



Apocalíptico I by Mauricio García Vega

Collapse: What's Happening to Our Chances?

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It's been a little over a year since we tried to assess the probability that today's perfect storm of environmental problems will lead to a collapse of civilization.¹ This seems an appropriate time to see how recent events and discoveries might have changed the odds. The trends in the main drivers of destruction continue unabated. The Population Reference Bureau, which in 2012 projected that the world population in 2050 would be 9.624 billion people, foresaw in 2013 a 2050 population of 9.727 billion, resulting from a slight rise in the global total fertility rate. There is little sign of consumption abating, with purchasing power increasing on average globally (but with great geographic differences). There is growing evidence that anthropogenic climate change is not only raising the global average temperature but also increasing the probability of extreme weather events. The latter have been especially destructive in portions of America's "breadbasket," essential to maintaining human food supplies. Even more worrying, there seems to be an escalating discovery of positive feedbacks such as the melting away of arctic sea ice, which decreases reflectivity and thus accelerates warming while ironically causing nasty blizzards in the northern United States. Warming also leads to even more warming by increasing the flux of the greenhouse gas methane into the atmosphere as permafrost thaws and possibly as methane clathrates (complexes of ice and methane underlying northern oceans) disintegrate as the oceans warm. More positive feedbacks are clearly reducing the odds of keeping climate disruption within "manageable" limits (if such have not already been passed).

¹ Ehrlich PR, Ehrlich AH. 2013. Can a collapse of civilization be avoided? *Proceedings of the Royal Society B* <http://rspb.royalsocietypublishing.org/content/280/1754/20122845>.

Recent analyses of the climate and agricultural situations² paint an ever-darkening picture. Indeed, there is building evidence of a likely failure to produce increases in crop yields that would be needed to feed 9 billion people in 2045, even if climate disruption doesn't clobber agriculture. There also are more and inevitably growing problems besetting efforts to obtain the mineral resources needed by industrial civilization.

Finally, there are signs that major powers, especially the United States, China, and Russia, are increasingly competing over resources in ways that could lead to major wars, possibly nuclear. Much of the competition in a disintegrating Middle East is related to access to oil, use of which for energy mobilization and plastic manufacture we would be phasing out if society were moving toward sustainability. The international situation, as historian Margaret MacMillan has pointed out, bears a frightening resemblance to that which preceded World War One.³ We are ending a long period without world wars but characterized by unprecedented technological changes that environmental/resource problems are going to make even less understandable. As globalization continues in a situation of intensifying resource competition, reactionary movements held together by new technologies, and lack of trust are rampant in a world still structured into nation states with only weak mechanisms available to deal with global threats. The building military confrontation between China and the United States could end in making all environmental issues moot.

There *is* some good news. Total energy consumption in the United States has been declining under President Obama because of steady increases in efficiency, especially in vehicles. U.S. coal consumption has been going down because electricity generation has been flat and coal's role in it has been diminished by being replaced by natural gas (which, even after accounting for fugitive emissions in production and transport, remains much better than coal in terms of climate change). Of course, this only makes sense as a temporary "bridge" to a much lower carbon mix. U.S. oil production is up, but that may be a short-lived reprieve. Even so, burning domestic oil is better both economically and environmentally than burning imported oil. And although Australia is eager to continue exporting gigantic amounts of coal at huge cost to Australia's environment and to that of the world, the Chinese government is moving rapidly toward a reduction of coal use, and India is being forced in that direction by finances.

There is also a heartening spread of solar technology in poor countries, among other things giving many more people access to modern communications (which, of course can be used for either good or ill!). "No-take" zones (areas where fishing is prohibited) have shown an amazing

² <http://vimeo.com/78610016>; <http://www.youtube.com/watch?v=TFyTSiCXWEE>; Grassini P, Eskridge KM, Cassman KG. 2013. Distinguishing between yield advances and yield plateaus in historical crop production trends. Nature Communications 4:2918 | DOI: 10.1038/ncomms3918 | www.nature.com/naturecommunications.

³ <http://bit.ly/K4rf8G>

capacity to regenerate neighboring fisheries. But sadly, the zones cannot control pollution, acidification, or temperature change and thus may rapidly lose their value. Brazil has greatly slowed deforestation in the Amazon with a combination of sound policies and good enforcement of them. And the population prospects for the United States are slightly less grim: the 2012 projection for 2050 of 422.6 million dropped in 2013 to a projection of 399.8.

But what is crystal clear is that these changes are not remotely big or fast enough to make a real dent in the problem. Furthermore, there are no plans nor any tendency toward making the most crucial move required to lessen the odds of a collapse: a rapid but humane effort to reduce the scale of the entire human enterprise by ending population growth, starting the badly needed overall decline in numbers, and dramatically curtailing consumption by the rich. There is not even discussion about the obvious elements of the socio-economic system that support a structure embedding a need for perpetual growth – fractional-reserve banking being a classic target that requires investigation in this context. Virtually every politician and public economist still unquestioningly assumes there are benefits to further economic expansion, even among the rich. They think the disease is the cure.

A few years ago we had a disagreement with our friend Jim Brown, a leading ecologist. We told him we thought there was about a 10 percent chance of avoiding a collapse of civilization but, because of concern for our grandchildren and great grandchildren, we were willing to struggle to make it 11 percent. He said his estimate of the chance of avoiding collapse was only 1 percent, but he was working to make it 1.1 percent. Sadly, recent trends and events make us think Jim might have been optimistic. Perhaps now it's time to talk about preparing for some form of collapse soon, hopefully to make a relatively soft "landing." That could be the only thing that might preserve Earth's capacity to support *Homo sapiens* in a post-apocalyptic future.

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