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On the ‘Global Sand Crisis’: From Capital Accumulation to Ecological Planning

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POLICY COMMENTARY



ABSTRACT

Against the common perception of sand as an abundant, even inexhaustible material, the idea of a ‘global sand crisis’ has emerged as a public issue over the past decade. A 2014 report published under the patronage of the UNEP, followed by a more comprehensive publication in 2019, has been central to this process. By raising awareness of a two-fold problem, an unexpected risk of sand shortage on the one hand, and the harmful environmental impact of (illegal) sand mining on the other, these somewhat ‘official’ documents have strongly influenced the dominant framing of the issue, in the media and even in the scientific literature. This article shows that, despite its merits, this dominant framing is incomplete, if not skewed. Emphasising the consequences at the expense of the causes, it overlooks social as well as geopolitical relationships, hardly relating sand overconsumption to the dynamics of capital. Relatedly, it conveys a legalistic viewpoint disregarding that at the root of the problem lies the commodification of natural resources, that is, the regular, legitimate economic system.

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INTRODUCTION: UNDERSTANDING THE 'GLOBAL SAND CRISIS'

For sensible if not evident reasons, sand is commonly assumed to be an inexhaustible material. Its presence is generally thought to be a 'never-ending story' (Welland 2009). At the turn of the 21st century, the very idea that sand might run out would probably have seemed absurd to most, despite a growing awareness of natural resource depletion. When thinking of the sandstorms that ravage cities such as Beijing, one may even believe that the issue is one of excess, not lack, of sand. The conventional wisdom associating sand with endless availability, however, proves to be doubly deceptive. On the one hand, it pays no heed to the threats (including the increasing number of dams) to the long-lasting natural-physical conditions ensuring sand reproduction. On the other hand, it overlooks the sharp socio-economic conflicts aroused by sand as a marketable 'resource'—a term surreptitiously conveying an instrumental-utilitarian connotation that is part of the issue. In the mid-2010s, available sand reserves worldwide could be estimated at around 120 million billion tons (Chaumillon 2016: 1). This abstract number is difficult to conceive in practical terms, and its reliability may be questioned, but the critical point is elsewhere. Whatever its accuracy, the very existence of this number suggests a crucial contradiction: sand is a resource that is hyper-abundant and yet finite, the proof is, it can be quantified. And there is only a short step from quantification to commodification. Just a few years ago, the global silica sand market was valued at almost 9 billion US dollars (Freedonia 2018); recent estimates for 2021 are over US \$21 billion, with the prospect of reaching 30 billion by 2027 (Imarc 2022). Sand, it turns out, is part and parcel of industrialised, urbanised, digitalised societies.

Yet it is hardly in the last decade, that is, very recently, that under the patronage of UNEP sand has emerged as a global public issue. Since 2014, the 'world's leading environmental institution' (Ivanova 2021) has sounded the alarm and released worrisome data on the subject, drawing attention to the unintuitive overconsumption of sand globally. Based on these findings, media reports on various outlets have tried to raise public awareness on the 'global sand crisis'. By showing not only how much sand plays a key role in economic development, but that it has become a scarce and valuable commodity, such accounts have opportunely shaken common perceptions. In turn, following recent contributions considering sand as a natural material caught up in social relations (Bisht 2021; John 2021), the purpose of this article is to challenge the official, then dominant, resulting framing of the issue. Indeed, the prevailing approach to overconsumption and sustainability appears only partial from the point of view of the social sciences in tandem with critical theory, especially if one draws on authors (e.g., Foster & Clark 2020; Keucheyan 2016; Löwy 2015; Tanuro 2014) who persuasively argue that capital accumulation is *per se* incompatible with ecological stability. From this perspective, by evacuating the very logic of capitalist development from consideration, while adopting a legalistic approach, the mainstream view on the so-called sand crisis impedes taking the full measure of the issue.

