Lourens Samuel, *Sand*

Sand is the foundation of our modern world. We use it in agriculture, landscaping, road embankments, to create building materials such as concrete, mortar, glass, and plaster, filter water, fracking, land reclamation, in the solar industry, electronic equipment… Our usage of sand amounts to around 50 billion tonnes every year. That is around 18 kilograms per person a day. It is the world's second most used natural resource after water. We use it even more than oil.

The thing is, we're running out of this essential resource. And it is happening fast.

The problem lies within the type of sand we use. The plentiful desert sand has been shaped into smooth spheres by the wind, rendering it largely useless as a binding component. The desired type of sand is instead the angular 'marine' kind which is found in rivers, lakes, and the sea. Formed by an erosive process over thousands of years, this sand is now being extracted at a rate far greater than its renewal.

One of the main reasons for our impending crisis is the rapidly growing urbanisation. The UN has predicted that by 2050, 2.5 billion more people will be living in urban areas, in addition to the current 4.2 billion urban dwellers. On average that would be like adding eight cities the size of New York every year, from now until 2050. Creating housing for all those people, as well as roads to connect them, will require enormous quantities of sand. China is estimated to have used more sand in the past decade than the United States in the entire 20th century. In India, the use of construction sand has tripled since 2000. In Dubai, the demand for this certain sand is so great that the seafloor around the United Arab Emirates is so depleted they are now importing sand from Australia.

Sand is not only used for buildings and infrastructure. Increasingly it is used to create the very ground we live on. One estimation asserts that approximately 15,563 square kilometres of artificial land have been created since 1985. That is a landmass larger than countries such as Jamaica and Lebanon.

The extraction of sand has unequivocal negative consequences for the environment and physically alters ecosystems. It tears up marine habitats, impacts water turbidity, increases water pollution, and wipes out coastal wetlands. Around 90% of the world's beaches have shrunk an average of 40 metres since 2008.

We are already starting to see the consequences of sand mining. Two dozen islands in Indonesia disappeared around the same time as Singapore imported 17 million tonnes of sand as part of its land expansion. A report found that sand mining exacerbated the impact of the Indian Ocean tsunami in Sri Lanka in 2005. Some experts warn that Vietnam may run out of sand by 2022 and estimations suggest that half of the Mekong Delta will be wiped out by the end of the century and up to 70% of California's beaches will be gone.

If we want our world to survive, we urgently need to find sustainable alternatives, or we will be facing a crisis of epic proportions.