

O Sun God, Savitr!
Thou dazzling fount of life-persuasive light!
Sublimest mystery speeding from afar!
Swift became that burst too potent on the sight!
This radiant type of strength and youth!
Glowing eternally!



శ్రీ వేపచేదు విద్యా పీఠము

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Steering forth he rises from the lap of the dawn!
Praised by singers, my God Savitar!
Stopped forth and never missed his place!
He steps forth the splendor of the sky the wide!
Seeing, far-shining, the shining wanderer!
- Rig Veda. vii. 65

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We alone shine!
All luminaries get illuminated by His Illumination!
The whole Universe is enlightened by His light!
- Kathopanishad

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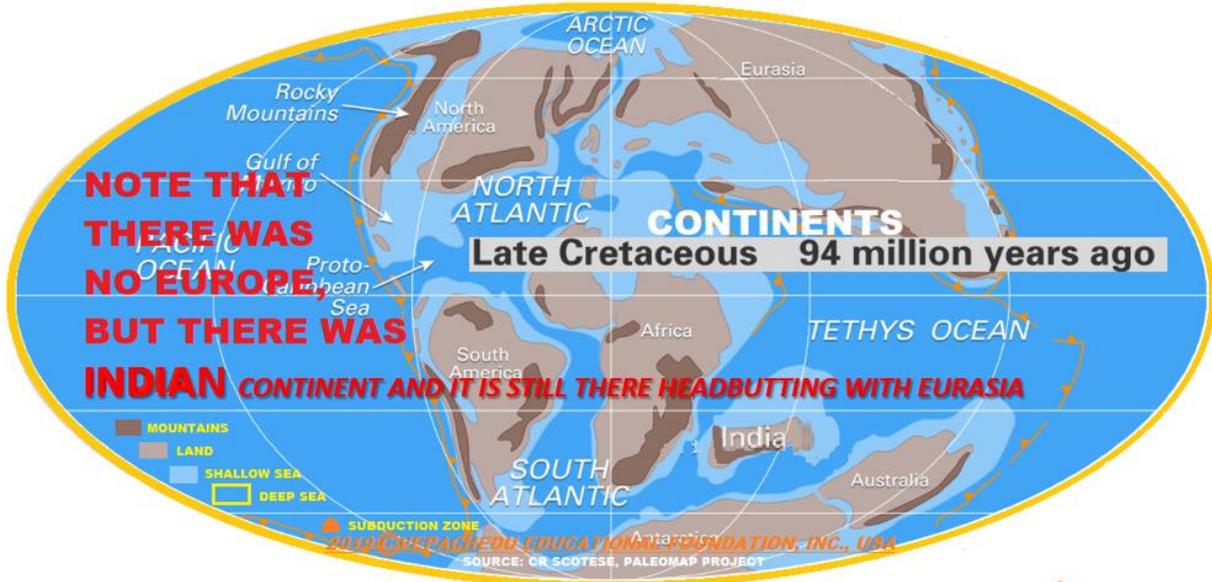
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SAND MAFIA WILL EXTINGUISH HUMANITY

INTRODUCTION

Common people¹ have never given sand even a passing thought², but human abuse of it is about to cause a global disaster of epic proportions extinguishing humanity similar to the catastrophe resulting in the dinosaur extinction at the end of the Cretaceous period³!



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HISTORY: Sand was used as early as 6000 BC to grind and polish stones to make sharpened tools and other objects. The stones were rubbed on a piece of wetted sandstone to hone the cutting edge. In some cases, loose sand was scattered on a flat rock, and objects were rubbed against the sandy surface to smooth them. The first beads with a glass glaze appeared in Egypt in about 3,500-3,000 BC. The glass was made by melting sand, although naturally-occurring glass formed by volcanic activity was probably known long before that time.

PROPERTIES: Sand is a loose granular material that results from the disintegration of rocks, consists of particles smaller than gravel but coarser than silt, and is used in mortar, glass, abrasives, and foundry molds. Sand, mineral, rock, or soil particles that range in diameter from 0.02 to 2 mm (0.0008–0.08 inch).

Most of the rock-forming minerals that occur on the Earth's surface are found in sand, and in some locations, feldspar, calcareous material, iron ores, and volcanic glass are dominant constituents of sand. All sands contain small quantities of heavy rock-forming minerals, including garnet, tourmaline, zircon, rutile, topaz, pyroxenes, and amphiboles. Quartz is by far the most common because it is abundant in rocks, is comparatively hard, has practically no cleavage so that it is not readily worn down, is nearly insoluble in water, and does not decompose. Most quartzose sands contain a small quantity of feldspar, as well as small plates of white mica, which, though soft, decompose slowly.



Introduction 1

... One of the surprising facts encountered in this book is that only 20 to 30 percent of the world's deserts are covered by sand, and that the world's great deserts in fact encompass a huge variety of terrains, not only relative to each other but sometimes within their own boundaries. There is, moreover, little exotic about the desert biome—almost 20 percent of the earth's land surface is desert, and there are deserts in almost every continent and at every latitude....

Sand deposits are terrestrial and marine. Terrestrial sand deposits include residual soil deposits, river channel deposits and floodplain alluvial deposits, and the marine sand deposits include shore and offshore deposits. Sand deposits located on the mountain and river valleys are in environmentally valuable areas. In developed economies, a shift to marine (mostly beach sand mining) mining has occurred due to the decline of inland resources and the expensive specialized equipment required for offshore dredging⁴.

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CONSTRUCTION AGGREGATE or simply aggregate includes all types of construction material, but mostly mined materials like sand, gravel, crushed stone, etc., largely used in the construction sector as the key ingredients of concrete and asphalt. Windowpanes, wineglasses, and cell-phone screens are made from melted sand. Sand is used for filtration in water-treatment facilities, septic systems, and swimming pools. Oil and gas drillers inject large quantities of hard, round sand into fracked rock formations in order to hold the cracks open like a wedge. Railroad locomotives drop angular sand onto the rails in front of their wheels as they brake, to improve traction. Foundries use sand to form the molds for iron bolts, manhole covers, engine blocks, and other cast-metal objects.

USEFUL SAND: There are many geological characteristics that affect the mining of crushed stone, sand, and gravel. Deserts cover about 20% of land surface and about 20–30% of which are covered by sand⁵.



Unfortunately, desert sand is unsuitable for construction and for almost any human use because the grains don't have enough fractured faces for concrete and asphalt, and are too small and round for water-filtration systems. However, the most common methods are the open pit mining and quarrying. The sand and gravel deposits which are above the water-level are excavated with front-end loaders, tractor scrapers, and draglines.

