

## Shall We Talk About the Weather?

We know everyone talks about the weather and none of us can do anything about it. Or can we? Mark Twain distinguished weather from climate very succinctly, "Climate is what you expect; weather is what you get." Climate refers to weather conditions that occur over years, centuries.

If you wonder why farmers and gardeners are concerned about the climate warming, it is because just a one-degree difference can affect crops. These changes are affecting planting zones, the habitats of insects, birds, and animal species and the patterns of drought and storms.

Pennsylvania may not have sufficient cold days each winter to be assured of their orchards's bud production. Costa Rica's export of their important coffee crop has dropped 44% since 2000 partially due to the increase in the number of warm days since the 1970s. These are expensive problems.

Carbon dioxide (CO<sub>2</sub>) is both the cause of ocean acidification and a major contributor to the greenhouse gases affecting climate change. Since CO<sub>2</sub> remains in the atmosphere for centuries, the problem will not go away any time soon. We need to taper off, not increase the emissions of CO<sub>2</sub> from fossil fuels.

One of the problems inherent in any discussion of climate change is the divergent way scientists and the rest of us use language. We laymen leap to conclusions, snatch at answers, settle the questions. Scientists on the other hand work with uncertainties and probabilities and arrive at theses that are open-ended, not conclusive. For scientists, one discovery leads to the next discovery, not to certainty. The state of knowledge about scientific subjects is temporary.

Those of us who left school decades ago can attest to that since most of what we thought we knew is either no longer true or so much has been added to that core of information it now looks entirely different. In science uncertainty is the norm. Science deals with trends, indications, possibilities. Most of us who are not scientifically educated are more comfortable with black and white, win or lose. We tend to distrust nuances.

Scientists have been writing about climate change and the connection to the burning of fossil fuels for decades. Guy Stewart Callendar (1898-1964) discovered links between burning fossil fuels and global warming and investigated the carbon cycle, called the Callendar Effect in his name.

For decades climate change did not attract much attention. It is a process and a slow process at that as glaciers slide into oceans, ice retreats, and the number of ships traveling from one side of the Arctic Circle to the other increases from year to year. We notice as polar bears quietly drown but we really don't comprehend shore erosion or the devastation resulting when deserts enlarge. These changes to our familiar planet are off our radar.

The Exxon Valdez wreck dumping oil into Alaskan waters was news. The 50% greater amount of petroleum runoff from parking lots, gas stations and driveways that goes into our own coastal ecosystems each year is not news. There are also spills; not only are there thousands of barely mentioned spills in the US but an oil pipeline in Ecuador was damaged and spilled 420,000 gallons of oil that polluted rivers and left thousands without drinking water.

For critics to the development of a strategy for coping with climate change the impulse to criticize comes not only from denial but from a concern about cost. We can sympathize, as measures to ameliorate the effect of this new 'normal' will be expensive. However, those people who have been studying the situation for decades have the numbers to prove that to do nothing is

vastly more expensive. One reason to make the effort to combat climate change is because climate change itself is unaffordable!

Last year alone the taxpayers paid \$140 Billion to cover crop losses, flood damages and wild fires. Twice the acreage is being burned now and there are seven times as many large fires. Because of early snowmelt and higher temperatures the fire season has increased by two months. It may be time to stop being penny wise and pound foolish?

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