisheries.

Warmer lakes, rivers, and streams threaten aquatic species. As permafrost (frozen ground) thaws, it releases heat-trapping gases into the atmosphere, which accelerates global climate change.

Q: What are some Global climate changes Solutions?

A: Boosting energy efficiency
   Greening transportation
   Revving up renewable
   Phasing out fossil fuel electricity
   Managing forests and agriculture
   Exploring nuclear energy
   Developing and deploying new low-carbon and zero-carbon technologies
   Ensuring sustainable development
   Adapting to changes already underway

Q: What are Global climate change solutions in America?

A: Reducing coal emissions, increasing the use of energy efficiency and renewable energy, greening transportation, and helping developing countries

Water (by N. Moreno Avila)


i Water Contamination and Waste causes

Water contamination is a global dilemma that impacts every country and its inhabitants in a different way. Here in the United States, the main worry is not the overwhelming amount of litter that plagues our fresh water resources -- like it is for underdeveloped countries. No,
the main worries are how our own agriculture, without trying to, pollutes our ground water resources with its use of pesticides and herbicides, and how we as a nation waste and misuse our water supply.

**ii Effects**

The Ogallala Aquifer is one of our country’s most valuable ground water resources, which supplies about 27 percent of our farmers with water for their crops. The Ogallala spans across eight states, from South Dakota all the way down to Texas, so you can imagine how necessary this aquifer is for all of us. However, due to the excess use of pesticides like Atrazine, which farmers use to protect their crops from plagues, these poisonous chemicals seep down through the soil and reach and contaminate the Ogallala. This contaminated water is then used to irrigate their fields and crops (crops that the rest of us eat).

**ii.i On Humans**


As mentioned before, one of the main concerns we have as a country when it comes to water is how much all of us carelessly waste it. This is a shame, because in some parts of sub-Saharan Africa, for example, in parts of Cameroon, children die due to disease and dehydration. Poor sanitation of facilities such as bathrooms makes diseases spread easily, and since most children in these parts of the world have poor nutrition, they are not able to fight off these diseases. These children then begin to suffer from severe diarrhea, which leads to dehydration. Since their communities have no safe drinking water, they cannot replace the loss of fluids. So they die.

**ii.i On Oceans**


In 2011, Japan suffered a major earthquake and tsunami, leaving it crippled. But that was only the beginning of Japan’s problems. Due to these natural disasters, Japan’s Fukushima nuclear power plant was also damaged. This damage has proven to be a big problem, because now radioactive water from the plant’s tanks is leaking into the Pacific Ocean. This radioactive water or radioactive plume is estimated to reach the U.S. coast around 2014. The good news is that by the time it does reach us, the plume would be too diluted to have any harmful effects on humans.

**ii.iii On Food**


Due to the use of harmful pesticides, the food we eat and the soil we use to grow that food are already having an effect on the nutritional value of our crops – making them less healthy for you. And if that’s not bad enough, these fertilizers are potentially poisonous. For example, Atrazine is said to be capable of retarding fetal development, because it is a considered a hormone disruptor. Eventually, because most of our agriculture depends so much on these fertilizers, it is predicted that in the future, we will exceed the federal safety levels which restrict how much of these harmful chemicals is allowed to mix in Ogallala’s wells.
Contaminated water not only has damaging effects on humans, but also on the ecosystems surrounding us. An Ecosystem is like a little community, made up of living organisms, like plants, animals, fungi, and bacteria. These communities exist all around us in our environment, in nearby lakes, ponds, and even parks. Ecosystems depend on balance: if one member of this great family can’t function, the rest can’t function properly either. That is why contaminated water is so dangerous, because it can disrupt this balance. Once polluted water enters an ecosystem due to the use of fertilizers or litter buildup in a lake, the organisms living in that lake will begin to suffer and eventually die. As this lake continues to be contaminated, the other animals in this ecosystem, which depend on the lake as their drinking water source, will be affected. If not contained, this chain of destruction will continue to feed off this chain of life.

Contaminated drinking water affects millions of people worldwide, especially parts of sub-Saharan African, Latin America, and the Caribbean. Many people in these regions depend on ponds, lakes, rivers, or other water sources that are not reliable because they are not protected or regularly sanitized. And these same sources are usually contaminated by overwhelming amounts of litter and fecal matter.

