INDIA RIVER WEEK

Is Sand mining Killing Our Rivers?

Mining Riparian Health: West Zone Regional Report

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SOPPECOM

A personal journey….

The Great Sand Robbery and Impending Ecological Disaster

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The Bali Raja dam symbolises the people's struggles to put an end to the increasing privatisation of natural and social resources and instead to establish social control over these resources such that they can be used for the benefit of the entire community and can help rejuvenate the fast degrading ecological conditions along the Yerala river basin.

CLOSE on the heels of the kidnapping of eight top IAS officers in Andhra Pradesh, the news items that appeared in the local Marathi newspapers of January 19, 1988 of the "detention" of eight people involved in illegal extraction of sand from river Yerala by the villagers of Balawadi and Tandulwadi (Sangli district, Maharashtra) shook the bureaucracy of this district. Though Mukti Sangharsh activists (Mukti Sangharsh is a mass organisation working in this region) promptly "denied" any forceful detention, it forced the district collector Shridhar Joshi to order an

that till the mid-sixties people had to be transported from one bank to the other in *kayals*, huge cauldrons in which sugarcane juice is boiled to prepare jaggery. Even till the 1971-72 all Maharashtra drought, the river used to have flowing water for at least six to eight months a year. But the picture gradually changed and from 1981 onwards it has become a completely dried-up river except for a brief monsoon spell.

The government, in its efforts to capitalise even on drought, started selling the sand from the dried-up river bed

Hope to cover

- West zone: the region and its rivers
- Extent of sand mining in the region
- Impacts of river sand mining on freshwater ecosystems
- River sand mining and groundwater
- Impacts on lives and livelihoods
- Legal and institutional issues
- Illegal mining and violence
- Possible alternatives
- Ways forward

West zone: the region and its river

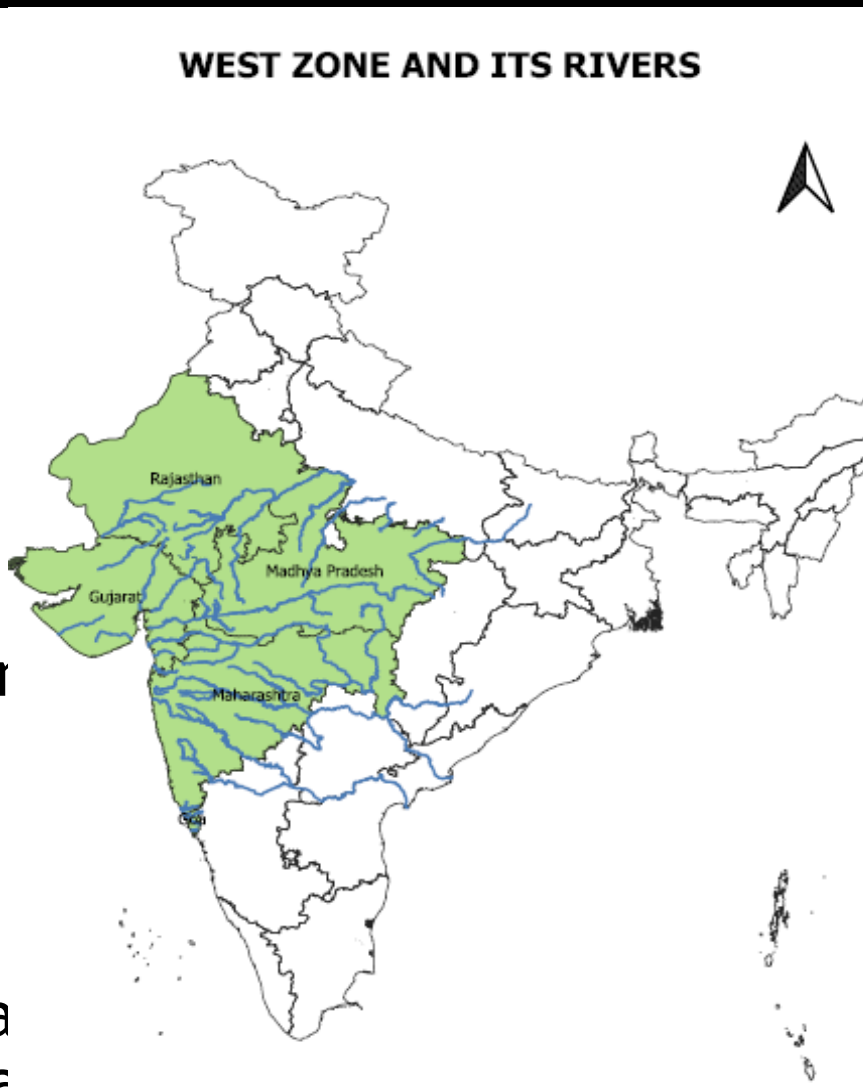
Rajasthan, Gujarat, Maharashtra, Madhya Pradesh and Goa