THE INS AND OUTS OF UNEP SAND WARNINGS

Breaking with the common perception of an infinite, undisturbed mineral, UNEP (also known as UN Environment) first sounded the alarm in 2014 against sand overexploitation through a fifteen-page report tellingly entitled: 'Sand, rarer than one thinks' (UNEP 2014a, 2014b). Building on the work of a dozen people, this short yet stunning publication was written by Pascal Peduzzi, a professor of environmental sciences at the University of Geneva and director of the Global Resource Information Database. Three aspects of this influential publication can be emphasised both in terms of context and content.

A TIMELY ALERT...

Firstly, although this UNEP-stamped document was not the first attempt to draw attention to uncontrolled sand mining, as shown by references cited therein, it offered a synthesis of unrivalled clarity, scope and visibility. Furthermore, it provided unprecedented institutional legitimacy. It made the scientific findings somewhat official, even though the program is careful on principle not to endorse the content of such publications. It also added a sense of urgency, being significantly published through a special 'Global Environmental Alert Service'.

The document's aim was openly to reverse spontaneous views and raise alertness of a massive yet unnoticed issue. It concluded by pointing out a gap between the objective seriousness and the subjective (lack of) awareness of the sand issue: the political response, it was argued, is by no means commensurate with the critical situation.

Secondly, the document put forward two distinct arguments. On the one hand, as the title suggested, the risk of sand shortage, however unlikely it may seem, can no longer be ruled out. In just a few decades, the document explained, a resource that took at least thousands of years to build up is being squandered. Impressive orders of magnitude were provided: amounting to at least 40 billion tonnes per year, the global consumption of aggregates (i.e., sand and gravel) would represent 'the highest volume of raw material used on earth after water' (UNEP 2014a: 10). On the other hand, indiscriminate sand extraction, especially illegal sand mining, has a severely harmful environmental impact on biodiversity, coastal erosion, climate, and so on.

Thirdly, and surprisingly enough, its acknowledged main source of inspiration was a—indeed striking—documentary film (Delestrac 2013). The report borrows several examples from it, including the astonishing observation that sand can be viewed as the most precious mineral in the world. However, a difference in approach or tone can be noted. Although the documentary film avoided any explicit mention of capital(ism) as such, it did bring up 'greed', 'speculation', or the 'logic of profit', vividly showing how the predation of natural resources is driven by economic growth in general and real-estate business in particular. Such a critical perspective on 'development', if roundabout or subtle, is somewhat lost in the subsequent report.

... WEAKENED BY SOME BLIND SPOTS

As valuable as the UNEP wake-up call has been in shaping the available knowledge and raising public awareness, it left indeed crucial aspects in a blind spot.

Firstly, inspired mostly if not only by natural sciences, it overlooks social relations. There are admittedly statements such as 'There are also socio-economic, cultural and even political consequences' and a small sub-section devoted to 'economic impact' (UNEP-GEAS 2014a: 2, 7). But this aspect is only allusively addressed; besides, the focus is explicitly put on the consequences rather than the causes. The document does not place the sand issue within the framework of power relations pertaining to ownership, wage, class, and so on. 'Humankind', a non-sociological notion *par excellence*, is made the 'largest of the planet's transforming agent with respect to aggregates' (ibid.: 2). Significantly, there is no mention of unemployment, inequality, or even poverty, factors that explain much of the unregulated sand mining as a subsistence activity. Conversely, a recent study of the social effects of sand trade on livelihoods in Singapore, Cambodia and Myanmar offers a fine example of a grounded political economy of sand extraction, showing how it breeds prosperity for some and vulnerability for others (Lamb et al. 2019).

Secondly, the report neglects North-South relationships. While mentioning an example of harmful sand extraction in the United States, it hastily implies that sand regulation would be adequate in the European Union and primarily situates the problem in so-called developing countries. The unequal economic and ecological exchange between central and peripheral capitalism (Amin 1976) is ignored, as well as the international division of labour and production, not to mention neo-colonial control and imperialist strategies. Besides, even though the majority of the sand extraction probably serves local economies, import-export in this area is very important worldwide; the available figures fluctuate, but on a global scale they are in the order of several hundred million tons per year. Therefore, sand mining can only be fully understood within the systemic framework of the capitalist world-economy (Wallerstein 2004). To take the most salient example, spectacular China's resource consumption cannot be calculated without considering that Western countries have relocated there much of their resource-intensive production (sand-consuming digital devices, for instance).

