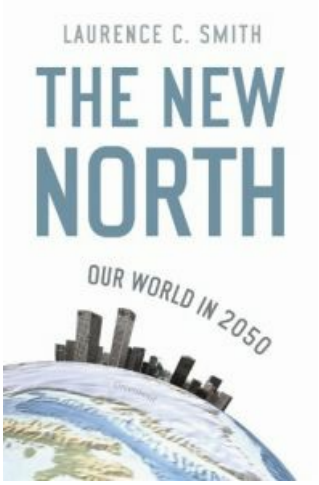

Book The New North

The World in 2050

Laurence Smith
Profile Books, 2011
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Recommendation

Professor of geography Laurence C. Smith makes a fine oracle. His ambitious, candid and accessible book predicts what the world will be like in 2050. He's well-poised to make climate predictions, since he combines academic training with firsthand observations in the far north. He translates dense academic data into common language and – perhaps most importantly for a hotly debated topic like climate change – he's clear on what science knows and what it doesn't know. Smith optimistically voices the hope that humanity can correct its current course, but he doesn't give many specific suggestions for what the reader might do to slow the pending upheaval. His study and projections range from shifts in agriculture to the likelihood of armed conflict and new national boundaries. *BooksInShort* recommends Smith's forecast about the impact of the great thaw to those interested in science and the results of global warming, and to those planning ahead for changes in worldwide resources and markets.

Take-Aways

- Climate change, globalization and urbanization are fundamentally changing the globe.
- Demographics and a need for resources will shape the new world.
- In 2050, most people will live in cities, the majority in megacities.
- Wealth is shifting globally, primarily eastward, and the world's population will age unevenly.
- Some fossil fuels are running out, but they will still provide most of the world's energy in 2050.
- Authorities do not monitor water closely enough, and access to freshwater is shifting radically.
- Climate change is unevenly distributed. Its powerful impact will hit the far north, where thawing will allow greater access to water, oil and new shipping lanes.
- However, thawing will harm indigenous traditions and wildlife habitats.
- Northern countries will see marked increases in wealth and population.
- However, northern countries also will experience environmental, economic, political and cultural changes that will put them under tremendous stresses.

Summary

Four Shifts that Will Change the World

In 2006, an American hunter legally shot a bear in Canada. The bear was odd; it looked like a polar bear, but it had brown markings and a flat face. It was a hybrid: half polar bear, half grizzly. This "pizzly" bear is a sign of how much global warming is changing the world. Climate change is driving species from their habitats. Wild animals are moving to new places and staying long enough to breed. Is this a sign of things to come? How will global warming and other sweeping trends reshape the

world? To answer, first assume that the planet won't suffer any catastrophic accidents, like getting hit by a meteor, or any global tragedies, like nuclear war. Second, assume that no truly disruptive technologies will arise, since technology is the wild card that could affect any of the "four global forces" that will shape the new world of 2050:

1. **Demographics** – Demography studies how the human population settles, changes and moves. Two main demographic trends will shape the future: overall population growth and the "Demographic Transition" – that is, the way birthrates drop in many cultures as industrialization increases.
2. **Demand for resources** – Humanity places a huge demand on "natural resources" – both finite (oil, coal) and renewable (trees) – and on "natural services," such as photosynthesis or the oceans' absorption of CO_2, as well as on the "gene pool," the planet's genetic diversity. Cultures vary in how much demand they place on the planet. For example, people in North America consume 32 times as many resources as people in Kenya.
3. **Globalization** – All aspects of society are increasingly "more interconnected and interdependent." Yet, while the world is becoming "flat" in the ways its peoples and resources mesh, it is also "lumpy," since different places globalize at different rates.
4. **Climate change** – Due to the increase in greenhouse gases, the Earth is retaining more heat. Temperatures rising unevenly worldwide are creating unexpected results.

Shifting Population, Shifting Wealth

As of 2008, more people lived in urban areas than in rural areas. Thus, most of the human race can't feed itself or get its own water. People move to cities primarily to earn more and live better, so this trend will continue. Some 3.3 billion people lived in cities in 2007; by 2050, the world will have more than six billion urban residents. Not only will more people live in cities, Earth will have more cities, and more "megacities" (with 10 million-plus inhabitants). Will these giants be like Singapore, which has managed radical growth with limited resources to produce a clean, well-organized city? Or will they be chaotic, like Lagos, Nigeria? Both are port cities, but energy-efficient Singapore has limited crime and a long life expectancy, while disease, corruption and crime are widespread in Lagos.