MINING AND EXPORT: For the deposits that are under the water-level workers use hydraulic and ladder dredges. The process of quarrying requires drilling and blasting. After the suitable method is applied the crushed rock is transported to the process facilities⁶. The high-compression concrete used in Dubai's Burj Khalifa, the world's tallest structure, was made with sand imported from Australia. Australia and India are major exporters of garnet sand, which is crushed to make an abrasive material used in sandblasting and by water-jet cutters⁷.



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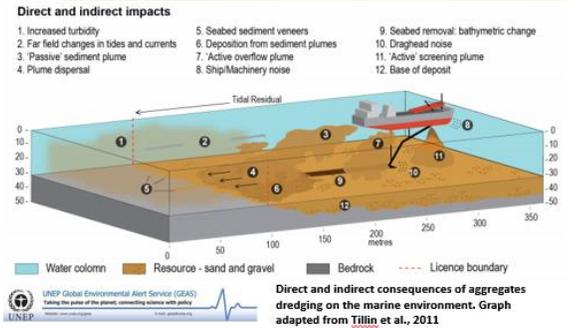
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BEACH SAND MINING

Most decision makers and river managers have never given sand even a passing thought. However, around the world, the global industrial-scale sand mining is causing wildlife to die, local trade to wither and bridges to collapse⁸. The demand for this increasingly valuable resource is unlikely to let up as urbanization is booming all over the world, devouring colossal amounts of sand⁹. The world will never again build cities as rapidly as it is building today and there is a narrow window of opportunity for limiting global warming, tackling air pollution and promoting innovative, resource-efficient growth¹⁰. Up to 50 billion tons of sand and gravel are mined each year to meet soaring demand from construction and land reclamation making it the largest extractive industry on the planet¹¹. This is more than twice the yearly amount of sediment carried by all of the rivers of the world¹², making humankind the largest of the planet's transforming agent with respect to aggregates¹³.



The world's use of aggregates for concrete was estimated for 2012 to be about 30 billion tons, enough concrete to build a wall 27 meters high by 27 meters wide around the equator¹⁴. This large quantity of material cannot be extracted and used without a significant impact on the environment. Extraction has an impact on biodiversity, water turbidity, water table levels and landscape and on climate through carbon dioxide emissions from transportation, as well as socio-economic, cultural, and political consequences. In some extreme cases, the mining of marine aggregates has changed international boundaries, such as through the disappearance of sand islands in Indonesia.

Impacts on	Description
Biodiversity	Impacts on related ecosystems (for example fisheries)
Land losses	Both inland and coastal through erosion
Hydrological function	Change in water flows, flood regulation and marine currents
Water supply	Through lowering of the water table and pollution
Infrastructures	Damage to bridges, river embankments and coastal infrastructures
Climate	Directly through transport emissions, indirectly through cement production
Landscape	Coastal erosion, changes in deltaic structures, quarries, pollution of rivers
Extreme events	Decline of protection against extreme events (flood, drought, storm surge)

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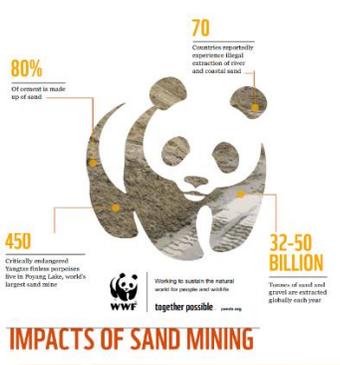
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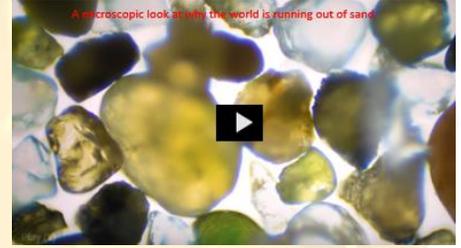
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However, people living in the highly concentrated urbanized regions of eastern China and the Ganges Valley in India have modest consumption patterns compared to the oil and petrol-guzzling habits of those in the more sparsely populated regions of North America and the Middle East, where people have much higher income levels.



Electricity is a major component of the world's energy mix, and electrification differs substantially between countries, swinging from less than 5% of total energy in Nigeria and Nepal, to more than 50% in Sweden and France.



Power generation is still dominated by carbon emitting fossil fuels, and most of the world's energy consumption involves directly burning fossil fuels, such as oil for transport, coal for making steel and cement industries and gas for heating.



Despite recent improvements in some countries in procuring energy from renewables, they make up only 13% of the world's total consumption, mostly hydro-electricity in high-income countries and biomass for cooking and heating in low income countries.

Carbon emissions by sector confirm that fossil-fuel based electricity is an important contributor to global climate change. Carbon emissions from electricity generation vary depending on fuel source, with coal-dependent countries such as Australia, China, South Africa, and US showing high proportions. In contrast, Denmark has lower emissions from electricity due to its high level of renewable generation. Many environmentally desirable products and activities also depend as heavily on aggregate, e.g., solar panels are made from

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silica and silicon, wind turbines are manufactured with foundry sand, electric vehicles need roads and highways that require aggregate. Global carbon emissions are concentrated in China and US, together producing 39% of global emissions¹⁵.

The mining of aggregates in rivers has led to severe damage to river basins, including pollution and changes in levels of pH. Removing sediment from rivers causes the river to cut its channel through the bed of the valley floor (or channel incision) both upstream and downstream of the extraction site. This leads to coarsening of bed material and lateral channel instability. It can change the riverbed itself. Another major impact of beach sand mining is the loss of protection from storms surges associated with tropical cyclones and tsunamis.



"The man who stands firm in order to protect a sand castle can never be relied upon – for he has given away his common sense."

SAND MAFIA

The Mafia is a network of influential politicians, powerful, and established construction companies and miners, who function in open. This influential network has figured its ways to function openly by breaching all the existing rules and regulation. Sand mining and theft is global and the world's beaches are being mined for sand for a variety of uses which is often very destructive and poorly managed. This theft of beach and dune sand is a direct cause of erosion along many shorelines, damaging the beach fauna and flora, ruining beach aesthetics, and causing environmental damage to other coastal ecosystems associated with the beach such as wetlands¹⁶. Formed by erosive processes over thousands of years, sand and gravel are now being extracted at a rate far greater than their renewal. Furthermore, the volume being extracted is having a major impact on rivers, deltas and coastal and marine ecosystems, results in loss of land through river or coastal erosion, lowering of the water table and decreases in the amount of sediment supply. Despite the colossal quantities of sand and gravel being used, increasing dependence on them, and the significant impact that their extraction has

DETRIMENTAL EFFECTS OF BEACH SAND MINING

- Destruction of natural beaches and the ecosystems they protect. Loss of habitat for globally important species offshore and onshore;
- Change in water flows, flood regulation and marine currents;
- Land losses both inland and coastal through erosion, declining protection from natural and extreme events (storm surge, flood, drought);
- Increased shoreline erosion rates, changes in deltaic structures, lowering of the water table, salinization of groundwaters and arable soils, pollution of rivers;
- Impacts on coastal infrastructures and river embankments;
- Impacts on climate directly through transport emissions, indirectly through cement production;
- Social and political turmoil due to illegal sand mining practices leading to complaisance, corruption, sand mafia, human rights violation, child labor, crime;
- Economic losses from tourist abandonment.

