

The Effects of Deglaciation of the
Tibetan Plateau
on the Mekong Fisheries

By,

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Phys. Geography; Wed 2pm

I'm going to tell you a story, although far from traditional... There are three players; the Plateau, the River, and the Dams. I would say humans, but we are the narrator, and thus there's no piece we aren't a part of.

From the crags of Mt. Everest- covered in ice thicker than our tallest towering buildings, with air so thin no life can sustain; to valleys deep and filled with water oxen and wild boar- when we think of the Himalayas, an image of this vast mountain range fills our heads. Standing alone, with perilous beauty, calling to those adventurous and wandering souls, beckoning to them like sirens out of the Odyssey. But, it is only a fragment. Indeed, the whole of the Himalayas are only a thin slice out of a much larger crustal pie.

Welcome to the Tibetan Plateau- and the start of our tale. With as many as 36,800 glaciers, the Tibetan Plateau is the source of life for some of the largest rivers in the world: The Ganges, Indus, Brahmaputra, Yangtze, Salween, Huang He (the mythical Yellow River) and the Mekong. Very few civilizations have been able to carve out a niche for themselves in the inhospitable climate, and yet, unwittingly, more than 2 billion Chinese citizens rely on the “Water Towers of Asia” alone, not including the peoples of another 10-18 countries downstream. Its aquatic environment is home to some of the largest freshwater fisheries in the world and feeds 1.5 billion people living along the winding river banks.

Now, during the 70's and 80's, scientists began collecting basic data on the advancing and retreating of these glaciers, and this information would be known as the 'Glacier Inventory of China'. They cataloged them by what is now the standard of glacial measurement- the all-important, “Mass Balance”, which encompasses the length and area of these enormous sources of life. Not one to leave till un-turned, scientists continued to dig, looking for anything that could help them date back the glacial behaviors further, eventually finding a photo from 83 years ago of the Ata glacier, among other things. Their efforts are represented in the Glacier Mass Balance Bulletin of the World Glacier

Monitoring Service (in case you were interested).

Since the 70's, 7,090 glaciers of the Tibetan Plateau have, and are, being meticulously watched- using in-field research, airplanes and now satellites equipped with mapping and photographic units- providing details we'd never have dreamed to see with the naked eye. And because of this, sixteen years ago, an alarm rang within the scientific community. The Tibetan Plateau was experiencing an unprecedented amount of glacial retreat as 1990 came to a close and 2000 began. What used to be a balance between accumulation and ablation through the decades, had turned drastically. Right now, as we sit here, 95% of all those glaciers are in retreat, 5% are advancing and none are stable.

As the world warms at expedited rates, the atmospheric circulations have changed, triggering decreasing precipitation in regions such as the Himalayas and increasing in Pamir, this positive feedback loop **has** a “vestige of a beginning, but no prospect of an end”, as James Hutton would say.

Let us cascade down. The toes of glaciers are melting quickly, surging headwaters from their sharp, wild valleys and flowing, to form the Mekong. The world's 7th longest river, the longest in Southeast Asia, it stretches 12,600 miles and is the heart of six countries. Like the Tibetan Plateau, it begins in the most important riparian country: China. Here, it is called the Lancang. It is only called the Mekong once it crosses the borders of Myanmar, where it does a small jaunt of 120 miles before flowing into Thailand then Laos, continuing through and feeding other tributaries in Cambodia, before depositing its suspended load, at the delta near Ho Chi Minh, Vietnam, joining the Pacific ocean.

The waters of the Mekong surge with life, and some of the most interesting of life, it is. Only out-matched by the Amazon in its biodiversity, it is home to more than 500 species of fresh water fish (several of them giants), 80% of which make the journey up-river in order to breed. In fact, the Mekong still holds the record for most fresh water catches, per capita, worldwide- with 8:10 people depending on the river for their living. In Cambodia alone, protein from fish sustains 70% of the population and is ingrained into their lore and festivals.

Now here's where things get complicated. The roaring waters from the Tibetan Plateau, whose sheer force carved dramatic landscapes and enriched the soil for centuries, had not gone unnoticed by both local and foreign powers alike. In the 1960's, amid the clandestinely fought battles of the Cold War, it was the United States who first attempted to build a dam on the Mekong.

