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Overview of some ecological history in Southern Thailand, especially around Sao Phao

I mentioned some of this ecology in my PhD thesis but I could not go into the details that I wished to. I always hoped to return to “do it right”, especially after I learned GIS. But that never happened, and now it looks as if it never will. So I want to get down what I recall before I totally forget.

I worked on the Isthmus of Kra, which is basically a flooded mountain range. On the East side is the Gulf of Thailand, where I worked, while on the West side is the Andaman Sea. The descent from mountains to the shore is much steeper on the Andaman side than the Gulf side. The Andaman side reminded me of the descent from mountains to sea in some of the steeper places on the American West Coast in Oregon, Northern California, and the Northeast Coast (Maine). The descent from the mountains to the shore on the Gulf side is like what happens in the Carolinas of the US, and is much gentler. There is a moderately sized flat area between the mountains and the sea on the Gulf side. How wide this flat zone is depends on where you look. It depends mostly on the flow of water nearby and on the mountains nearby. In most places, it is not more than 50 kilometers wide, sometimes not more than 10.

I would like to insert diagrams here but I am not very good at drawing in MS Word. I might try, or I might sketch some by hand, scan them, and include them here.

The general scenario that I describe here should be familiar to people who work on coastlines, especially with mountains nearby. That does not mean the situation in Southern Thailand is not relevant. If other people understand more than I do, then I invite them to write about it.

Some hydrology and geography: Rain from the mountains carries silt down to the sea. How much silt depends on the geology of the mountains, the slope, the vegetation cover, and the pattern of rainfall. I don't go into that here. The silt is deposited somewhere in the sea. Where it is deposited, and how much is deposited where, depends on the silt load, the slope of the sea bed at the sea shore and close to the sea shore, the depth of the ocean, and the temperature of the sea. I don't go much into that here except to say this: The Andaman side has a steep slope that continues into the sea, and deep water. Not much sediment is deposited near the coast. Most of the sediment goes out to sea where it might help with sea fertility. The Andaman side has a couple of really beautiful beaches but not many.

In contrast, the Gulf (of Thailand) side is gently sloped. The sea bed slopes gently. The water is shallow. Sediment gets deposited near the coastline. As sediment is deposited near the coastline, the coastline moves progressively outwards in steps. This process leads to an even more gently sloped coastline with more deposition near the coastline, and so on. The Gulf side has many beautiful beaches, each several hundred meters wide. More accurately, the Gulf used to have beautiful beaches until pollution, erosion, deforestation, and human activity seriously damaged them.

The particular pattern of deposition on the Gulf side is important.

A current runs parallel to the shore. Sometimes the current runs north and sometimes south. I was never sure of the prevailing general direction. Where I lived, the current ran north. It doesn't matter as long as the current stays steady for at least a couple of kilometers along the mouth of a creek, and it does.

"Creeks" or "streams" can range from a trickle to a river. There are only four real rivers between Surat and Songkhla. Not surprisingly, they are at the major port towns: Surat, Sichol, Nakorn Sri Thammarat (Paak Phanang), and Songkhla-Haat-Yai. An intermediate sized stream-and-port is at Thatsala. Most other streams are small. The Thai word for a creek or a stream is "khlong". "Khlong" is usually translated as "canal" but that translation is misleading because Americans think of a canal as human-made while most khlong are not. To avoid confusion, I use the term "stream".

Some sediment is deposited on the land before the water carrying it gets to the ocean. I return to that.

When sediment goes out a stream mouth, the softer lighter sediment goes farther out into the Gulf, where it likely contributes to the famous productivity of the Gulf. Because sand is heavier, sand is deposited near the shore. Because of the current parallel to the shore, the sand gets laid down in long deposits parallel to the shore, that is, in sandbars parallel to the shore out at sea. The size of a sandbar depends on the current in the Gulf, the current from the stream, and the sand. Usually the sandbars form a few hundred meters from the present shore, maybe 400 meters on average. When I was sure that a stream had been running long enough to make a decent sandbar, I could swim out from the present shore to the sand bar, and stand up, as if I were standing on the surface of the ocean. I did this at Paak Duad and Paak Tha Maak, to the surprise of the Thai, who thought I was crazy.

Stream mouths tend to be from 2 kilometers to 20 kilometers apart. They are fairly common.

When sand bars form from adjacent stream mouths, the sandbars eventually meet to form one sandbar. Or the sandbar from stream A gets long enough to extend near to the mouth of stream B.