Sand mining has been recorded to occur in 73 countries, on 5 continents.

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O Sun God, Savitr!
 Thou dazzling fount of life-persuasive light!
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 Swift became that burst too potent on the sight!
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 Glowing eternally!



శ్రీ వేపచేడు విద్యా పీఠము

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 Stealing forth he rises from the lap of the dawn!
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on the environment, this issue has been mostly ignored by policy makers and remains largely unknown to the public¹⁷. Sand Mafia is doing a roaring trade in India with an estimated illicit sand market around INR 150 bn (\$2.3 bn) per year, along with the accompanying gang violence¹⁸. Sand Mafia violence is not unique to India, but is a worldwide phenomenon¹⁹, and we are running out of one of concrete's essential ingredients: sand²⁰.

AFRICAN CONTINENT

The coasts of Ghana, Kenya, Cape Verde, Zanzibar, etc., are lined by picturesque beaches with the finest sand that holds back the tides, salt water flow inland protecting crops, plants and homes. This protective and beautiful sand is also a source of money in the unregulated sand mining industry without any concern for the environmental degradation and looming disaster.



Demand for African beach sand is not only from Africa's giant cement manufacturers and construction businesses, but also from outside the continent, e.g., Dubai used at least 200 million cubic meters of sand and stone, most of which is from Africa, for its island project The Palm Jumeirah. One of the safest countries in Africa is Cape Verde where every third person is unemployed and

depends on stealing sand endangering tortoises that once buried their eggs on the beaches, where only dirt and stones left for them now²¹. Nagonha in northern Mozambique sits on a tall dune with lush greenery on the one side, and a turquoise Indian ocean on the other with the Mozambique's growing tourism industry. But sand mining has irrevocably tarnished the scenery, ecology, and people's lives²². There are more than

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200 small to medium size sand-mining sites on the Wild Coast of South Africa having devastating environmental impacts²³. The effects of climate change from changing precipitation patterns to rising seas are being exacerbated by the coastal erosion already affecting West Africa due to sand mining, increasing the exposure and vulnerability of the people and assets located there²⁴.

AMERICAN CONTINENT

USA: Deposits of sand, gravel, and stone can be found all over the United States and sand was used to produce glass as early as 1607 in Virginia. The first sustained glass-making venture was formed in 1739



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in Wistarburgh, New Jersey, by Caspar Wistar²⁵. The production of sand for construction purposes grew significantly with the push for paved roads during World War I and through the 1920s. The housing boom of the late 1940s and early 1950s, coupled with the increased use of concrete for building construction, provided another boost in production²⁶. Today, a typical American house requires more than two hundred tons of sand, gravel, and crushed stone for the foundation,



basement, garage, driveway, and its share of the street that runs in front of it. A mile-long section of a single lane of an American interstate highway requires thirty-eight thousand tons of aggregate. The most dramatic global increase in aggregate consumption is occurring in parts of the world where people who build roads are trying to keep pace with people who buy cars²⁷.

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Today, the processing of sand is a multi-billion-dollar business with operations ranging from very small plants supplying sand and gravel to a few local building contractors to very large, highly automated plants supplying hundreds of truckloads of sand per day to a wide variety of customers over a large area. Onshore sand mining in coastal dune systems such as those in Monterey Bay, California, in the United States, lead to long-term erosion of about 0.5 to 1.5 meters a year²⁸. The three largest sand extraction sites in the United States combined represent 16 million cubic meters a year²⁹. Regulatory approval for new quarries³⁰ is more and more difficult to obtain because people don't want to live near noisy quarries, in spite of their lives are dependent on the aggregate. Quarries approved prior to stricter regulations are indispensable and the scarcity of alternatives makes them more valuable.

The rapid growth in construction of the biggest, and the most expensive houses with the best water views on many barrier islands with the greatest exposure to ocean storms has been driven by lax land-use ordinances, low flood-insurance rates, and the willingness of Congress to cover much of the cost with the taxpayers' money when the inevitable disaster such occurs, e.g., the Disaster Relief Appropriations Act of 2013 to pay for the hurricane disaster in New Jersey.

CENTRAL AND SOUTH AMERICA: Estimated sale of construction aggregates in Central and South America was 2.2 billion tons in 2017. In Mexico, demand for construction aggregates was projected to rise 4.7% per annum through 2017 to 605 million tons³¹. Barbuda, one of the lowest lying islands in the Caribbean, has been labelled as one of those most vulnerable to the effects of climate change. The 62-square-mile island, made up of wetlands, is becoming one of the most vulnerable spots on earth with respect to the consequences of climate change. Barbuda continues sand mining, the only revenue source, despite warnings³².

AUSTRALIAN CONTINENT

Australia has been a user of silica sand ever since white settlement, with one of its major silica sand mines being created in the 1930's on the Kurnell Peninsula near Sydney, where Captain Cook had earlier landed. There were more than 70 million tons of silica sand removed from this mining operation before it was

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mining regions³⁵.

closed in 1990. Silica sand from this mine was used to support the growing Sydney building market during that period. Other places in New South Wales, where silica sand is mined, include the Broken Hill area in the far south west of the state and the Newcastle Stockton sand dunes in the east. In Queensland silica sand mining has been taking place on North Stradbroke Island for many years. Most Australian states mine silica sand for building purposes and this is expected to grow as the population increases and more buildings are required³³. The silica sand is also used to manufacture solar panels and demand has been soaring as new energy continues to garner increased attention³⁴. Sand is in such high demand, people are stealing tons of it and Australia heads the list of sand

Australia is a major mineral sands mining country due to its large natural reserves and extensive mining sites. Most of the Mineral Sand Mining Industry (MSMI)'s products proceed to downstream smelting and refining companies for processing prior to being exported or used by domestic manufacturers. Titanium dioxide products are mainly sold to pigment manufacturers, while zircon is primarily sold to producers of refractory bricks for use in metal smelting operations. The MSMI is in the growth phase of its economic life cycle. Strong industry revenue gains, higher average wages and increasing profit margins have driven significant growth over the past five years, and MSMI's contribution to Australia's GDP is projected to increase at 5.2% annually over the 10 years through 2023-24. The MSMI products include: Concentrates of rutile, ilmenite, leucoxene, monazite, zircon, leucoxene, and other minerals, and synthetic rutile. The MSMI activities include: Sand mining of rutile, ilmenite, leucoxene, monazite, zircon, leucoxene, and other minerals, and synthetic rutile production³⁶.