They failed miserably.

In 1995, China had taken up the mantle, finishing the first dam across the mainstem of the Mekong. Instantly, fear and discord struck countries downstream. Wars broke out. It wasn't until China presented the, 'Peaceful Rise Strategy', (hoping to advance themselves with as little bloodshed as possible), that countries, especially in the Lower Mekong Basin, relented. But it was not smooth sailing. Promises between governments were loosely kept and the citizens have been the ones to pay the price ever since. China's promise to alert Laos and Thailand, before releasing overflow, failed to be passed on several times- homes, crops and lives were casually lost with little to no publicity, locally or internationally. In 2003 and 2008, two more dams were completed in China, with five more being prepared. In the LMB, there are over 100 proposed dams. Eleven dams between these countries are slated to be completed before this decade finishes with China and Thailand being major financial backers behind most of them. Agencies, created to monitor and regulate the planning and building of the dams receive mixed reviews on their effectiveness. Considering there is no legally binding contract between themselves and the superpowers they face, their mandates are little more than suggestion. Interestingly, there are as many citizens for these dams, as against them.

Hydropower, the dream of having electricity. Not living off the sun, candles and generators that over-heat or malfunction in crucial moments. It's a dream being sold in the form of a huge cement structure, to people who live day to day and not beyond. But these colossus's are already having a substantial impact on the migratory patterns of the Mekong fisheries, to which these people owe their livelihoods. Cut off from their long journeys upstream, fish habitats and their ability to feed are being altered. Scientists fear a homogenization of the species, eliminating many niche feeders, leaving them

susceptible to any number of hazards. And with the advent of fish farming (aquaculture), parasites are being transferred to wild populations, impacting species diversity further, as seen with our salmon farms.

You may be wondering at this point: if the fisheries are already being threatened by dams, how could deglaciation affect them? How could it get any worse? What's the point of this entire story?

It's simple. Water. Is. Life. Without it, there are no more fisheries, there are no more enriched flood plains. Crops and livestock wither, deltas wash away, basic sanitation systems fail and people dehydrate and turn to anger. Entire economies collapse. As many wars have been fought for water, as revolts against oppression or over greed. It is one of mankind's oldest contentions. Currently, people are moving to the reservoirs and near the banks of the Mekong. Glacial runoff is flowing 5.5% more than it ever has, and this is seen as an auspicious sign by many rural communities. A place to make a home and a living. The fishing industry is set to intensify, and so is the consumption of these waters.

The toes of 95% of glaciers are melting away seamlessly. Current projections show in less than a decade, several glaciers will have all but disappeared. Those remaining, will continue to shrink causing the waters flowing from the Plateau will slow to an unprecedented rate, unseen in modern history. The Colorado River, Venice Italy and New Orleans are eerie projections of what might become of Vietnam's delta, of the estuaries and tributaries. And with fears abound over damming, something that can be controlled, what will happen as the water basin begins to disappear, taking the fish with it?

An over-riding flaw I noticed in my research, is that there were plenty of reports on the dams and fisheries and on the deglaciation of the Plateau itself, but not one studying how the increased water flow is affecting the riparian biomes after the dams are in place, or projections on how they will change when the waters recede. Which, politically speaking, is a concerning question and situation that can, indeed, be modeled using current laws, systems and previous courses of action. I would say, from observation, that it is a going to become an issue that will require global response, in effort to try and mitigate damages (starvation, for example) between these countries. I personally feel that this issue has so many facets to it that, like the Millennium Ecosystem Assessment, all the research should be compiled and published into a comprehensive study in which we can use as a springboard to start creating new policies, preempting what seems like an inevitability.

List a term or concept that you did not previously know:

-Mass Balance- The big one. I didn't understand how important this was to the measurement of glaciers, until I read these reports.

-China's Peaceful Rise Strategy- very interesting and rather self-serving but very important for the past and current levels of inter-political peace.

-Tonle Sap- I had no idea this tributary of Cambodia played such a huge role in, not only the countries GDP, but their history. It kept an entire country from starving during the reign of Pol Pot.

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