Thirdly, as already suggested, the report emphasises the consequences at the expense of the causes and does so euphemistically. Although much debated since the 2000s (Bednik 2019), the term 'extractivism' does not appear in it, although it is precisely what it is all about, as sand overexploitation far exceeds natural production. The term 'Anthropocene' does not appear any more than 'extractivism' does, despite the responsibility attributed to humankind. Moreover,

whereas the alternative concept of ‘Capitalocene’ (e.g., Moore 2016) had then arguably not yet emerged, the words ‘capital’ and ‘capitalism’ are conspicuous by their absence, as are ‘productivism’ and ‘consumerism’. A quick call is made to reduce sand consumption but only in favour of recycling and substitution, leaving unchanged the treadmill of production (as discussed by Buttel 2014). The very logic of ‘development’, which historically has essentially widened market relations (Rist 2019), is not questioned.

Fourthly, it conveys a binary, uncritical view on illegal sand mining, implying that legal and illegal activities would be easy to discriminate. In fact, there is no sharp line between lawful and unlawful activities or actors: sand mining operates along a ‘continuum of (il)legality’ (Magliocca et al. 2021: 57). In the report, illegal sand mining is simply linked to weak governance and corruption (ibid.: 7), as if it were not primarily driven by socio-economic factors referring to the labour market situation, profit opportunities, and so on. However rigorously they are constructed, numerical estimates of the illegal share of sand mining tend to support the conventional, legalistic view. They may give an instructive order of magnitude (not infrequently half of the total as in Morocco); however, they wrongly suggest a clear-cut separation between formal and informal actors or activities where reality is tangled. The case of sand not only illustrates the ‘close interconnectedness of the illegal and the legal economy’ (Beckert & Wehinger 2013: 16); it justifies the graphic convention in terms of ‘il/legality’ (Nordstrom 2007). Known for corruption and informal transactions (Chiodelli & Gentili 2021; Jones 2019), the construction sector is a prime example of this blurring.

The same limits can more or less be found in a later, longer report that confirmed and amplified the findings made five years earlier. Showing that sand consumption has tripled over the past two decades, it makes it no less than ‘one of the major sustainability challenges of the century’ (UNEP 2019: 9, 29). Consequently, recommendations are made regarding global governance, regulation efforts, and citizens’ awareness. This more comprehensive document certainly provides a valuable overview; however, the picture it presents remains incomplete. Data and descriptions are undoubtedly striking but their interpretation falls short. Whereas the conclusion blames the ‘sand mafias’, it leaves out the responsibility of corporations and companies, as well as that of states, as if they played no part in ‘irresponsible extraction’. Arguably, the report calls for a ‘deep transformation in how we think about, plan for and manage sand resources’ (ibid., xv) and does not dodge the perspective of planning, but it carefully eludes questioning the mode of production that underlies the overall dynamics. It urges to prevent ‘unnecessary consumption’ but avoids any clear reference to profit maximization, economic growth, class inequality, and the like. In sum, it stays far from the idea that extracting materials for the sake of capital accumulation is akin to a robbery or theft of nature (Foster & Clark 2020; Lynch & Stretesky 2016).

CHALLENGING THE DOMINANT FRAMING OF THE SAND ISSUE

This divergence of interpretation should come as no surprise considering the shift of UNEP over the past half-century, moving away from an initial critical stance on development and growth to a partnership with the business sector to promote ‘green economy’. It can then be seen as just another illustration of the depoliticisation carried out by UNEP under the guise of neutral, technical expertise (Maertens 2018). Emphasising the limitation of such a problem-solving approach is nonetheless crucial, as the narrative promoted by UNEP has strongly influenced the dominant framing of the sand issue. On account of this influence, the noted limitations and biases are found in the media coverage, but also in much of the scientific literature. In both cases, the—very real—overuse of sand is hardly ever related to (the mode of) production, while the sole stigmatisation of illegal activities can lead to absolving legal yet harmful practices.