The Gravel and Sand Quarrying Industry (GSQI) produces raw materials that are mainly used in glass and cement product manufacturing, and construction services. Rising demand from building construction, and increased demand from road and bridge construction have supported the industry over the past five years.

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Further, greater demand from glass and glass product manufacturers has helped to support industry demand over the period. But the public sector spending on heavy industry and other non-building construction over the past five years has been reduced and the demand for sand and gravel declined accordingly. The GSQI displays moderate capital intensity, reflecting moderate plant and equipment expenses, and extensive costs related to establishing a new quarry or expanding an existing one, and the GSQI firms need to make substantial investments in specialized quarrying equipment, including heavy earthmoving equipment such as excavators, loaders, bulldozers, dump trucks, grading and screening facilities, and sand-washing facilities³⁷.

The MSMI has suffered from conservationist and anti-mining movements during the 1970s because it operates on or near the coastline where the majority of Australians live or seek their recreation. Mining of these minerals by open cut methods close to major center of population has led to a need for very high standards of performance in rehabilitation by the mining companies concerned. Rehabilitation now results from an extensive program that starts with surveys of landform and vegetation before mining, and continues as a responsibility of the mining company for 7 years or more after mining. The emphasis required by public policy is on re-establishment of native species³⁸. This was less of a problem on the west coast because the deposits were inland. Accordingly, the MSMI is concentrated on the east coast between the Hawkesbury River in New South Wales and Rockhampton in Queensland, and on the west coast at Capel, south of Perth and at Eneabba, north of Perth³⁹.

EURASIAN CONTINENT

CHINA: Urbanization anywhere creates problems of pollution, congestion, poor health, crime and waste. Unregulated, unplanned urban sprawl creates these problems with dire consequences to the society, economy, and environment.



In the past few years, China has used more cement than the US used in the entire 20th century. Sand needed for this urbanization is obtained from Poyang Lake, China's biggest freshwater lake and a

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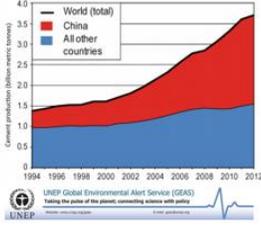
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haven for millions of migratory birds and several endangered species. Hundreds of dredgers may be on the lake on any given day, some the size of tipped-over apartment buildings. The biggest can haul in as much as 10,000 tons of sand an hour⁴⁰. A recent study estimates that 236 m cubic meters of sand are taken out of the lake annually. That makes Poyang the biggest sand mine on the planet, far bigger than the three largest sand mines in the US combined. The Pearl River Delta of China has witnessed the most rapid urban expansion in human history, a predominantly agricultural region transformed into the world's largest continuous city⁴¹. China hopes that by 2030 to have completed a hundred and sixty-five thousand miles of roads, three and a half times as long as the American interstate system, and China consumed more sand between 2011–2013 than the US did in the whole of the 20th Century.



EUROPE: Europe has shown that developed economies can continue to prosper without resorting to river sand, using the sand from crushed quarry rocks and recycled concrete. However, Europe still uses marine sand⁴². Sand was until recently extracted in land quarries and riverbeds; however, a shift to marine and coastal aggregates mining has occurred due to the decline of inland resources. The mining of marine aggregates is increasing significantly. Although the consequences of substrate mining are hidden, they are tremendous. Marine sand mining has had an impact on seabed flora and fauna. Dredging and extraction of aggregates from the ocean benthic zone destroys organisms, habitats and ecosystems and deeply affects the composition of biodiversity, usually leading to a net decline in faunal biomass and abundance, or a shift in species composition. Long-term recovery can occur only where original sediment composition is being restored.

INDIAN CONTINENT

ISLANDS OF INDIAN OCEAN: By 2100, global average sea level rise is expected to reach 0.26 to 0.55 meters under the best-case scenario of about 70% reduction of greenhouse gas emissions, and nearly one meter under unabated increase in greenhouse gas emissions. This problem is particularly acute for small islands states, where retreat options are limited. In the Maldives, a few of the largest and highest

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islands, such as the capital city, Male, are being consolidated to ensure they can host the population displaced from low-lying islands. To strengthen the city, a large amount of sand is being imported to Male, to be used in building higher towers and coastal protection. The sand is taken from offshore sand islands. Paradoxically, the sands extracted for the protection measures in Male are leading to the lowering of some islands, increasing the need to relocate their populations⁴³. In Sri Lanka in particular, demand has been rising since the early 1990s, and has taken a notable leap since the 2004 tsunami. Regulated river sand mining (RSM) in Sri Lanka is regulated according to strict extraction and transportation schedules. It was estimated that this increase in regulation has directly benefitted over 300,000 people. However, a growing construction boom has seen the country's annual sand requirement grow rapidly from around 8 million cubic meters immediately post-tsunami to over 70 million cubic meters today, and illegal sand mining continues in Sri Lanka⁴⁴.



BHARAT: Bharat (Indian Union) with 28 states and 1.3 billion population is the largest country in the Indian Continent with about half of the continent's population and is larger than the European Union (EU) with more diversity than that of EU. Illegal sand mining has become a common uncurbed phenomenon in 23 states of India⁴⁵. Every river flowing in the country is being ruined due to this unsustainable practice and is resulting in an ecological imbalance⁴⁶. Illegal mining is responsible for erosion and is changing the

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flow of rivers. The River Yamuna has shifted its course by 500 meters and is posing a threat to flood embankments in Noida. The removal of more than 12 million tons of sand a year from the Vembanad Lake catchment in India has led to the lowering of the riverbed by 7 to 15 centimeters a year. Incision can also cause the alluvial aquifer to drain to a lower level, resulting in a loss of aquifer storage. It can also increase flood frequency and intensity by reducing flood regulation capacity. However, lowering the water table is most threatening to water supply exacerbating drought occurrence and severity as tributaries of major rivers dry up when sand mining reaches certain thresholds. Erosion occurs from direct sand removal from beaches, near-shore marine dredging of aggregates, and as sand mining in rivers⁴⁷.

The Mafia's lobby with the construction companies is spread out across the country. In the National Capital Region (NCR) alone, 300 truckloads of sand are collected every day. The most blatant case of illegal sand mining takes place in the lowest reaches of the Ganga, between the Farakka barrage and the confluence of the river with the Bay of Bengal, where pontoons are anchored in the middle of the river, large pumps are set up on them, and the sand is pumped up and sent to the riverbank through a pipe. Recently, the Uttarakhand High Court declared the Ganga and the Yamuna as legal and living entities in response to a petition by an activist, seeking an end to illegal sand mining around Hardwar⁴⁸. As part of the same order, the court banned all sand mining in the area for four months, and asked the government what it planned to do to stop illegal mining⁴⁹.

