Water resources and desertification

And one more thing from the Guardian about population and over consumption.......
The “suburbs” of Mexico City population: 21,000,000
Hillside Slums in Port-au-Prince, Haiti
Oil fire on the Gulf of Mexico after the Deep Horizon oil spill

In 2013 Global oil consumption was roughly 91 million barrels/day—
Deep Horizon spill was roughly 4.9 million barrels
Industrial Feed Lot in Brazil
It takes an average of 1,850 gallons of water to produce one pound of beef, whereas it takes an average of 500 gallons of water to produce one pound of chicken.
Greenhouses in Almeria, Spain
Clear-cut Forest in British Columbia
Clear-cutting in Willamette National Forest, Oregon
Surfing the trash by Java, Indonesia
Crop production in China
Kern River Oil Field in California
Groundwater & Land Subsidence in California

In an average year, groundwater provides about 40% of California’s water supply.

In the current drought, groundwater may account for 65% or more of the state’s groundwater supply.

Subsidence in Santa Clara Valley has required various infrastructure construction & repairs, totaling more than $756 million.

Subsidence from groundwater pumping in the San Joaquin Valley has been called the greatest human alteration of the Earth’s surface.

Today, land subsidence is occurring at almost 1 ft/yr.

By 1970, subsidence of more than 1 foot had affected more than half of the San Joaquin Valley — in some areas as much as 28 feet.


Sustainable Conservation
http://www.suscon.org
World Population and the consequences thereof.....

Percentage of Population Without Reasonable Access to Safe Drinking Water

Reasonable access to safe drinking water is defined as the availability of at least 20 liters per person per day from an improved source within 1 kilometer of the user's dwelling.

Population graphics and information obtained from: http://www.theglobaleducationproject.org/earth/human-conditions.php
Water Resources

Percent of water on the surface of the earth?

Roughly 70%

What percent of that water is salty and therefore not potable?

Roughly 97%

What percent of that fresh water is held up in glaciers?

Roughly 1.74%

Getting thirsty?
## One estimate of global water distribution

<table>
<thead>
<tr>
<th>Water source</th>
<th>Water volume, in cubic miles</th>
<th>Water volume, in cubic kilometers</th>
<th>Percent of freshwater</th>
<th>Percent of total water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oceans, Seas, &amp; Bays</td>
<td>321,000,000</td>
<td>1,338,000,000</td>
<td>--</td>
<td>96.54</td>
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<tr>
<td>Ice caps, Glaciers, &amp; Permanent Snow</td>
<td>5,773,000</td>
<td>24,064,000</td>
<td>68.6</td>
<td>1.74</td>
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<tr>
<td>Groundwater</td>
<td>5,614,000</td>
<td>23,400,000</td>
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<td>1.69</td>
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<tr>
<td>Fresh</td>
<td>2,526,000</td>
<td>10,530,000</td>
<td>30.1</td>
<td>0.76</td>
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<tr>
<td>Saline</td>
<td>3,088,000</td>
<td>12,870,000</td>
<td>--</td>
<td>0.93</td>
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<tr>
<td>Soil Moisture</td>
<td>3,959</td>
<td>16,500</td>
<td>0.05</td>
<td>0.001</td>
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<tr>
<td>Ground Ice &amp; Permafrost</td>
<td>71,970</td>
<td>300,000</td>
<td>0.86</td>
<td>0.022</td>
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<tr>
<td>Lakes</td>
<td>42,320</td>
<td>176,400</td>
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<td>0.013</td>
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<tr>
<td>Fresh</td>
<td>21,830</td>
<td>91,000</td>
<td>0.26</td>
<td>0.007</td>
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<tr>
<td>Saline</td>
<td>20,490</td>
<td>85,400</td>
<td>--</td>
<td>0.007</td>
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<tr>
<td>Atmosphere</td>
<td>3,095</td>
<td>12,900</td>
<td>0.04</td>
<td>0.001</td>
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<td>Swamp Water</td>
<td>2,752</td>
<td>11,470</td>
<td>0.03</td>
<td>0.0008</td>
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<tr>
<td>Rivers</td>
<td>509</td>
<td>2,120</td>
<td>0.006</td>
<td>0.0002</td>
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<tr>
<td>Biological Water</td>
<td>269</td>
<td>1,120</td>
<td>0.003</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

How do we, as humans, consume water? Is the rate at which we consume it sustainable?
Groundwater recharge (mm/year)

Groundwater depletion (mm/year)
Glen Canyon Dam: a lesson in hydrogeology
What does all this mean for your future water security?
**Physical water scarcity**
Water resources development is approaching or has exceeded sustainable limits. More than 75% of the river flows are withdrawn for agriculture, industry, and domestic purposes (accounting for recycling of return flows). This definition—relating water availability to water demand—implies that dry areas are not necessarily water scarce.

**Approaching physical water scarcity.** More than 60% of river flows are withdrawn. These basins will experience physical water scarcity in the near future.

**Economic water scarcity**
(human, institutional, and financial capital limit access to water even though water in nature is available locally to meet human demands). Water resources are abundant relative to water use, with less than 25% of water from rivers withdrawn for human purposes, but malnutrition exists.

**Little or no water scarcity.** Abundant water resources relative to use, with less than 25% of water from rivers withdrawn for human purposes.

Source: Comprehensive Assessment of Water Management in Agriculture, 2007
The CIA has stated that floods, shortages and poor water quality may eventually lead to instability and regional conflicts. In 2001, Kofi Annan, the UN secretary-general at the time, declared that “fierce competition for fresh water may well become a source of conflict and wars in the future.”
Desertification: a type of land degradation in which a relatively dry land region becomes increasingly arid, typically losing its bodies of water as well as vegetation and wildlife. It is caused by a variety of factors, such as climate change and human activities.
Can anything be done?