

Concrete, or Beaches? World's Sand Running Out As Global Construction Booms

By [Nick Meynen](#)

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A crucial component of concrete, sand is vital to the global construction industry, writes Nick Meynen. China alone is importing a billion tonnes of sand a year, and its increasing scarcity is leading to large scale illegal mining and deadly conflicts. With ever more sand fetched from riverbeds, shorelines and sandbanks, roads and bridges are being undermined and beaches eroded. And the world's sand wars are only set to worsen.

Dubai is a fairytale world. Back in 1995 a jeep brought me to a region where you do not want to run out of fuel: Rub' al Khali or the Empty Quarter.

Think of Lawrence of Arabia and a thirsty death. This is the [largest continuous sand desert](#) in the world, a sandpit as big as France.

Today, Dubai has a mile-long artificial peninsula in the form of a palm tree that is packed with hotels and expensive villas. When the global recession hit Dubai in 2009, the world stood still.

Well, at least the work on Dubai's artificial island project called '[The World](#)' stopped. By that time, it had already moved a massive 321 million tons of sand, but the islands were left empty.

Elsewhere, the building boom went on. The Burj Khalifa is now the highest tower in the world. According to its website, there are about 330,000 cubic meters of cement in the tower – one fourth of it comprises sand. How easy for the Burj and other Dubai skyscrapers to have all that sand in their backyard, right?

The desert that has run out of sand!



As it turns out, the [tons of sand in the Burj Khalifa](#) came from Australia because there is not enough sand for concrete available in that region itself.

The largest continuous sand desert in the world is unusable for concrete. It is not even good enough to build those islands. The wind has free play in the desert and makes the sand grains too round, so that they do not stick together.

Marine sand is better but the lion's share of the marine sand on the coast of Dubai has already been used up for the palm islands. And the salt in sea sand does not work well with the steel in reinforced concrete. Dubai desalinates its water but that is way too costly a method to use to clean marine sand. It also requires oil, and unfortunately for Dubai, its [oil stock is dwindling](#). The city [already imports more petroleum](#) products than it exports and in a decade or two the wells will be dry.

The World Expo in 2020, to be held in Dubai, will probably be one of the world's most pompous of shows. A tower even higher tower than the Burj Khalifa is being built for it.

In 2012, the British business bank Barclays amended the popular adage that 'pride comes before a fall' with a study that shows that '[high-rises come before a fall](#)' – demonstrating that there is a strong chance of financial crashes following a boom in the construction of skyscrapers.

If you look past the palaces in Dubai and its sinking oil, water and construction sand reserves, then the question is not whether but when the desert will blast Dubai's bling into decor more suitable for an apocalyptic film.

Singapore: stockpiling sand

Nearly 6,000 km to the South East of Dubai is [Singapore, which stockpiles sand](#). It imports massive amounts of this resource and keeps it as a reserve, comparable to a strategic stock of oil. Singapore needs sand to continue to grow – the city-state has increased its land mass by 22% in the past 50 years.

Initially, this was easy. Its neighbours sold it their sand. But in 1997, Malaysia officially stopped selling sand to Singapore. Indonesia and Cambodia stopped in 2007, and Vietnam in 2009. The entire international sand business became a political mine field. Populations tend to dislike the idea of selling pieces of their country for the purpose of expanding another country, especially if violence against them and their environment is involved.

In some cases, the export went underground. The non-governmental organisation [Global Witness](#) found that in Cambodia – the most corrupt country in South East Asia according to anti-corruption watchdog Transparency International – contracts worth millions were still ongoing, with officials involved.

In practice, companies dig sand in vulnerable natural areas and local fishermen lose their key capital: fish. Investigative reporting has shown that this [happened in Vietnam](#), also as a result of the illegal export of sand to Singapore.



The sand mafia also [swept 24 Indonesian islands](#) off the map to sell the sand in [Singapore](#). This caused a [dispute over the exact location](#) of the international border between Singapore and Indonesia. At one point, Singapore had to pay \$190 per tonne of sand, making it more expensive than a barrel of crude oil.

Singapore's sand story has occasionally made it to the news, but today it becomes ever more obvious that the scarcity of sand across the world is spreading and affecting all of us. The growing sand shortage is putting sand in the machine called 'industrial civilisation', and leading to deadly conflicts.

The sand mafia in India

Sumaira Abdulali, 55, is now a public figure in India. The media call her the 'Minister of Noise' because of her [activism against noise pollution](#) in Mumbai. But she first became famous for her fight against the sand mafia.

In 2004, she noticed that the beach near her house in Alibaug, near Mumbai, was shrinking. She heard trucks at night that she suspected were carting the sand away, and decided to

take action. She called the police, took her car and drove to where the road ended at the beach.

“Instead of rushing to the scene of the crime, the police warned [off] the illegal sand miners”, said Abdulali.

As she waited in her car for the police to arrive, the men present at the mining site pulled her out and [assaulted her](#). She survived the beatings, but needed to be hospitalised.

