

A Sustainable Environment: Our Obligation to Protect God's Gift

by
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The Rising Seas Will Require Adaptation

Despite what you read from the climate change deniers, the sea level is rising due to three separate but related factors. The warming of the planet is also warming the oceans, and this causes an expansion of the water causing it to rise. Glaciers and polar ice caps melt every summer but during the winter the snows from the evaporated sea water balances the loss of ice. However, the summer melting is greater than normal and the winter snowfalls are less than usual as the winters are shorter and warmer. The third factor is the melting ice sheets covering Greenland and West Antarctica. The warmer water is causing some melting from below the ice sheets which allows for some of the ice to move faster into the ocean and weaken the ice sheets thus having them break off into the sea.

Over the past century, the sea level has risen about four to eight inches but during the past 20 years, the rate of level rise has doubled, and we have seen an increase of almost three inches. It is very unlikely that this increase in sea level rise will do anything but continue to rise and at a more rapid rate. The carbon dioxide emitted into the atmosphere will exist for at least another 75 years unless a technology is developed that will absorb the carbon dioxide and convert it to some other useful material. How high can the sea level rise? The Intergovernmental Panel on Climate Change says we can expect the oceans to rise between 11 and 38 inches by 2100, enough to swamp many of the cities along the U.S. East Coast. More dire estimates, including a complete meltdown of the Greenland ice sheet, place sea level rise to 23 feet (7 meters), enough to submerge major cities like London and most of Florida.

Since it is really too late to reduce the carbon emissions already in the atmosphere, we must ADAPT to the current situation which, as indicated above, will only get worse as the climate temperature continues to increase. A good example of a city that has a major problem with sea level rise and is resorting to adaptation is Miami Beach. It is a coastal city built on porous limestone which allows a rising sea level to push water up out of the ground. If the city experiences a coastal storm, it can see a two-foot flood. In order to mitigate this ongoing problem, the city is spending about \$400 million to develop a resiliency plan. They plan to install a high tech drainage system, and they also plan to raise the roads a few feet. This investment is a minor one compared to what coastal cities are doing all over the world. They are spending about \$280 billion per year to adapt to this changing environment.

Some of this money is being used to develop new and ingenious engineering solutions to this worldwide problem. The Dutch engineers excel in this area as they have had to develop systems for their entire country, as much of it is below sea level. That is why it is known as The Netherlands, or the "lower country". Rotterdam, its second largest city, while already protected by sophisticated dikes is upgrading its resiliency plan. They are building "water plazas" which

are buildings with reservoirs that sequester rainfall and letting it seep out into the ground. Or this water can be used for swimming or wading pools, anything that can be benefited by this excess water. In China, Dutch engineers are building a city that is specifically designed to absorb all water runoff. They call this approach “living with water”.

Here in the U.S., this Adaptation Economy will have to be adopted by many of our coastal cities like New Orleans and San Francisco. I am sure that most of them are already looking into this major issue. Two years ago, the Rockefeller Foundation agreed to fund a new position for 100 major U.S. cities, that of Chief Resilience Officer. It is their responsibility to assess the potential consequences of climate change in each city and develop a plan to adapt to the changing landscape. In addition, the organization “100 Resilient Cities” was created so that the 100 CROs can learn from each other. Sophisticated modeling techniques are being adopted in order to predict how and where water will inundate the coasts. This is a great and very important new field for high tech designers.