Bounded by the Thar desert in the north, the Vindhya range in the east and the Arabian sea in the west

Cuts through arid to semi arid, sub tropical and tropical agroclimatic zor

Rainfall varies from 300 mm to 3000

Narmada, Chambal, Son, Tapi, Betwa Ken, Mahi, Sabarmati, Banas, Godava.., Krishna, Wainganga, Mahadayi, Zuari



Extent of sand mining in the region

Estimated sand consumption in the region

State	As per 1:2.5 ratio of cement to sand (MMT)	As per the per capita sand consumption value - Aghor et al ((MMT)
Gujarat	35.54	12.08
Rajasthan	40.31	13.71
Madhya Pradesh	42.70	14.53
Maharashtra	66.07	22.47
Goa	0.86	0.29

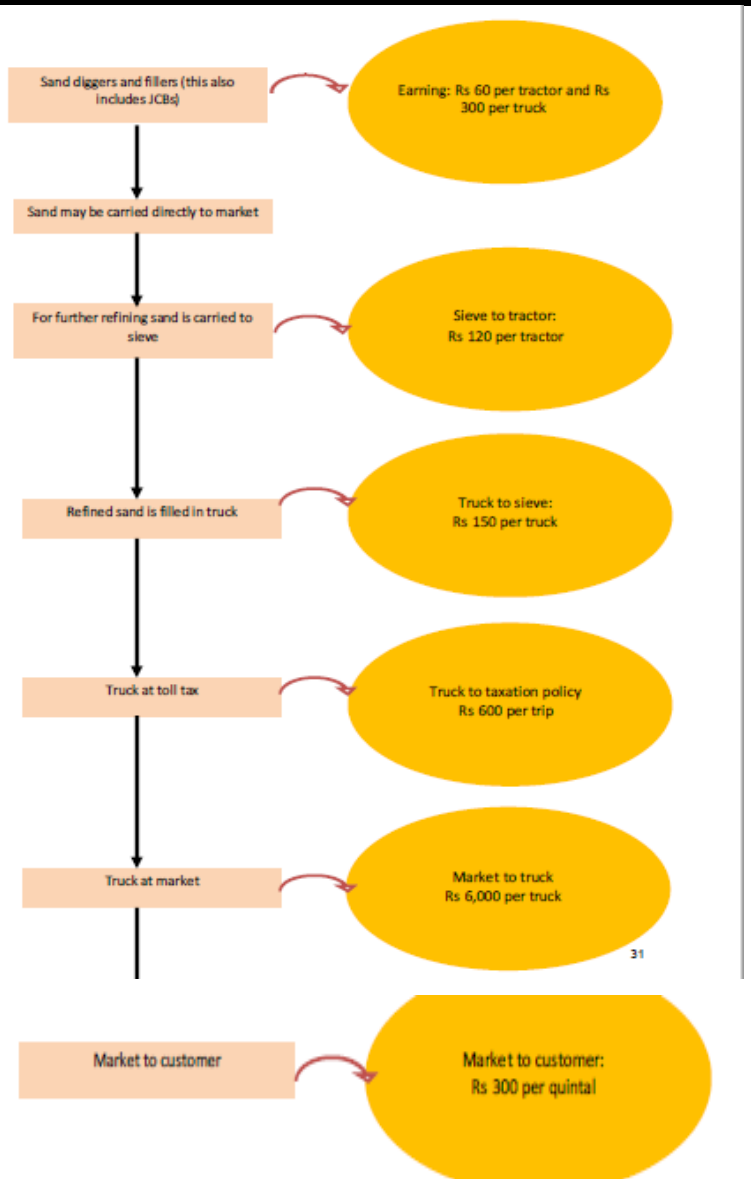
Extent of sand mining in the region

Projected growth of sand excavation (in MMT)