As a sandbar forms near to the present shore, the water between the present shore and the sandbar changes character. The area between the offshore sandbar and the present shore is not exactly like a small lagoon, but it is like a small lagoon. I am pretty sure the fish, plants, and crustaceans change character too, but I could not verify this. The shrimp that are best for shrimp paste (krapii) proliferate in those zones between the present coast and the sandbars. The best areas for closing off to make artificial low-density shrimp farms used to be in those slightly offshore areas between the present coast and the growing sandbar.

Eventually the area between the present coast and the new sandbar fills in, and becomes more like land than like sea. The area between the present coast and the new sandbar becomes a wetland swamp ("bung") first, and then drier land. When it is a swamp, plants such as coconuts, other palms, lilies, and water chestnuts begin to grow there, including my favorite "jaak" palm from which excellent vinegar is made from the fruits and excellent roof thatch from the fronds.

When the area between the present coast and the new sandbar fills in enough, the stream begins to flow out past the sandbar. The sandbar-that-was-once-out-at-sea becomes the new present coastline. The

old coastline used to be a sandbar like the new present coastline. The old coastline is now an old inland sandbar.

As soon as they can, people invade the new land to make it into rice fields and various gardens. The kind of garden depends on fertility, salinity, and wetness. Converting the new land into rice fields helps speed the conversion of the new land from wetland to just "land". Old swampland ("bung") makes excellent rice land once the salinity (and some chemicals from having been a swamp) are reduced to the right levels. The nutrient quality of the soil is high.

The rice fields in that near-shore location don't "screw up" water circulation much. All in all, the rice fields act like "damp" land if not full-blown wetland. Even so, the presence of rice fields forces the water from the stream to flow past the rice lands (old wet lands and swamp) out past the old sandbar (new coastline). The diversion of water away from the near coast to the stream and then out to sea speeds the process of turning the next sandbar into coastline.

Here is where diagrams would help. Imagine a coastline with a new sandbar forming out at sea about 400 meters (sandbar 1), an old sandbar as the present coastline (sandbar 2) with coconuts planted on it but little else, an even older sandbar (sandbar 3) about 400 meters closer in, with rice land in between, and an even older sandbar (sandbar 4) another 400 meters closer in, with rice land in between sandbars 3 and 4. That pattern is all over the Gulf side of Southern Thailand.

Except for a few places (Songkhla, Paak Phanang, part of the Surat basin), the wetlands on the Gulf side of Southern Thailand have never been very wide (deep). Wetlands consisted of the area around mouths of streams, and in the zone between the present shoreline (sandbar 2) and the most recent old coastline (sandbar 3). This strip varied from 50 meters wide to a kilometer wide at most. This strip of wetlands was continually rebuilt and continually extended out to sea as the process of making sandbars and filling in went along.

People did not build houses on sandbar 2 because to do so was too dangerous. They planted coconut palms on sandbar 2. People built houses on sandbars 3 and 4 and further inland. A "sandbar" is called a "dohn". ("dohn" is not pronounced like "John" or "Don" but somewhere between "Don" and "donut".) People name the dohn sometimes. People often referred to the people living on sandbar 3 as the people living "on the sandbar" or "bon dohn". Houses built on a dohn (sandbars 3, 4, and further inland) were safe, dry, free from bugs, and close to gardens. They were quite comfortable. I called these patches of houses built on dohn "neighborhoods". Often the people in one neighborhood were closely related. This whole pattern was a common sight along the coast of the Gulf of Thailand too.

This progression of high sandbars with low land in between occurred not only right along the coast but had occurred in the past all the way from the mountains to the present coast. Once upon a time, several thousand years ago, the coastline began at the mountains. The coastline then marched step by step (sandbar by sandbar) out many kilometers from the mountains to its present location. I could easily find this sandbar-swampland-(rice fields)-sandbar progression as far as 10 kilometers inland, often farther. Of course, the farther inland, the sandbars were more eroded and the old swampland (bung) was more filled in, but the general pattern was still clear.

Usually distinct neighborhoods could be traced in a historical progression from inland to the coast. If I had been able to return to do more fieldwork, I wanted to trace one particular progression from the coast near where I did original fieldwork right to the place where I did the fieldwork. I would have been able to trace the growth of population and villages (and relatedness etc.) for perhaps 500 years. Alas, I was not able to do that. Now, with modern times, people are so mixed up that the old pattern could not be found.

Here is where the flow of water overland comes in again.