As she was beaten, one of the miners asked:

“Do you know who I am?”

He was the son of a local politician, also the owner of a construction company.

Two years later, Abdulali started a lawsuit against the sand mafia in Maharashtra. In 2010, the [Bombay High Court banned sand mining](#): first only in areas that came under the ecologically-sensitive Coastal Regulation Zone and later in the entire state of Maharashtra, whose capital, Mumbai, is the base of the Hindi film industry, popularly known as Bollywood.

With more than 20 million inhabitants, Mumbai is also one of the 10 largest cities in the world – with a huge appetite for sand by its construction industry. Despite that, the ban on sand mining remained in force until protective measures were turned into laws, which [did not happen until 2015](#).

Abdulali sums up the effects of sand extraction in India: soil erosion, landslides, water table loss, infertility of farmland, disturbances of ecosystems and marine life, beach disappearances – all the way to collapsing bridges.

Once Abdulali made a surreal video of a [train crossing the Vaitarna railway bridge](#) while machines were extracting sand from the riverbed. That bridge is in Virar, north of Mumbai, and the city’s sole link to North India. Last August, when the [Mahad bridge](#), across the Savitri river, on the Mumbai-Goa highway collapsed, killing at least 28 people, several activists including Abdulali [blamed the incident](#) on sand mining on the riverbed.



Around that time, railway officials also admitted that they were concerned that the Vaitarna bridge’s [foundation had been weakened](#) by illegal sand mining on the riverbed. A senior Western Railways officer [told The Hindu](#) newspaper:

“We believe there is a nexus between the sand mafia and certain state government departments. Due to the illegal sand mining, the flow of the Vaitarna has been altered, which is a dangerous sign for the bridge’s health.”

Attempted murder – and guess who the police sided with

In 2010, Abdulali took a journalist and photographer on a [field visit to Raigad](#) – the Maharashtra district where the Mahad bridge is located – where sand extraction was in

progress despite the ban. They pretended to be looking to buy land, but then filmed illegal and industrial exploitation of sand.

Their return to Mumbai did not go well. Their car was attacked and they were forced into a car chase on a dirt track, with two cars trying to push them into a ravine. Abdulali said that on the main road, a truck was also waiting to crash into them, but it also missed.

“What saved our lives is that my husband is a professional rally driver and he taught me some of his driving skills”, said Abdulali. “Again, the police were in cahoots with the mafia. I wanted to report an attempted murder attack, but they wanted to give me a speeding ticket! Once again, a powerful local politician controlled the illegal trade in sand.”

The Bombay High court later [severely criticised the police](#) for the attack on Abdulali and her companions. Abdulali’s story is unfortunately not an isolated case. In India, anti-sand mining activists are often [physically attacked and even killed](#).

Earlier this year, journalist Sandhya Ravishankar, who wrote a [four-part series on illegal sand mining](#) along Tamil Nadu’s southern beaches, which was published in the online magazine *The Wire*, said that she had been [receiving death threats](#) and was facing online abuse, which she blamed on a sand-mining company that she had named in her reports.

She filed a [complaint](#) in connection with the threats and harassment with the Chennai police in March.

Recycling rubble into sand? Nah ... !

Abdulali says that the people in control of the business usually make sure that they also get into the local village council, or at even higher political levels.

For instance, the father of one of the men who beat her up in 2004 became a minister of state in Maharashtra. He claims he is out of the sand business now, but still owns the largest sand storage site. He has shifted his business interests to the next goldmine: stones.

Abdulali said that recycling construction material would help reduce the demand for new sand.

“To reduce the demand for new sand, you need to evolve into a circular economy”, she said. “Big cities in India crush many old buildings to make room for new, but the debris ends up at landfills. In some countries, the use of primary material is only allowed after the demolition waste is used up.

“In the Netherlands, 90% of all demolition waste is recycled. Even poorer countries like Vietnam are now reusing demolition waste. You can build roads with a lot less sand, by [recycling plastic as a resource](#). We have to do that. If we continue like this, India will dig a grave for itself and pay a very expensive price. The circular economy is a much better option.”

Today you can also [drink beer for the sake of beaches](#). A machine reduces empty beer bottles to a kind of sand that is useful in construction. But a circular economy also needs energy. The beer campaigners do have a point: beaches worldwide are in trouble. Rivers transport sand to the sea. Take the sand out and you end up without a beach. In Sri Lanka,

they found that out the hard way.

The most eroded coastline in all of Sri Lanka is around the delta of the Maha Oya river, which, not by accident, is also the river with the most sand mining. In some places the beach recedes by 12 metres to 15 metres each year. Thousands of families here have lost their land by the sea.

When the damage became too rampant and too evident, a ban on mechanical sand extraction in the river was called for. But here too, the sand mafia keeps digging.