Karnataka is one of the leading states, after Madhya Pradesh, Maharashtra and Andhra Pradesh, to witness the devastating effects of rampant sand mining. Between 2015 and 2018, the state has officially registered 20,779 cases of illegal sand mining, and 9,599 FIRs⁵⁰. Unbridled illegal sand mining in Dakshina (south) Kannada and Udupi districts over the last few decades has caused irreversible ecological damage, according to environmentalists and experts. Illegal sand mining that thrives on the banks of Netravati, Phalguni, Sita, Swarna, and Panchagangavali rivers has affected aquatic life and the course of the rivers.

However, the increase in demand from major cities of the state and even neighboring states has resulted in the deployment of heavy boats, earth movers and machinery to extract sand. This has affected the fragile

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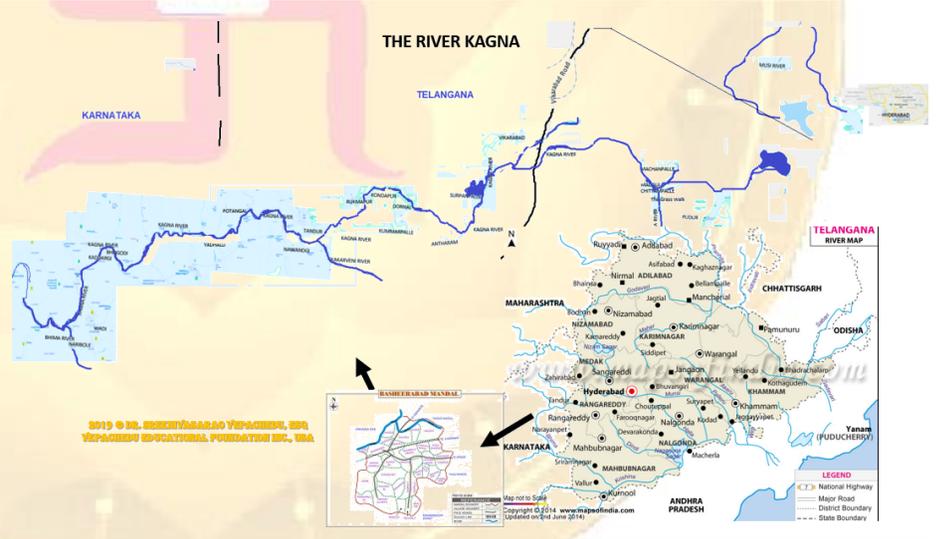
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ecosystem of the coastal region. The state government is receiving approximately Rs 150 crore as royalty from legitimate sand mining blocks every year. As per estimates, the state government is losing around Rs 200 crore per year due to illegal sand mining⁵¹. The officials at Department of Mines and Geology have registered 16 cases daily related to Sand Mafia in Karnataka from 2015-2017. As many as 12,318 cases were booked during this period, all of them mentioning illegal sand mining, transportation, storage, and use of filter sand. The criminal network of the Sand Mafias is very violent and anyone who raises their voice against it is snubbed or killed⁵². In 2017, Maharashtra accounted for almost 40 % of illegal mining in India⁵³, highest in the country. Between 2015-16, 30,979 cases on illegal sand mining were registered in Maharashtra alone.

Sand auction was banned in 1996, and the then Andhra Pradesh High Court ordered a stay on the mining activities with effect from 1 April 2012⁵⁴. Yet, reports suggest that 2,000 truckloads of sand reach Hyderabad every day from the beds of the Krishna and Godavari rivers and sand from the banks of River Kagna is being lifted illegally on the borders of Karnataka and Telangana states.

SAND - BORDER DISPUTE BETWEEN TELANGANA AND KARNATAKA STATES:

Basheerabad is a Mandal in Telangana on the border of Karnataka, on the [Hyderabad-Mumbai train route](#)⁵⁵. The main occupation in Basheerabad is agriculture dependent on the River Kagna. Some of the crops grown in this region include tobacco, paddy,



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groundnut, cotton, pulses, jowar, cereals, orange, mango, sapota, tomato, etc. The River Kagna is a main tributary to the River Bhima, flowing from east to west and confluences near Shahabad in Karnataka. A number of quarries and stone polishing units, Cement Corporation of India (CCI), Visaka Cement Industry Ltd (VCIL), Penna Cement Industries LTD, etc., are located in the Basheerabad Mandal.

Recently, a wrangle between Karnataka and Telangana states erupted forcing the intervention of Basheerabad police in Telangana state. In 2016, Karnataka state sanctioned permission for mining 1.5 lakh tons of sand to their rural development corporation in Kagna river. Since then, Karnataka contractors have been mining sand in the region. But, when the mining activity crossed the border into Telangana, the farmers of Kyadgira in Basheerabad Mandal tried to stop them. Officials of Telangana alleged that contractors from Karnataka were crossing the border and quarrying sand from their territory. Basheerabad Tahsildar Ms. Umamaheswari Vepachedu, who was just transferred from Hyderabad to monitor the 2018 elections, explained to officials of Karnataka Rural Infrastructure Development Corporation that according to the map presented by them clearly indicated that the area in dispute falls under Telangana state. She suggested to them to resume mining only after the border dispute was settled.

Pickets of Telangana and Karnataka police were maintained for four days, as tension prevailed while discussions continued. After a thorough review of the border, both States' Survey Departments settled the border dispute permanently by declaring the disputed site was Telangana area. Accordingly, Karnataka contractors and withdrew their illegitimate claim and returned to Karnataka side from Telangana side of the border and police pickets of Telangana and Karnataka were withdrawn on Saturday, 22 December 2018. Thanks to Ms. Vepachedu's unwavering stand in the face of threats from the Karnataka police, the sand dispute was resolved amicably, ushering in the New Year 2019 peacefully⁵⁶.

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ॐ असतो मा सद्गमय | तमसो मा ज्योतिर्गमय | मृत्योर्मा अमृतं गमय | ॐ शान्तिः शान्तिः शान्तिः ॥

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SUBSTITUTES AND SUSTAINABLE USE

In a 2014 report, the United Nations Environment Programme (UNEP) estimated that 85% by weight of all mining products is sand and gravel. UNEP estimated that half of all sand used in construction and industry in Morocco comes from illegal coastal mining⁵⁷. As urbanization increased so did the demand for sand in construction, making it the most mined resource on earth, fueling illegal mining unchecked around the world, destroying waterways and beaches, and stripping off the foundations of riverbanks and waterways; resulting in widespread ecological devastation. Dredging in rivers and seas pollutes natural habitats, affecting local fishing and farming industries.