> "The northern quarter of our planet's latitudes will undergo tremendous transformation [in] this century, making them a place of increased human activity, higher strategic value and greater ecological importance."

A shift in wealth is accompanying the shift in population. As the economy globalizes, wealth will move, primarily eastward, and the "BRIC" countries – Brazil, Russia, India and China – will become more important. In 2010, "the United States, Japan and Germany" had the world's three largest economies. In 2050, the sequence will be China, the US and India. The rise of "new superpowers" will force changes in the global political balance. Since their economic growth will coincide with urbanization, the cost of living in the BRIC nations will rise.

> "The long-term trend for the Earth's climate, for at least several centuries, is rising air temperatures in the...lower atmosphere."

Society will face other changes: The baby boomers are aging, producing a graying population. Urbanization historically drives birthrates down, which will contribute to an overall, unevenly distributed demographic shift. In 2050, the median age will be almost 55 in Korea and older than 45 in Russia, but only 31 in Iraq and 23 in Afghanistan. This shift will impel other transitions. Part-time work may replace retirement, and countries without a youthful population will be more open to foreign immigrants, especially skilled laborers.

Energy and Water

Coal, oil and natural gas power today's industrial society, which depends on a ready supply of raw materials, especially metal. As the world urbanizes and industrializes, demand for these foundational materials will spike. Given the projected population growth, will the world run out of pivotal resources? The answer is complex. Some resources are nonrenewable but can be recycled. Oil is the limiting factor. The world will use 20 million more barrels of oil per day in 2030 than in 2010, and the day of easily accessible oil is already over.

> "For the last two decades, cities in the developing world have been growing by about three million people per week. That is equivalent to adding one more Seattle to the planet every day."

Armed conflicts are more likely to occur over oil than other resources, and the cost of oil will go up due to demand, regulations and rationing by oil-producing nations. Science is exploring alternatives to oil (hydrogen, ethanol and other biofuels), but a "full-blown hydrogen economy" remains more than 30 years away, and harnessing hydrogen requires considerable energy. Electric cars are an alternative to gas cars, but fossil fuels generate the electricity they use. The best biofuel crops don't grow in all climates, and they produce greenhouse gases. Nuclear energy, which doesn't produce harmful gases, provides "about 15% of the world's electricity." It has the potential to produce 38% by 2050, but concerns about health and safety have forced companies to limit production.

> "Cities will trump agriculture. Farmers will either lose or sell their historic water rights. Croplands will return to desert."

The ideal is to obtain more energy from carbon-free, renewable sources. Hydropower, a widely applied, mature technology, provides "about 16%" of global electricity, a percentage that will drop as other alternatives advance. Wind and solar energies will expand radically, though levels of wind and sunshine fluctuate markedly. Wind may generate 10 to 50 times more power in 2050 than it did in 2010. The idea that the sun already sends Earth "more inexhaustible clean power" than it "could ever possibly use" is attractive, but "sunlight is diffuse," and capturing enough of it to generate real industrial-level power is very hard. Existing photovoltaic panels are inefficient and expensive. Using renewable energy also presents the challenge of large-scale energy storage, which calls for a breakthrough in battery technology. Fossil fuels will still supply most power in 2050. Limiting carbon gas production requires better "carbon capture and storage" technology.

> "Finding a cheaper way to hijack sunlight is...the single greatest barrier to the widespread use of solar power."

Water will become an even more pivotal resource. Too much water (floods, monsoons) drowns crops and destroys cities. With too little water, people and crops die, and deserts spread. Water at the wrong time or place can be catastrophic. Other factors complicate humanity's relationship to water: Some 97% of it is "salty ocean," and frozen glaciers hold much more freshwater than rivers, lakes or rainfall. Water is unevenly distributed worldwide. A population growth of 50% by 2050 will put new demands on freshwater supplies, especially as new populations industrialize and use more water. Some of the fastest growing regions (Pakistan, southern Africa, the

Middle East) already struggle to get water. Cities such as Phoenix and Las Vegas are growing in deserts; some sections of California depend on "a thousand miles of pipelines, tunnels and canals."

> "In a world where all sea ice melts away each summer, multiyear ice will go extinct and icebreakers will go where they please."

Two other factors add to the world's challenging water situation: First, private corporations have begun "to privatize and consolidate water supplies." While this may result in more efficient water distribution, it means many people will have to pay for something they used to get for free. Second, governments offer very limited water monitoring. Only a few regions (Europe and the US) have any "hydrologic monitoring whatsoever." No one knows what the water situation will be in the near future, and no one has enough information for "efficient water management."