The sand mafia is not limited to South Asia. In Elmina Bay in Ghana, the sand mafia even digs sand just in front of the few beach resorts the country has. Hotels have lost 30 metres of beach. The sea now comes to their doorstep. The Environmental Justice Atlas contains the [details of at least 64 conflicts](#) around sand, gravel and quarries.

Even the most mined material in the world has become scarce. The resulting struggle for what is left is getting ugly. In the future, that could be a violent struggle in a big way.

The coming sand wars

Worldwide, we use twice as much sand as all the rivers in the world transport. So we have started digging elsewhere. The majority of all the sand we now use is marine sand. As a result, two thirds of all beaches in the world lose sand – just as sea levels are rising due to warming climate.

Northwest Europe fetches more than [100 million cubic meters of marine sediment](#) from the North East Atlantic, mainly sand from the shallow North Sea. But marine sand is less suitable for concrete because salty sand does not go well with concrete reinforced with steel. To use marine sand in construction, you need to wash it with fresh water. Unfortunately for us, that is another problem.

Seventy percent of the earth is covered with water, but only 0.007% of that is fresh water available for consumption. Fred Pearce, the acclaimed author of *When the rivers run dry: Water, the defining crisis of the twenty first century*, pointed out a while ago that if everyone today lived like the average meat, beer and milk consuming westerner, all the water in all the rivers in the whole world would not be enough.

Forget the one or two litres of water you drink every day. Making one average ice cream uses up 1,000 litres of water, one steak takes 5,000 litres.

The world's soils provide twice as much food today as they did a generation ago, but in that period we also diverted three times more water from rivers and the surface to agriculture. At one point, hard choices will need to be made between using fresh water for food crops or for washing marine sand. The interests of the construction industry and those of farmers will clash.

Another hard choice to be made is that between the beaches and our buildings. Oddly enough, in the US, despite a federal ban on sand mining on beaches, there is just one company openly digging away on a beach in California, using a legal loophole. The building company that is literally [making America smaller](#) has its headquarters in Mexico.

But that conflict is an anecdotal side-show compared to the one between the world's two

superpowers. The demand for sand increases annually by more than 5%, mainly due to rapid urbanisation. In 20 years, the production of cement – which requires sand – has tripled. China uses about half of all sand used globally and makes 58% of all the cement in the world. Shanghai built more skyscrapers in 10 years than New York ever did.

China's billion tonne a year sand habit – and that's just imports



The Chinese hunger for sand is immense, and sand mines on the mainland are no longer low-hanging fruit. [Poyang Lake](#), China's largest lake, is also the largest sand mine in the world: 236 million cubic metres of sand are extracted from it every year. Because of this, the water table near the lake has dropped, hurting fauna and flora, and also the locals who live in the vicinity.

China today imports one billion tonnes of sand a year. That is five times more than its annual coal imports. In the South China Sea, China is busy pumping sand on pieces of rock that would otherwise stay under the water – thus creating islands. These islands strengthen its claim on the disputed South China Sea, securing shipping lanes, and access to new oil and gas reserves.

The tensions with other countries claiming parts of the same sea have increased in recent years, sometimes resulting in deaths – as was the case in a conflict between China and Vietnam.

But the bigger issue is the rising tension between China and the US. The Trump administration does not appear very willing to accommodate China as a rising superpower. Trump's strategist and right-hand man Steve Bannon once said that the [US and China will be at war within five to 10 years](#), and that such a war would begin in the South China Sea.

Trump's Foreign Minister Rex Tillerson, formerly the CEO of oil giant Exxon, claimed that China should not be allowed access to the islands it is building in that sea. This prompted [China to remind Washington](#) that the US was not a party to the conflict in the South China Sea and it would be wise to keep it that way.

Since World War II, the US has been the dominant navy in Asia and in the South China Sea. However, China's construction of islands in the South China Sea is accompanied by an expansion of its military presence in the area.

Although most media attention regarding those troubled waters is related to potential oil sources and the strategic importance of the disputed islands to China, [The Economist wrote in February 2015](#) that there is another reason why China is so eager to control that sea: sand.

Capitalism goes into self-destruct mode

[*Sand Wars*](#) was the title of a popular 2013 documentary by the European channel ARTE. It prompted the United Nations to draft a report called [*Sand. Rarer than one thinks*](#). It all makes this author think about one book from the 1930s.

In that era of emerging fascism, in his book [*War with the Newts*](#), the Nobel Prize-nominated author Karel Capek satirised the short-sightedness of appeasement, the slow erosion of norms and a raw capitalist expansion strategy that ended with the loss of our coastlines by the very same creature humans created.

Little could he know that a century later, facts are trying to catch up with his science-fiction.

Nick Meynen is one of The Ecologist's 'New Voices' contributors. He works at the [EnvJustice project](#) in the European Environment Bureau but he is also a journalist and an author. The sand series is part of Nick's new book the title of which translates to: '[Frontlines. A journey through the shadows of the world economy](#)'.

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