Many decades ago, before deforestation and replanting in the mountains, when rain fell, of course the rain water filled streams, but the rain water also flowed gently down over land, rather like a thin sheet. On the Gulf side, the flow was gentle because of the long flat shelf or "porch" between the mountains and the sea. Water took about from three days to a week to flow from the mountains to the coast. It was easily possible to look at a storm in the mountains, and predict when the water would come to your village, and about how much water would come when. Typically the water gradually picked up volume, crested, but the crested was not high, and then gradually subsided. The water flowing overland settled into rice fields (old swamps) and helped enrich them. The rice fields on the Gulf of Thailand had a reputation for especially beautiful ("ham" or "suay") and productive ("somboon").

By the time I got there, the ecology had been ruined, the flow of water disrupted, and old rice fields dramatically lost productivity. When rain fell, the time between rain in the mountains and water arriving in the village was much shorter, typically only a day, even as far as 20 kilometers from the mountains. The water did not gradually rise, peak, and subside. It came as a rapid flood. Areas on the sandbars ("bon dohn") that had once been good house sites and had been insulated from flooding were now subject to flooding and damage. The water carried more sediment and coarser sediment.

The flooding and heavy sediment clogged the old rice fields, eroded dikes, and destroyed irrigation patterns (irrigation was passive through arranging dikes rather than active through moving water). Instead of being cultivated as wet rice paddies, many (at least 50%, depending on where) rice fields were cultivated by broadcast for quick crops. Many villages had completely given up on traditional wet rice growing. The yields in broadcast rice fields usually declined over time unless a field was lucky enough to get the right amount of water and sediment. Destruction of the ecosystem contributed to the tendency of people to sell land to developers and schemers. It contributed to the drive to turn wetlands and rice fields into shrimp farms and other aquaculture farms.

I was lucky enough to see all kinds of cultivation, and to see traditional life still going. But I am sure the time I was there (1981 through 1983) was the end of traditional life. I like the traditional life, and I mourn its passage. I can, however, live with change. It is the ecological destruction and the change to a crappy lifestyle that bothers me.

The flooding and heavy sediment also severely damaged coastal wetlands ("bung"). The wetlands filled in, were scoured out, or both in alternation. Except in a few places (Songkhla, Paak Phanang), wetlands on the Gulf of Thailand were never very wide, often no more than 500 kilometers or a kilometer. Even so, as everywhere, wetlands served to buffer the coast, as refuges for animals and plants, as the home of animals and plants found nowhere else, and as havens for poor people. As wetlands were filled in and scoured out, all these useful functions were destroyed too. Where, in the past, poor people were able to

get by without fear of starvation, after about 1970, poor people were in clear stress. I do not wish to go into this topic more here.

Of course, the logging and replanting in the mountains also had bad effects on the ecology and life there, but that is another topic for another note.

Shrimp farming came to Southern Thailand after about 1985. Where it came, and what happened, are both big topics that I can't go into here. I go into those topics elsewhere. Activists blamed shrimp farming for the demise of all the wetlands in Southern Thailand. That was true sometimes, and more true in some areas than others. My wife, Nitaya, and I saw un-needed, unproductive, and badly harmful destruction of wetlands by shrimp farmers.

But shrimp farmers were not the biggest enemy of the coast and of wetlands. Where they could, shrimp farmers did not locate on wetlands but on old rice fields that had been formed out of wetlands hundreds of years ago. Old rice fields make far better shrimp farms than does wetland. We have to keep in mind that wetlands have been made and then filled in by a continuing natural process for thousands of years and by a continuing social practice for two thousand years. Old rice farmers have filled in more wetlands than present shrimp farmers have. The entire basins around the cities of Surat and Nakorn Sri Thammarat are old wetlands that were filled in by rice farmers, a much greater extent of old wetland than present shrimp farming has used. Because of deforestation, rice fields that shrimp farmers use had ceased to be the productive beautiful rice fields of the past long before shrimp farmers converted them to shrimp farms. Because of deforestation, the coastal strip of wetlands was in bad shape and declining long before shrimp farmers finally dug up parts of it. The small strip of natural wetlands is devastated by even a little urban growth, both from direct destruction and from pollution. It would not be possible here to describe how fast urban areas have grown in Thailand. Deforestation in the mountains, and urban growth, killed more rice land and wetlands than shrimp farming. I cannot guess if urban growth or mountain deforestation killed more wetlands and rice fields.

This account is not an excuse for all shrimp farming and for the useless destruction of wetlands by shrimp farmers. All it means is that we have to put current affairs in the context of ecological and social history.

Please see other notes in my pages on fieldwork.