THE ELEPHANT IN THE ROOM: CAPITALISM

The UNEP wake-up call has gained an appreciable amount media coverage over the last years. In addition to popular science journals (e.g., Pearce 2019; Smith 2018) as well as various ecologist magazines and websites, the topic has been tackled by a quite large range of outlets, from the IMF’s magazine *Finance & Development* (Edwards 2015) to *Wired* (Beiser 2015) to *The New Yorker* (Owen 2017). This media attention, however, has remained too scattered for sand to take on the consistency of a salient social issue, so that its overconsumption could still

be described lately as the global environmental crisis or catastrophe ‘you’ve probably never heard of’ (Beiser 2017; Whiting 2019). Enlisting the help of recognised experts (e.g., Tweedie 2018), some contributions are thorough; however, they generally suffer from the shortcomings already mentioned. They may well adopt a dramatic tone to disclose a major environmental crisis (including a hard-hitting yet problematic *cliché* of a ‘sand war’ that mixes up different sides of the problem), yet their assessment offers only a partial view. It tends to elude the core of the issue, namely the overexploitation of natural resources entailed by the dynamics of capital. Nothing proves this better than Vince Beiser’s book *A World in a Grain* (Beiser 2019). For all its qualities, including highlighting the licit nature of many major damages, it never mentions capitalism itself—and this is anything but a single case.

In contrast, a full understanding requires bringing extractivism and commodification to the forefront, as does Anselm Jappe (2020) in his book on concrete. From a distinct yet convergent perspective, David Harvey (2016, 2018) has shown how cement consumption leads to the core of capital accumulation in general and of urban expansion in particular. Not delving into the material as such, he took it as the premise of a broader argument, ultimately contending that capitalism is ‘spiralling out of control’. Such a view is missing from the prevailing framing of the sand issue as a major environmental crisis. Unlike sand, the dynamics of capital is unlimited, characterised by exponential, never-ending expansion: therefore, the squandering of sand is by no means accidental but only expresses the ‘metabolic rift’ generated by the capitalist appropriation/expropriation of nature (Foster & Clark 2020).

Regrettably, scientific literature produced by the natural sciences also tends to disregard the capitalist mode of production, as if it were taken for granted. Typical in this respect is a recent article published in *Science* under the heading of the ‘tragedy of the commons’ (Torres et al. 2017a; Torres et al. 2017b). Focusing on extraction, trade, and consumption, it neglects the level of production and the underlying dynamics of capital. The same applies to a comment published in *Nature* under the title ‘Time is running out for sand’ (Bendixen et al. 2019), which insists on population growth while being silent on capital reproduction. Therefore, the ‘sustainability challenges’ or ‘unsustainable exploitation’ that are rightly pointed out cannot be fully understood, nor can the solutions envisaged (‘source’, ‘replace’, ‘re-use’, etc.), albeit essential, get to the root of the issue. Some accounts not only leave out capitalism but even economy in general (e.g., Dybas 2020), not infrequently pointing to Asia’s responsibility while conveniently sparing that of the advanced countries of the global North (Larson 2018). As a result, capitalism disappears even in the discourse of NGOs (e.g., Weyler 2018). Recent contributions by Robert John (2021) and Arpita Bisht (2021) are welcome in this context, as each in their own way bring it back in.

THE DIFFERENTIAL CONTROL OF IL/LEGAL SAND MINING

A political-economic approach to green criminology based on the case of the Alberta tar sands helps take a further step. It not only urges us to ‘consider how and whether the extraction of raw materials serves to threaten ecological sustainability in favour of capital accumulation’ (Lynch, Stretesky & Long 2016: 142), but also prompts a break out of legalism, whether to adopt another definition of crime or study the social construction of legal rules (e.g., Brisman & South 2019). Central is the role of the law in the fact that ‘capitalism not only provides the structure for harming nature but also shapes the very way we think about crime and the environment’ (Lynch, Stretesky & Long 2016: 152). Paradoxically, the lack of attention to this aspect in the natural sciences sometimes helps to endorse this idea. This is exemplified in a book evocatively titled *The Last Beach*, in which two geologists provide a global overview of threats to the sustainability of beaches (Pilkey & Copper 2014; also Vousdoukas et al. 2020). When dealing with serious sand mining, they do not measure it by the yardstick of legality; just as if they were adopting the approach advocated by critical green criminologists, they are instead primarily concerned with the damage caused.

