The world needs a global agenda for sand

July 2 2019

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What links the building you live in, the glass you drink from and the computer you work on? The answer is smaller than you think and is something we are rapidly running out of: sand.

In a commentary published today in the journal *Nature*, a group of

scientists from the University of Colorado Boulder, the University of Illinois, the University of Hull and Arizona State University highlight the urgent need for a global agenda for sand.

Sand is a key ingredient in the recipe of modern life, and yet it might be our most overlooked natural resource, the authors argue. Sand and gravel are being extracted faster than they can be replaced. Rapid urbanization and global population growth have fueled the demand for sand and gravel, with between 32 and 50 billion tons extracted globally each year.

"From 2000-2100 it is projected there will be a 300 percent increase in sand demand and 400 percent increase in prices," said Mette Bendixen, a researcher at CU Boulder's Institute of Arctic and Alpine Research (INSTAAR). "We urgently require a monitoring program to address the current data and knowledge gap, and thus fully assess the magnitude of sand scarcity. It is up to the scientific community, governments and policy makers to take the steps needed to make this happen."

A lack of oversight and monitoring is leading to unsustainable exploitation, planning and trade. Removal of sand from rivers and beaches has far-reaching impacts on ecology, infrastructure, national economies and the livelihoods of the 3 billion people who live along the world's river corridors. Illegal sand mining has been documented in 70 countries across the globe, and battles over sand have reportedly killed hundreds in recent years, including local citizens, police officers and government officials.

"Politically and socially, we must ask: If we can send probes to the depths of the oceans or the furthest regions of the solar system, is it too much to expect that we possess a reliable understanding of sand mining in the world's great rivers, and on which so much of the world's human population, rely?" said Jim Best, a professor at the University of Illinois Department of Geology. "Now is the time to commit to gaining such

knowledge by fully grasping and utilizing the new techniques that are at our disposal."

In order to move towards globally sustainable sand extraction, the authors argue that we must fully understand the occurrence of sustainable sources and reduce current extraction rates and sand needs, by recycling concrete and developing alternative to sand (such as crushed rocks or plastic waste materials). This will rely on a knowledge of the location and extent of sand mining, as well as the natural variations in sand flux in the world's rivers.

"The fact that sand is such a fundamental component of modern society, and yet we have no clear idea of how much sand we remove from our rivers every year, or even how much sand is naturally available, makes ensuring this industry is sustainable very, very difficult" said Chris Hackney, research fellow at the University of Hull's Energy and Environment Institute. "It's time that sand was given the same focus on the world stage as other global commodities such as oil, gas and precious metals."

"The issue of sand scarcity cannot be studied in geographical isolation as it has worldwide implications," said Lars L. Iversen, a research fellow at Arizona State University's Julie Ann Wrigley Global Institute of Sustainability. "The reality and size of the problem must be acknowledged—and action must be taken—on a global stage. In a rapidly changing world, we cannot afford blind spots."

More information: Mette Bendixen et al, Time is running out for sand, *Nature* (2019). DOI: 10.1038/d41586-019-02042-4

Provided by University of Colorado at Boulder