Thinning coastlines, and the disappearance of some islands altogether, led Indonesia and Malaysia to ban sand exports to Singapore. Myanmar banned sand mining on some beaches, and Cambodia and Vietnam placed restrictions on exports⁵⁸. Cambodia suspended all sand exports in 2017. Regulations are in place in many countries, both developed and developing countries, but they are not enforced to mitigate future environmental impacts because mining activities contribute to economic development with immediate revenues, driving economic growth, creating jobs and building the much-needed infrastructure⁵⁹. High-volume hydraulic fracturing (HVHF) demand on a per-well basis is increasing by 8% per year in US⁶⁰.

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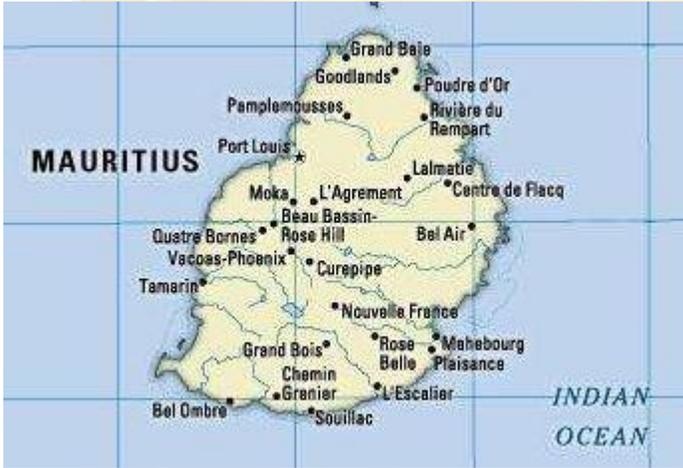
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Substitutes for sand are available such as mud that can be used for reclamation, straw and wood to build houses, and crushed rock to make asphalt and concrete that can be recycled. About 28% of building materials used in Britain in 2014 had been recycled. Europe plans to recycle 75% of glass by 2025 to lower demand for industrial sand⁶¹.

LESSONS FROM THE INDIAN (HINDU) ISLANDS OF INDIAN OCEAN: The sand or pebbles



obtained from the rocks can be used to replenish the depleted beaches, such as in Grand Sable in Mauritius with the support from Japan International Cooperation Agency. Rock gravel stays longer and reduces the erosion rate, without preventing the use of the beaches for fisheries and touristic activities. By the late 1980s, Mauritius felt the brutal effects of sand mining, as its lagoons were depleted, corals and seagrass dead, heightened erosion, and weakened ecosystems; resulting was visible enough for the government to hire scientists to study the issue. Mauritius has banned sand mining and paid compensation to those who worked as sand miners, and some of

them bought boats for tourism. Following the ban, the Ministry of Environment and Ministry of Fisheries monitored the former beach sand mining sites for several years, and found new sea grass cover and new coral colonies. However, the transition from sand to rock for construction is not an easy one and it took about four years to mix the rock sand to a consistency that worked for cement for Mauritius, and the world can learn from this expertise. Where there is a will, there is a way⁶²!

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DEEMED LICENSE PROVISION OF BPCIA (FDA RECOMMENDATION)

The Biologics Price Competition and Innovation Act of 2009 (BPCIA) requires that a marketing application for a biological product that previously could have been submitted under section 505 of the Food, Drug, and Cosmetic Act (FDCA) (21 USC 355) must be submitted under section 351 of the Public Health Service Act (PHSA) (42 USC 262), which is subject to certain exceptions during a 10-year transition period ending on March 23, 2020, effective date. An approved application for a biological product under section 505 of the FD&C Act shall be deemed to be a license for the biological product under section 351 of the PHSA. On 11 December 2018, FDA released its guidance and recommendations interpreting the deemed license provision of the BPCIA under which an application for a biological product approved under section 505 of the FDCA will be deemed to be a license for the biological product under section 351 of the PHSA effective from 23 March 2020⁶³. After the transition date, FDA will not approve any pending or tentatively approved NDAs for biological products subject to the provision. Instead, sponsors may withdraw these applications and resubmit them as BLAs or aBLAs, as appropriate.

A sponsor of a proposed biosimilar product would be able to submit a 351(k) BLA that cites the listed drug as its reference product after the NDA for the listed drug is deemed to be a BLA or after another product that could be a reference product for the proposed product is licensed under section 351(a) of the PHSA. Sponsors that intend to adapt their development programs to meet the requirements for a submission under section 351(k) of the PHSA can request meetings with FDA, including a Biosimilar Biological Product Development (BPD) Type 3 meeting, before March 23, 2020, to support the development and review of a proposed biosimilar product or a proposed interchangeable product. Sponsors of development programs for proposed protein products should evaluate whether a planned submission would allow adequate time for approval of the application prior to March 23, 2020.

Sponsors evaluating a proposed biosimilar product should consider whether the proposed product:

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Sublimest mystery speeding from afar!
Swift became that burst too potent on the sight!
This radiant type of strength and youth!
Glowing eternally!



శ్రీ వేపచేదు విద్యా పీఠము

May the golden-eyed Savitar come hither!
Steering forth he rises from the lap of the dawn!
Praised by singers, my God Savitar!
Stepped forth and never missed his place!
He steps forth the splendor of the sky the wide!
Seeing, far-shining, the shining wanderer!
- Rig Veda. vii. 65

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"In the dark of the night of 20 December, two Kenyan truck drivers met a blazing death. The men were loading up their vehicles at around 2am on the bank of the Muoni river, about 60 miles south-east of Nairobi, when a mob of local youths descended on them. The attackers torched the lorries, burning the drivers "beyond recognition", police told a local newspaper. A third truck driver was shot with arrows."

"Unregulated sand mining is a problem in at least 70 countries. It's an easy, lucrative venture - and one with a violent underbelly." Meet the mafias making buckets of cash from illegal sand <https://www.newsscientist.com/article/mg23731650-400-meet-the-mafias-making-buckets-of-cash-from-illegal-sand/>

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The most common sand is composed of particles of quartz and feldspar. Quartz sand particles are colorless or slightly pink, while feldspar sand has a pink or amber color. Black sands, such as those found in Hawaii, are composed of particles of obsidian formed by volcanic activity. Other black sands include materials such as magnetite and hornblende. Coral sands are white or gray, and sands composed of broken shell fragments are usually light brown. The white sands on the Gulf of Mexico are made of smooth particles of limestone known as oolite, derived from the Greek word meaning egg stone. The white sands of White Sands, New Mexico, are made of gypsum crystals. Ordinarily, gypsum is dissolved by rain water, but the area around White Sands is so arid that the crystals survive to form undulating dunes. Quartz sands, which are high in silica content, are used to make glass. When quartz sands are crushed, they produce particles with sharp, angular edges that are sometimes used to make sandpaper for smoothing wood. Some quartz sand is found in the form of sandstone. Sandstone is a sedimentary, rock-like material formed under pressure and composed of sand particles held together by a cementing material such as calcium carbonate. A few sandstones are composed of almost pure quartz particles and are the source of the silicon used to make semiconductor silicon chips for microprocessors. Molding sands, or foundry sands, are used for metal casting. They are composed of about 80%-92% silica, up to 15% alumina, and 2% iron oxide. The alumina content gives the molding sand the proper binding properties required to hold the shape of the mold cavity.