Newspaper articles and scientific contributions too rarely question the boundaries and substance of ‘illegal sand mining’, a phrase that contains and conceals many problems. First, it encompasses various realities, ranging from structured criminal networks to informal subsistence activities. Not restricted to mafias or, more broadly, ‘organised crime’ as legally defined, it may also involve isolated, powerless actors finding there a means of survival, as in the case of the female ‘sand thieves’ or rather ‘sand slaves’ in Cape Verde (Courtade 2019). It

sometimes involves formal states and companies, in connexion to criminal actors: a notorious example of this hybridisation is Singapore, one of the world's largest importers of sand, which has been known to plunder sand from several countries (Indonesia, Malaysia, later Cambodia and Vietnam) with the complicity of high-ranking officials and through looting individuals and shell companies (e.g., [Global Witness 2010](#)). Second, this expression falsely suggests a clear separation between legality and illegality. Yet even the existence of 'sand mafias' does not mean a well-circumscribed, autonomous illegal sphere. In India, to take the most (in)famous example, a 'nexus' is at play and not a clean-cut separation between legal and illegal operations ([Rege, 2016](#); also [Mahadevan 2019: 1](#)). As shown in other contexts (e.g. [Briquet & Favarel-Garrigues 2010](#)), a 'politico-criminal configuration' mixing official and unofficial actors and activities is at work. In the case of urban sand in Rio de Janeiro, for instance, militias exert political influence, on occasion acting in unison with public officials; urbanisation is made up of 'legal-illegal imbrications' ([Müller 2021a, 2021b](#)). Third, this phrase falsely suggests that legal sand mining would hardly be part of the issue, whereas legal activities have just as serious an environmental impact as illegal ones. Apart from the case of Dubai, whose marine sand resources have been absurdly depleted, legally or not, nothing illustrates this better than the case of the Alberta tar sands. 'One thing is certain: everything was legal, legitimised,' writes reporter David Dufresne ([2015, 48](#)), describing an ecological calamity. 'That was precisely the issue'.

Overall, sand then appears as an emblematic case of what Michel Foucault ([1979](#)) termed the differential management or control of illegalisms. Such a perspective challenges a commonly held interpretation according to which, in the case of sand and environmental crime more generally, illegal activities would be only the result of a 'high profit-low risk' ratio between a cheap, readily available, easily extracted, much sought-after resource on the one hand, and a legal grey area, weak regulation and low punishment on the other. Such an explanation falls short since it barely pays attention to the power relations (corporate lobbying, for instance) that underlie the shifting line between legality and illegality, focusing narrowly on activities that have been declared illegal without questioning the social construction of deviance or the inequalities before the law and justice. One cannot study illegal sand mining without considering how the boundary between lawful business and illegal activities is defined, produced, and (unequally) repressed. In this respect, be it sand or other natural elements (wood/timber, for example), blaming merely illegal activities may serve as an excuse or an alibi for legal environmental devastation as part of normal socio-economic functioning.

CONCLUSION: A CASE FOR ECOLOGICAL PLANNING

The foregoing considerations are not a mere theoretical matter; they have consequences in terms of policy orientations. Logically and practically, putting an end to the overconsumption of sand within a mode of production based on extractivism, productivism and consumerism, hence on the commodification of nature, appears highly unlikely, even unrealistic. Fostering recycling and searching for substitute materials are certainly necessary actions, but only a stopgap measure if market environmentalism is not called into question. At the very least, and for this purpose, the case of sand does not only require stricter regulation: it makes the case for democratic ecological planning, in the framework of a post-capitalist development paradigm grounded in environmental justice ([Bisht 2022](#)).

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The author has no competing interests to declare.

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