It is very expensive to clean water and keep it clean, because of the complexity of the cleaning and testing process. So, this is one of the major reasons why underdeveloped countries don’t have clean water – they simply can’t afford to keep it clean.

Contaminated water and irresponsible misuse of this resource are difficult problems, but they are not impossible to solve. There are already a number of projects underway, and some have already had a major positive impact worldwide.

Automated irrigation systems: Remember the Ogallala? There’s a team of researchers down at the Conservation and Production Research Laboratory who are working on ways to help farmers that depend on it make the most of every drop of water. These researchers have developed automated irrigation systems. What this means is that farmers won’t have to worry about watering their crops, because it would be done for them automatically, sort of like automated sprinklers. These systems will help reduce the amount of water wasted and reduce the overall cost of pumping out water.

Better data collection and monitoring: One of the main factors that have made giving people access to safe water such a hard task is that nobody knew where to start. Or in other words, nobody knew who had an urgent need for pure water. They also didn’t know what countries were the most affected by contaminated water. That’s why for over 20
years, organizations like **WHO** (World Health Organization) and **UNICEF** (United Nations Children’s Fund) have made it easier to collect and track this information. They use surveys such as the Multiple Indicator Cluster Survey (MICS), which are household questionnaires. This means that these surveys are given to every home in the countries they want to collect data from. These surveys are a great way to find which towns or groups of people depend on unreliable water sources, and which have reliable sources. In the end, it makes helping people in need so much easier.


**The prevention package:** **UNICEF** and **WHO** have come up with a strategy to stop further deaths of children from diarrhea due to malnutrition and unsafe water. The prevention package includes these strategies: giving children access to rotavirus and measles vaccinations, promoting breastfeeding, promoting vitamin A supplementation, promoting hand washing with soap, and improving the water resources (making and keeping them clean).


**You:** No matter how hard one organization or group tries, water pollution and water misuse are a huge problem. It’s going to take everybody to fix it – including **You**. Don’t worry, you don’t have to be a researcher or humanitarian leader to make a difference; sometimes, small acts are enough. For example, don’t leave the water running while you’re brushing your teeth, and don’t take too long in the shower. You can also teach your friends and family these things, so they can also take care of water. If that’s still not enough for you, you can always go on-line and look for other ways to get involved.

**Here are some helpful sites:**


http://www.epa.gov/

http://wateruseitwisely.com/

http://www.discoverwater.org/

---

**Questions and Answers**

**Water Contamination and Water Misuse:**

**Q:** Name two ways in which water is contaminated or misused worldwide?

**A:** Agricultural pesticides and industrial waste pollute water worldwide affecting millions of people, leaving them with no potable water for drinking, bathing, or cooking.
Q: Name some of the challenges that people in some areas of the world face when accessing sources of water?
   A: Water sources are often unreliable and fluctuate due to drought, seasonal rainfall and other climate induced issues. In addition to the unreliability of the water source often times there are issues of sanitation arising from litter and fecal matter polluting the sources.

Q: What damage has been done the oceans?
   A: Our oceans are constantly being polluted by dangerous chemicals. Sometimes, these chemicals come from accidents such as oil spills, nuclear melt downs, oil drilling and other industrial accidents. Other times these chemicals are coming from intentional dumping of toxic waste into the ocean by unscrupulous companies.

Q: Is the use of pesticides affecting our food?
   A: Because of the use of pesticides, our crops are being negatively affected, which makes our food less nutritious and possibly poisonous.

Q: Who’s impacted by contaminated water?
   A: Everyone! Innocent animals, people and our ecosystems suffer because of our carelessness. The financial cost of keeping water clean is overwhelming for underdeveloped countries, but the emotional cost is even greater.

Q: How can we be informed by what is going on with the water crisis?
   A: By following organizations like World Health Organizations and United Nations Children’s Fund. These organizations offer better tracking and monitoring of people who need water and how they obtain it.

Q: Drinking unsafe water can cause death tolls amongst children, what can be done to prevent this?
   A: Prevention help can be found through WHO and UNICEF which contain literature on water usage, vaccines and hygiene. You have the power to fix the mistakes of past generations and reduce deforestation!