Year	Gujarat	Rajasthan	Madhya Pradesh
2017	49.64	49.14	56.80
2018	52.62	52.09	60.21
2019	55.78	55.21	63.82
2020	59.12	58.53	67.65
2021	62.67	62.04	71.71
2022	66.43	65.76	76.01
2023	70.42	69.71	80.57
2024	74.64	73.89	85.41
2025	79.12	78.32	90.53

Rate of sand production is estimated to grow annually at 6% (GoI 2018)

Value chain of sand mining



Source:
Prayatna Samiti
Report 2011-12

Impacts of river sand mining on freshwater ecosystems

- Sediments play a decisive role in the development and quality of the riverine environment; sediment dynamics determine river morphology and habitat-forming processes

- Direct and indirect impacts:
  - Direct where aggregate removal of sand is directly responsible for ecosystem damage, habitat loss and other physical changes to the ecosystem
  - Indirect where aggregate removal of sand can alter channel morphology which in turn can alter the distribution of habitats and ecosystem functioning, deterioration of water quality, and hydraulic changes affecting movement of fish and habitat availability

Impacts of river sand mining on freshwater ecosystems

- Some of the type of impacts
  - Abiotic impacts to river systems
  - Impacts on riverine vegetation
  - Impacts on invertebrates
  - Impacts on fish
  - Impacts on certain types of birds (especially sand nesting birds)

Lapwings coexist with people who grow melons and cucumbers on the sands of the Narmada. They call and fly around and do not perch on trees like the egret. They stand on the ground as their feet cannot make a grip on tree trunks. They lay their eggs, like the curlew, on the sand without elaborate nest building (Sunny 2020). Their habitats are completely destroyed because of river sand mining

River sand mining and groundwater

- Rivers and aquifers: interdependent systems
  - Givers and receivers

- Complex exchanges of groundwater with the river-flow
  - Depending upon the morphology of the river, the aquifer boundaries, the hydrological conditions in the river and the interconnected aquifers
  - Varies across space and time
  - The strip of sand plays an important role in this exchange
  - A strip of sand is like a long, narrow, thin (shallow) aquifer, sometimes in continuation with aquifers on either side of the channel, under the river flood plain
  - Presence of thick sand deposits in the riverbeds ensure at least some stocks that enable drinking water for humans and livestock and also for irrigation

River sand mining and groundwater

- Water storage potential of sand
  - Specific yield of such sand is 15% (0.15)
  - 1 m thick sand layer in a 100 m wide riverbed that stretches over 1 km, can potentially store up to 1500 m^3 of water
  - Mining this strip of sand implies a loss of potential in-channel natural storage of 1.5 million litres
  - 1 truck load – 20 tonnes of sand has a volume of 12 cubic metres = into 1.8 m^3 of groundwater storage potential
  - This is permanently taken away when a truckload of sand is mined
  - Meaning: one, the storage capacity at that location is lost and two, the capacity to release water downstream has also reduced by the same volume
  - Projected to the region it means a loss of ~ 17 Mm^3 of water storage lost in sandy aquifers

- Sand-mining has serious implications on the morphology, hydrology and hydrogeology of a river system and also other life forms dependent on this life ecosystem

Impacts on lives and livelihoods

- Earlier there was significant local labour absorption: Now the labour capital ratio has significantly changed
  - Earlier labour accounted for ~ 30% of the cost of sand; now it is reduced to ~ 10%
- Impact on drinking water and irrigation
- River bank erosions, floodin of agricultural fields
- Impacts on fishers
- Impact on river bed cultivat

Legal and institutional issues

- Sand is classified as a minor mineral, as defined in the Mines and Minerals (Development and Regulation) Act, 1957
  - Section 15: every state is empowered to frame rules for regulating the license, control and monitoring of the sand mining in the region
  - Section 23C: empowers state government to frame rules to prevent illegal mining, transportation and storage of minerals