> "No one really knows if our globalization megatrend will accelerate, slow or reverse over the next 40 years."

Many areas are at their limits for accessing groundwater and will need to bring water from farther away, which will require more power. Industrializing, urbanizing societies will demand more energy, but power generation uses a lot of water (mainly for cooling), and waste heat from power plants warms surrounding waters, changing ecosystems. Climate change leads to differentiated shifts in access to water: Decades-long droughts may strike some areas, while others flood.

> "I imagine the high Arctic...will be rather like Nevada – a landscape nearly empty but with fast-growing towns fueled by a narrow range of industries."

Also consider "stationarity," the concept that "natural phenomena fluctuate within a fixed envelope of uncertainty" – that is, forces vary within known limits. This idea is a foundation of risk management, which uses accumulated statistics to estimate the likelihood of specific risks. Climate change and urbanization destroy stationarity by disrupting systems, creating harder-to-predict shifts over a wider geography. Scientists can make some general predictions – for example, as more ice melts, seas will rise, flooding low regions, including many "delta cities" – but they cannot know how fast the sea will rise or how far the water will spread. Some analysts worry that societies will fight wars over water, but, historically, people have resolved water clashes without violence. However, these climate pressures will reshape cultures and economies.

What Will Happen to the World?

As you plan for the future, consider four foundational observations:

1. **Change happens unevenly over time** – In a complex system, change "unfolds erratically," so expect climate change to have up and down cycles.
2. **Change happens unevenly over space** – The climate system is complex and diverse. The overall trend will be to grow warmer, but some regions will cool.
3. **Change will happen, but...** – Climate change is certain, but human action still can markedly affect how much the climate will change and in what directions.
4. **Changes in temperature aren't random** – Temperatures rise more over land than over water. The "northern high latitudes" will experience the most change, with this ripple effect: Ice will melt, reflecting sunlight; the water will absorb the sun's heat, increasing warming.

The Impact on the North

Overall, "10% to 48% of the world's land surface" will see its current climate transformed. This change is most dramatic in the Northern Rim countries (NORC) – the US, Canada, Greenland (Denmark), Iceland, Norway, Sweden, Finland and Russia – whose climate shifts will ripple through many pivotal systems, including:

- **Animal life** – As the polar ice melts, species such as polar bears literally lose their habitats. Expanding cities or outside species fleeing changing climates push out native creatures. As northern regions warm, they will become more hospitable for agriculture, but less so for the traditional lifestyles of indigenous people.
- **Transportation** – In the past, ships could risk northern waters only for brief periods, because of the threat of ice crushing or trapping a ship. Rising polar sea temperatures are extending shipping's time frames. Ships offer the cheapest way to transport goods, so northern ports are booming. Some cities and mining sites that depended on "ice roads" will be isolated, because the permafrost no longer stays frozen, so no one can drive on it.
- **Population** – NORCs like Norway and Canada are seeing notable population increases. Canada's main cities now follow its southern border, but new cities will grow up north.
- **Raw materials** – Russia has massive natural gas fields, and Canada has "oil sands" that can be processed into petroleum. These reserves are second only to Saudi Arabia's. The Canadian province of Alberta has more oil than Kuwait or Iraq.
- **Water** – NORCs won't suffer the freshwater shortages that will challenge hotter, more crowded countries. This will increase the NORCs' power, make political alliances with them more attractive, draw immigrants and give them new assets to trade.
- **Politics** – Canada has largely been oriented east to west, but its orientation will shift as people move northward, and as companies ship oil and other raw materials to the south. Northern nations have a lot in common, and they will tend to form peaceful "super-regions" marked by liberal policies and shared cultures. An influx of widely varied immigrants will stress these cultures. Northern societies also will have to find peaceful, legitimate ways to deal with their area's indigenous peoples. Canada created the Nunavut Territory, as big as Mexico, with an 85% Inuit population. Russia is still trying to figure out how to deal with that challenge.

  > "We humans will survive anything even if polar bears and Arctic cod do not...the more important question is not of capacity, but of desire. What kind of world do we want?"

Other geopolitical change predictions are more speculative. Clashes over control of the North Pole's resources may turn violent. As Russians move away from cities founded by Soviet centralized planning, open spaces remain behind that China could buy – or take. Globalization might stall, or even reverse itself, in the face of a cultural backlash or overpriced oil. In the end, humanity has a choice and a responsibility.

About the Author

Laurence C. Smith teaches space studies, earth studies and geography at UCLA. He was a Guggenheim Fellow in 2006-2007.