



A Mother, a Daughter, a Graph

Elizabeth R. Sawin, December 19, 2007

My friend Diana told me a story once about the woman who was a teacher to both of us, Donella Meadows. Dana, as we called her, was working on a book chapter about food and hunger, and Diana, her research assistant, had just provided her with a stack of graphs about grain yields and population growth from different regions of the world.

Dana looked through the stack one by one... and burst into tears at the sight of the graph from Africa, where the increase in yield per acre had been overtaken by an increase in population. Africa was producing more food each year, but yields were growing more slowly than the number of mouths to feed.

In the trajectory of that graph Dana Meadows foresaw suffering to come and wept for it. At least that is the story I've told myself in the years since her death. I never had the chance to ask for her version of the story, why she cried, or what she felt.

Until a few days ago, I had never cried myself in response to a graph.

Now I have. After skimming one of the many articles published last week about a sudden and dramatic decrease in ice cover in the Arctic this past summer, I found this graph at the website of the National Snow and Ice Data Center, and burst into tears. This is the biggest single year decrease in ice cover in the dataset, which stretches back to 1979.

I know all the caveats. After years working in laboratories and creating graphs of my own, I know that one data point doesn't define a trend. I know that the climate system is messy and noisy and not fully understood.

But I also know that the Arctic is a sensitive indicator of climate change, a place where changes in the Earth system show up first and more dramatically than elsewhere on our planet. As one scientist interviewed about the latest ice data said, "Now as a sign of climate warming, the canary [in the coal mine] has died."

And I know that Arctic ice is one of many 'tipping points' in the climate system where warming can begin to feed upon itself. Less bright, white ice means less reflection of heat back into space, which means more warming, which means less ice. When the data for a variable that has the potential for tipping-point behavior takes a sudden turn for the worse it is hard to keep from asking the question: Is this it? Is this the moment the runaway train takes off?

I was staring at the ice-cover graph when our ten-year old daughter walked past and asked what it was. I explained. Her eyes became wide and tear-filled. "That's scary," she said. And then, after a pause, "Will our town be under water?"

What does a mother say to a question like this? Are data sets from the National Snow and Ice Data Center, like pornography, something to be

kept out of the sight of children? I could hide the graphs I suppose, but there's no way to hide the planet whose pulse they record.

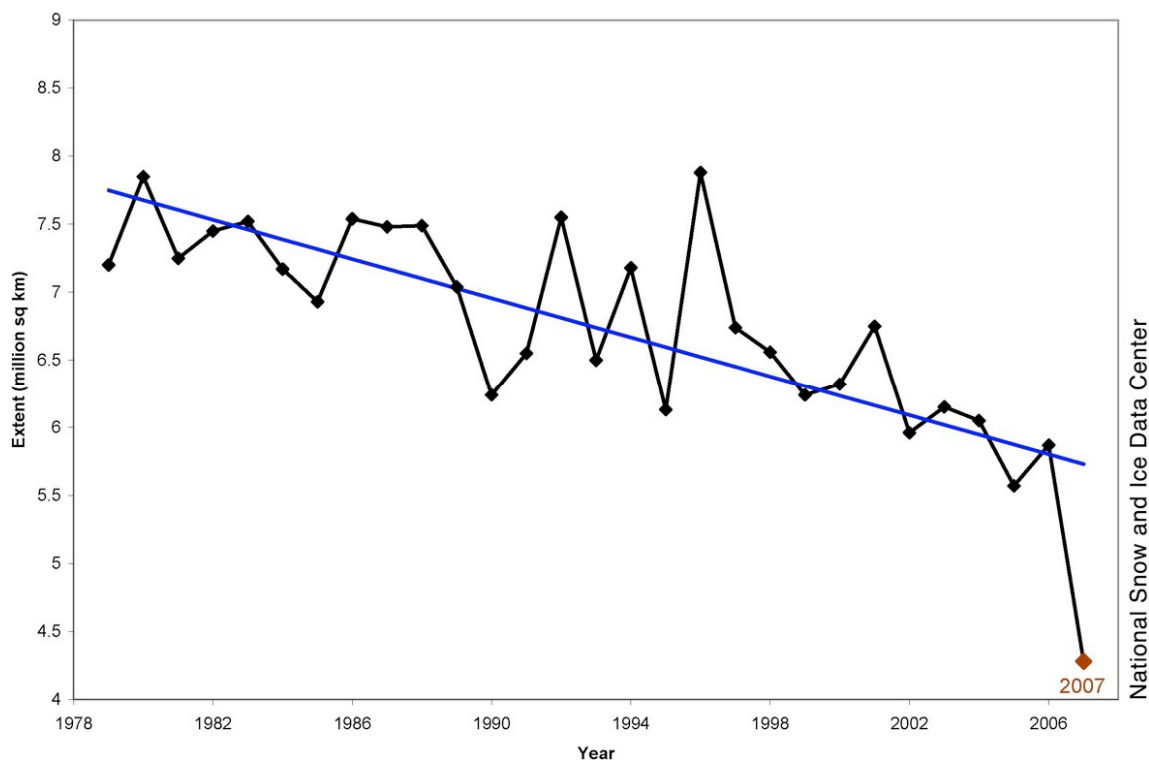
Now that I know a little more about crying over graphs, I am no longer so sure that the tears in the story about Dana Meadows were as simple as tears of compassion for suffering to come. I think they might have been tears of frustration and impotence, tears that came out of knowing that it doesn't have to be this way.

The trend-line of a graph isn't the result of an act of God or a meteor from outer space. It is the result of human choices. That people make those choices not just in ignorance, but also while information about the trends is on the front pages

of major newspapers is enough, easily enough, to make one cry.

Diana never told me the details of the ending of the story about Donella Meadows' reaction to the African food yield graph, but I feel certain I know the general outline. Dana dried her tears and took out her pen. She answered the phone, wrote another essay, and taught another class.

What else do you do, when your heart is breaking, but keep on going, saying over and over, as beautifully as you can: this hell is of our own creation and can be ended, as it began, by the power of our choices?



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