- The Ministry of Environment, Forest and Climate Change issued the Sustainable Sand Mining Management Guidelines, 2016
  - Emphasize that every district in the state should prepare a district survey report

- Involvement of NGTs

Illegal mining and violence

- Madhya Pradesh is one of the most notorious states for illegal sand mining and violence
  - The state registered a total of 42,152 cases of illegal mining for major and minor minerals during 2009-2015

- “Illegal mining cannot flourish in the state without political patronage irrespective of the party in power” (Former State Home Minister Babulal Gaur)

- “Earlier also a police officer was murdered in 2012 while exposing sand mafia. Madhya Pradesh is no. in illegal mining- it is clear it’s not possible without government’s protection” (Jyotiraditya Scindia)

Illegal mining and violence

- Sand mining has been historically very viole
  - Look at the reported cases in just one year in M

- Feb 2018: Sand mafia tries to kill IFS officer, Abhishek Tomar, in Chhattarpur: mafia tried to crush him under a tractor, and when he escaped, they fired at him
- A week earlier in Chhattarpur, sand mafia tried to kill a tehsildar who stopped them from carrying out illegal mining in Urmil river
- March 2018: Journalist, Sandeep Sharma, probing illegal sand mining cases in Bhind mowed down by truck
- May 2018: Shantanu, a village youth from Sitapur village in Anooppur district, was threatened and beaten by the people involved in the mining and the local police for objecting to illegal sand mining in Son river – a case of police working hand in glove with illegal sand miners
- June 201: Sand mafia led by BJP corporator attacks Narmada Bachao Andolan (NBA) activists in Badwani, cops refuse to act – stone pelting on activists associated with NBA on the Badwani – Nisarpur state highway, near Rajghat, when they tried stopping 3 tractors filled with sand, allegedly being smuggled from the Narmada river
- Sept. 2018: A Deputy ranger Subedar Singh Kushwaha was crushed to death when he tried to stop a tractor laden with illegally-mined sand in Morena district
- Sept. 2018: Two forest guards shot at in Gwalior: after allegedly killing the deputy ranger in Morena, the sand mafia allegedly shot at two forest guards


Sand mafia's tractor runs over 24-yr-old UP cop

A 24-year-old police constable was allegedly crushed to death by a tractor, laden with illegally mined sand from Rajasthan after he tried to stop it from speeding away in Agra's Kheragarh area on Sunda The tractor driver also op

Possible alternatives

- Possible alternative could be broadly grouped under:
  - Resource avoidance and/or reduction
  - Alternative materials
  - Best practices to minimize extraction impacts

- Some specific alternatives
  - Desilting dams and reservoirs, and dry mining off-channel or floodplain deposits, instead of in-stream or in-channel mining
  - Manufactured Sand (M-Sand) through reusing/recycling construction and demolition
  - 'Green concrete' forms such as bottom ash or fly ash concrete, geopolymer concrete, etc.
  - Waste by-products like quarry dust, waster foundry sand, copper slag, stainless steel slag, granulated blast furnace slag, sheet glass powder, etc

Possible alternatives

- Another route to bring down the use of sand in construction is to conceptualise construction and materials differently
  - Energy efficient, biomass based materials technologies
  - Infrastructure sectors: water harvesting, buildings, retaining walls, roads, etc
  - It has a potential of bringing down the use of sand by ~30% (Vilas Gore)

Ways forward

- Need to fill knowledge and data gaps: leading to informed public discourse
- Relooking at the policy and legal/institutional frameworks
  - How do we make them more ecosystem sensitive and democratic?
- Need to privilege gram sabhas/gram panchyats and urban local bodies
  - How do we politically empower them to play the regulatory role?
  - Strengthening of the 73rd and 74th Constitutional amendments
- Prioritisation of sand use to meet local needs and non-mechanised ways of mining and transportation
  - Self Help Groups and Cooperatives
- Water conservation efforts should not go against the interests of rivers
- Social demand for potential alternatives

The intricate relationships between the fishers, the small-scale sand miners, the sand farmers, the birds and the trees pertain not only to the possibilities of developing sustainable ways of human life in an economic sense, but also sustaining all life forms and their relationships.

(Yemuna Sunny 2020)

A big thank you…

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