

**Casper Star Tribune of Sunday, June 28, 2015: “Worst is yet to come on climate change”  
(to be published in the WTE in a few days)**

How much is global warming costing the people of Wyoming? The flash floods that inundated some Wyoming communities this spring and that, in years past, cost several lives, were bad enough. There is worse to come. The average American consumes more than 300 gallons of California water every single week, simply by eating the food that was produced there. The cost of that food, that water, is about to skyrocket.

California farmers produce more than a third of the nation’s vegetables and two-thirds of its fruits and nuts. To do that, they use nearly 80 percent of all the water consumed in the state. They are now facing serious restrictions—and these restrictions mean higher food prices for everyone. Even farmers with water rights dating to the Gold Rush are hit with sharp cutbacks. Officials said the restrictions will grow as the summer months go on, for the state’s prolonged drought shows no signs of easing.

We are on the threshold of “Carbon Shock,” Mark Shapiro writes in his book of that title. A UC Berkeley professor living in the San Francisco Bay Area, he reports from “the Front Lines of the Disrupted Global Economy.”

Shapiro speaks in terms of “atmospheric chaos.” Carbon—those five gases that together give rise to the greenhouse effect—is changing “the cost of everything,” he says. California is “the marker for what is happening on the rest of the planet.”

He comments that the state’s fertile soil and abundant biological resources make it “a thirty-eight-billion powerhouse of food that feeds the nation and the world.” All of it is now under the stress wrought by the tumult in the atmosphere.

Three converging factors are hitting California’s agriculture: longer seasons of extreme heat, shorter cold seasons, and dwindling water supplies. Together the three factors engender enormous costs—to farmers, to consumers, to governments. Figuring out just what the costs are and who will pay what comes down to “the amount you or I can afford to spend on, say, an almond, a tomato, or a cherry.”

He talked to a cherry grower near Lodi. “These trees are like my children,” said the farmer whose 200 acres of cherry trees have been in the family for forty years. He showed his visitor the stunted results that come “with not enough chill hours.”

Cherries are the canaries of climate change. “We don’t even know what a normal season is any more,” said the farmer. The consequences are like a sequence of falling dominos. Less snow falling in the Sierras means less melt-water in the dry months. Salt is building up in the fields because not enough fresh water flushes through them. The steadily rising level of the Pacific Ocean contributes further: salt water is seeping into the Sacramento Delta. The USDA —us taxpayers—paid some eight million dollars just to subsidize the 2012 losses. The 2013 season was about as bad, with “half the yield

that had been considered normal before 2010.” The EPA estimates that in the San Joaquin Valley, “temperatures will rise between 1 and 3.5 degrees Fahrenheit by 2050.”

Crops across California will be subjected to “intensifying stress” due to hotter temperatures and declining water resources, with increasing vulnerability to heat-adapted pests and altered pollination patterns. Over the past thirty years an unprecedented number of heat waves, severe droughts, and heavy rains have happened, attributable “primarily to human activities.”

The U.S. government assigns an average figure of \$38 per ton of greenhouse gases as the “social costs” of carbon. That figure is likely too low, says Shapiro, considering the UK government has assigned a figure of \$55 to \$88 per ton. Inasmuch as the U.S. was responsible for 6.5 billion tons of carbon emissions in 2012 alone, even \$38 per ton makes for a significant price tag.

In 2006 the London economist Nicholas Stern reported to the British government that, to adapt to and respond to those costs globally would require about two percent of global GDP; seven years later, he revised the figure upward to include the massive displacement and loss of life due to flooding. More than a trillion dollars will have been spent by the end of the century.

Recovery from extreme weather events; the pressure on coastal infrastructure from rising sea levels; the public health impacts as diseases, pests, and bacteria move northward that once were limited to the tropics; the effects of ever more erratic rainfall, and the loss of productive capacity from all these phenomena: these are the “social costs” of carbon. They are unaccounted for by those who create them—we, the public pay for them.

Foregoing almonds from California may be the least of our worries, even in Wyoming. We may get them from elsewhere, but they consume just as much water.