[A microscopic look at why the world is running out of sand https://www.youtube.com/watch?v=V2349cn0-T0](https://www.youtube.com/watch?v=V2349cn0-T0)
https://www.youtube.com/watch?time_continue=2&v=BrXyvwuWZ6

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³⁸ Coaldrake, Landscape Planning, Volume 6, Issues 3–4, Pages 359-374 (November 1979) <https://www.sciencedirect.com/science/article/abs/pii/0304392479900388>; Environmental Impact Statement (EIS) Report under the Environmental Protection Act 1994 <https://environment.des.qld.gov.au/management/impact-assessment/eis-processes/documents/urquhart-point-eis-assessment-report.pdf>; The High Cost Sand Mining Extracts From Coastal Ecosystems: Researchers say the world faces a sand crisis as skyrocketing demand for the building material leads to the destruction of coastal environments and marine life. <https://www.newsdeeply.com/oceans/articles/2017/09/19/the-high-cost-sand-mining-extracts-from-coastal-ecosystems>

³⁹ Lewis, Environmental aspects of mineral sand mining in Australia <https://link.springer.com/article/10.1007/BF02087020>

⁴⁰ Sand Mining From Rivers <https://www.fiestasparadise.nl/machinery/08-13-sand-mining-from-rivers-2020.html>

⁴¹ Sand mining: the global environmental crisis you've probably never heard of <https://www.theguardian.com/cities/2017/feb/27/sand-mining-global-environmental-crisis-never-heard>

The great leap upward: China's Pearl River Delta, then and now <https://www.theguardian.com/cities/2016/may/10/china-pearl-river-delta-then-and-now-photographs>

China's Pearl River Delta overtakes Tokyo as world's largest megacity <https://www.theguardian.com/cities/2015/jan/28/china-pearl-river-delta-overtake-tokyo-world-largest-megacity-urban-area>

⁴² WWF research details potential threats posed by world's largest mining industry and possible solutions https://wwf.panda.org/our_work/water/?333451/Uncovering-sand-minings-impacts-on-the-worlds-rivers

⁴³ IPCC. (2013); Delestrac. (2013)

⁴⁴ Curbing Unregulated River Sand Mining in Sri Lanka <https://www.gwp.org/en/we-act/change-and-impact/Impact-Stories/curbing-unregulated-river-sand-mining-in-sri-lanka/>

⁴⁵ Illegal Sand Mining 2017: Rivers Continue To Lose Mindless Mining Battle, South Asia Network <https://www.fiestasparadise.nl/machinery/08-13-sand-mining-from-rivers-2020.html>

⁴⁶ India's Rivers in Ruined Condition Due to Unchecked Illegal Sand Mining
Every river flowing in the country is being ruined due to this unsustainable practice and is resulting in an ecological imbalance. <https://www.newslick.in/indias-rivers-ruined-condition-due-unchecked-illegal-sand-mining>

⁴⁷ Padmalal et al., (2008); Kondolf, (1997); Myers et al., (2000); John, (2009); Kondolf, (1997).

⁴⁸ Mohammed Salim vs. State of Uttarakhand & others, Writ Petition (PIL) No.126 of 2014 (March 20, 2017) <http://lobis.nic.in/d-dir/uhc/RS/orders/22-03-2017/RS20032017WPPII1262014.pdf>

Accordingly, while exercising the *parens patrie* jurisdiction, the Rivers Ganga and Yamuna, all their tributaries, streams, every natural water flowing with flow continuously or intermittently of these rivers, are declared as juristic/legal persons/living entities having the status of a legal person with all corresponding rights, duties and liabilities of a living person in order to preserve and conserve river Ganga and Yamuna. <https://www.thethirdpole.net/en/2017/04/03/indian-regional-court-gives-rights-to-nature/>

While New Zealand passed legislation only recently giving legal rights to the Whanganui river ecosystem, Ecuador had already given legal rights to nature in its Constitution adopted in 2008. In fact the first enunciation of such legal rights of nature happened in the famous Sierra Club v. Morton case of 1972, in the United States (which the Uttarakhand HC does not cite). While the judgment went against the Sierra Club, in his famous dissent US Supreme Court Justice William Douglas stated:

Contemporary public concern for protecting nature's ecological equilibrium should lead to the conferral of standing upon environmental objects to sue for their own preservation.... Inanimate objects are sometimes parties in litigation. A ship has a legal personality, a fiction found useful for maritime purposes. The corporation sole — a creature of ecclesiastical law — is an acceptable adversary, and large fortunes ride on its cases. The ordinary corporation is a "person" for purposes of the adjudicatory processes, whether it represents proprietary, spiritual, aesthetic, or charitable causes. So it should be as respects valleys, alpine meadows, rivers, lakes, estuaries, beaches, ridges, groves of trees, swampland, or even air that

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O Sun God, Savitr!
 Thou dazzling fount of life-persuasive light!
 Sublimest mystery speeding from afar!
 Swift became that burst too potent on the sight!
 This radiant type of strength and youth!
 Glowing eternally!

May the golden-eyed Savitar come hither!
 Shining forth he rises from the lap of the dawn!
 Praised by singers, my God Savitar!
 Stopped forth and never missed his place!
 He steps forth the splendor of the sky the wide!
 Seeing, far-shining, the shining wanderer!
 -Rig Veda. vii. 65



శ్రీ వేపచేరు విద్యా పీఠము

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 -Kathopanishad

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feels the destructive pressures of modern technology and modern life. The river, for example, is the living symbol of all the life it sustains or nourishes — fish, aquatic insects, water ouzels, otter, fisher, deer, elk, bear, and all other animals, including man, who are dependent on it or who enjoy it for its sight, its sound, or its life. The river as plaintiff speaks for the ecological unit of life that is part of it. Those people who have a meaningful relation to that body of water — whether it be a fisherman, a canoeist, a zoologist, or a logger — must be able to speak for the values which the river represents, and which are threatened with destruction.

THE FIRST SUCCESSFUL CASE OF THE RIGHTS OF NATURE IMPLEMENTATION IN ECUADOR <http://therightsofnature.org/first-ron-case-ecuador/>

⁴⁹ Sandmining is destroying [Eur]asia's rivers <https://www.thethirdpole.net/en/2017/05/05/sandmining-is-destroying-asias-rivers/>

⁵⁰ <https://www.deccanherald.com/exclusives/illegal-sand-mining-wrecking.html>

⁵¹ <https://www.deccanherald.com/special-features/75-sand-mining-coast-illegal-692887.html>

⁵² <https://www.newsclick.in/sand-mafia-network-politicians-construction-companies-and-criminals>

⁵³ India's Rivers in Ruined Condition Due to Unchecked Illegal Sand Mining

Every river flowing in the country is being ruined due to this unsustainable practice and is resulting in an ecological imbalance.

<https://www.newsclick.in/indias-rivers-ruined-condition-due-unchecked-illegal-sand-mining>

⁵⁴ <https://timesofindia.indiatimes.com/city/hyderabad/No-end-to-illegal-sand-mining/articleshow/12421625.cms>

⁵⁵ Hyderabad-Mumbai train route <https://www.cleartrip.com/trains/17032/>

⁵⁶ Telangana vs Karnataka | Kagna River Sand Issue <https://www.youtube.com/watch?v=Y3uhpPsDFnw>



⁵⁷ An improbable global shortage: sand <https://www.economist.com/finance-and-economics/2017/03/30/an-improbable-global-shortage-sand>

⁵⁸ Dramatic Photos Show How Sand Mining Threatens a Way of Life <https://news.nationalgeographic.com/2018/03/vietnam-mekong-illegal-sand-mining/>

⁵⁹ In US, "mining, processing, and transporting the sand promises economic benefits for some parts of the population while imposing business, environmental, and social costs, on other parts of the population. Citizens and elected officials have to evaluate the mix of benefits and costs and their distribution over the short term and long term to make an informed decision as to what is best for their community. The commercial businesses promoting frac-sand production typically commission economic impact analyses that purport to layout the "economics" of frac-sand production. These types of impact studies, however, almost always quantify only what are labeled benefits: additional jobs, payrolls, and tax revenues to governments. Costs associated with frac-sand production are rarely discussed in these studies. Since economic analysis, in general, involves the analysis of choices and tradeoffs where benefits and cost have to be weighed, the study of only benefits is difficult to label an economic analysis. As economists are fond of saying: "There is no such thing as a free lunch," meaning costs are almost always present and have to be considered in any rational decision." Power et al., The Economic Benefits and Costs of Frac-Sand

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https://www.iatp.org/sites/default/files/2013_05_30_FracSandMining_f.pdf

7 Principles to Make Mines Safer & More Efficient <https://www.mining-technology.com/features/featurecan-sand-mining-ever-be-green-5842185/#wpcf7-f66246-01>

⁶⁰ 7 Sand Mining Communities, 3 States, 5 Months – Part 1: An Exploration of Sand Mining Impacts: Lasalle County, IL by way of Chicago's South Side
<https://www.fractracker.org/2016/01/7-sand-mining-communities-part-1/>; RAPIDLY EXPANDING FRAC SAND MINING IS HIDDEN DANGER OF FRACKING BOOM IN US. Major Harms Already Seen to Human Health, Water Quality and Property Values in WI and MN; Rapid Growth of Fracking Could Lead to Similar Mining

"Eons of geological fortune have given the state some of the best silica sand in the country, used to build homes and businesses and the roads to get to them, and to provide traction on those roads when they get icy.... New Jersey's sand, which mostly comes from the state's southern half, has been worth an estimated \$176 million in recent years. The state was ranked 11th in overall industrial sand production nationwide, producing nearly 17 million tons in 2007. ... Second only to perhaps Illinois, the purity and quality is the best in the country here in New Jersey. ... [Hiding in plain sight] most sites are isolated from nearby homes by a buffer of forest." New Jersey's sand mining industry provides some of the country's best sand but finds itself in an economic slump
https://www.pressofatlanticcity.com/news/press/atlantic/new-jersey-s-sand-mining-industry-provides-some-of-the/article_b90a1dc2-1213-11e0-a0cb-001cc4c002e0.html

Meet the mafias making buckets of cash from illegal sand <https://www.newscientist.com/article/mg23731650-400-meet-the-mafias-making-buckets-of-cash-from-illegal-sand/> Unregulated sand mining is a problem in at least 70 countries. It's an easy, lucrative venture - and one with a violent underbelly

⁶¹ An improbable global shortage: Sand <https://www.economist.com/finance-and-economics/2017/03/30/an-improbable-global-shortage-sand>; IS RECYCLING A SOLUTION TO THE INFRASTRUCTURE CONUNDRUM? <https://www.quarrymagazine.com/Article/8738/Is-recycling-a-solution-to-the-infrastructure-conundrum>; <https://www.davidowen.net/files/2017-5-29-new-yorker-sand-1.pdf>; THE 'SCIENCE' OF SAND CASTLES

<https://www.quarrymagazine.com/Article/8533/The-science-of-sand-castles>; WHERE THE SAND MEETS THE SEA <https://www.quarrymagazine.com/Article/8496/Where-the-sand-meets-the-sea>; <http://a.aggregatesandminingtoday.com/aggregates-and-mining-today-2017-7.2.0.0.current-news.aspx>

⁶² The Mauritius Playbook <http://documents.worldbank.org/curated/en/525881490277124588/pdf/113666-BRI-PUBLIC-ADD-SERIES-no-710561-WACA-Knowledge-Sheet-7-Sand-mining-Final-digital-v2-1.pdf>

⁶³ Interpretation of the Deemed to be a License Provision of the Biologics Price Competition and Innovation Act of 2009: Guidance for Industry (December 2018) <https://www.fda.gov/downloads/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/UCM490264.pdf>; <https://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/default.htm>; <http://www.fda.gov/BiologicsBloodVaccines/GuidanceComplianceRegulatoryInformation/Guidances/default.htm>

⁶⁴ In addition to the primary sources cited above, additional references include:

New York Times, Washington Post, Mercury News, Bayarea.com, Deccan Chronicle, the Hindu, Hindustan Times, Times of India, AP, Reuters, AFP, The Guardian, Pravda, Spiegel, Connexion, etc.

Disclaimer: Every effort has been made to verify the accuracy of items in the AIJN. However, readers are urged to check independently on specific matters.

"Where the mind is without fear and the head is held high, Where knowledge is free Where the world has not been broken up into fragments, By narrow domestic walls." Rabindranath Tagore (1861-1941). Gitanjali, 1912.

One World One Family

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AUM! SWASTI!

Om! Asatoma Sadgamaya, Tamasoma Jyotirgamaya, Mrityorma Amritamgamaya, Om Shantih, Shantih, Shantih! (Aum! Lead the world from wrong path to the right path, from ignorance to knowledge, from mortality to immortality, and peace!)

SWASTI! AUM!



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