

Sand Mining, Sustainable Environment and Natural Resources as SDGs Driver in Sub-Saharan Africa

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Africa and indeed, Nigeria is blessed with diverse natural resources and viable environment with the continent representing 20% of the earth surface containing 60% of the world's arable lands, 30% of the world's reserve of minerals with Nigeria accounting for about half of the West Africa's population which positions her as the key player in West Africa. Similarly, Nigeria is noted for abundance of natural resources acclaimed as Africa's biggest oil exploitation with the largest natural gas reserves. One of such valuable resources that is development-driven is avalanche of sand which constitute one of the foremost resources in construction activities, be it industrial or domestic. Thus, sand mining which is the removal of sand from their natural location to areas of utility has become a lucrative economic activity in Nigeria. This however is not without concomitant economic consequences on sustainable environment, natural resources and development, hence, its influence on the attainment of SDGs. Sand mining despite economic contributions to household income, domestic and industrial usage as well as the Gross Domestic Product, GDP, the astronomical demand for sand mining occasioned by housing insufficiency, infrastructural development, construction among others, the environmental and resource impact keeps on unabated which is inimical for the quality of environment, natural resources and sustainable development. To be SDGs compliant in the 21st century therefore calls for a rethink on a number of activities that are not environmentally friendly resulting from illicit, illegal and lack of requisite concern for the environment. It is against this background that this study examined sand mining, sustainable environment and natural resources as a driving force for SDGs attainment in Nigeria Sub-Saharan Africa.

Background to the Study

Development albeit, sustainable development constitutes the hub of growth and development the world over. It therefore follows that nations of the world must ensure that concerted efforts are directed at bringing about growth and development to facilitate all round breakthroughs. This perhaps ranked tallest especially among the orchestrated developed worlds/nations in driving their economy. Thus, sustainable development which ensures satisfaction of the present generation in terms of resource utilization in generating optimum results without affecting the unborn and future generations has become household concept.

Reiterating the place of sustainable development, World Commission on Environment and Development, WCED (as cited in Omeluzor & Ogo, 2018) averred that meeting the demand of the present time in satisfying the plethora of needs and wants without hindering the future generations' ability to meet their needs constitute sustainable development. In the word of Oladiti (2023), sustainable development is all-encompassing phenomenon that requires sustainable resources that can be utilized both in the present and the future without one adversely affecting the other. Three pillars of development have been canvassed for explaining vividly, the concept of sustainable development. The said pillars according to Asemah and Imafidon (as cited in Adeniji & Hundo, 2023) relates to i. Socio-economic development having environmental considerations undertone; ii. Principle of needs with focus on the reorganization of national resources that guarantees quality of life for all; and iii. Resilience with focus on the preservation of the environment. The third pillar encapsulate focus on the future generations' right from the present one in the use of resources in such a way that the usage will not affect the future generations, their standard of living inclusive.

Arising from the peculiarity of sustainable development to the overall attainment of national goals and objectives as well as pave way for nations of the world to collaborate in ensuring the needed development across all strata of economies, developed, developing and third world countries, the global effort emerged captioned Sustainable Development Goals, SDGs. As a fall out of the expiration of the previous global development effort encapsulated in Millennium Development Goals Strategy (MDGS), Omolewa (2019), Oladiti (2022) described SDGs as a global response to problems facing human society in the 21st century such as poverty, food insecurity, gender inequality, unemployment, security related issues to mention few. It was the contention of Klarin (2018) that SDGs as driver of sustainable development address among others, issues relating to social justice pursuance, environmental preservation, social fairness, climate change issue, cultural diversity promotion.

Capturing the ideals of the SDGs, Adeniji and Hundo (2023) summed up the SDGs' 17 goals and 169 Targets vis: End poverty; Zero hunger; Healthy living; Quality education; Gender party; Access to water and sanitation service; Sustainable energy; Inclusive and sustainable economic growth; Equitable and sustainable industrialization; Lower inequality among nations; Inclusive cities and human settlements; Sustainable production and consumption habits; Tackling climate change; Protections of oceans, seas and minerals resources; End biodiversity loss; Encourage inclusive and peaceful society for long term development and Global cooperating. These goals and their associated target speak volume about sustainable

development at large especially in the 21st century. Little wonder the choice of this year's conference theme of addressing development challenges among African economies in the 21st century. The task of achieving SDGs in a task for all and as such, all hands must be deck.

Secondly, Africa as a continent and Nigeria as a nation are confronted with a lot of development challenges which tend to scuttle their efforts at attaining the SDGs goals. For instance, Tetfund (2023) while identifying opportunities for innovation and challenges especially for Nigeria, exposes the continent and the nation's situational analysis as follows: Africa is expected to witness more than half of the world population growth by 2050. Africa ranked second world largest and most populous continent; 20% of the entire earth surface inhabited by Africans with 60% of the world's arable lands and 30% of the minerals reserve. Nigeria is credited a key regional player in West Africa as it accounts for about half of West Africa's population, one of the world's largest population of youth, abundant natural resources and Africa's biggest oil exporters and noted for largest natural gas reserve the world over.

In spite of the foregoing natural gifts, the continent paradoxically under performs economy-wise with just 3% of Global GDP, less than 3% of international trade noted for primary commodities and natural resources. African bears 25% of the global disease burden. Obviously, this kind of development index can neither drive sustainable development nor promote SDGs attainment in Sub-Saharan Africa and Africa in general. Sustainable development as a term is said to gain popularity in the second phase of 20th century (Putra & Purnaweni, 2018) occasioned by the rapid economic growth across the globe with intensive use of natural resource underpin. Hence, a fall out of the activities of the World Commission on Environment and Development, WCED to stem illicit use of resources, sustainable development concept relating to development that meet the needs of the present without compromising the ability of the future generations in meeting their own needs was conceived (Dubinsky, 2013). Earlier position of the ideals of sustainable development by Keraf (2010) is to synchronize, integrate and assigning some weight to the three major aspects of development in terms of economic, social, culture and environment.

Attesting to the foregoing, Oladiti (2023) affirmed that sustainable development in any nation is a function of available resources and how such are being handled. This perhaps underscores Dubinsky (2013)'s three pillars of sustainable development of economy with respect to technical activities that guarantee economic growth; ecology with respect to activities that guarantee natural resources and environment protection; and social responsibility relating to employees are in work place and miming environment. Similar view was the one credited to Absmah and Imadifon (as cited in Adeniji & Hundo, 2023) who identified socio-economic development with environmental focus; principles of needs with regards to the re-organization of natural resources that guarantees quality life for all; and resilience which relate to environment preservation that ensures judicious utilization of resources in the present without affecting future generations and their living standard.

The corollary of the above is the place of environment and national resources generally in driving sustainable development. One of the prominent environmental resources that have

attracted attention in the environment is sand which might not be unconnected with its plenitude and economic importance of both domestic and industrial purposes. Natural resources according to Rais, Abdullah, Malik, Mahmuda, Pardana, Abdullah, Dja'wa, Suriadi, Naping and Manuhutu (2019) is everything given by the nature for the purpose of meeting human needs which could be in form of biotic components like animals, plants, micro-organism as well as abiotic components like petroleum, natural gas, metal, water, soil, to mention few. For the purpose of utility, sand excavation has become lucrative job. Sand mining thus is like a double edge sword for the environment, resources and human beings as well as sustainable development and SDGs. This study therefore focuses on the extent to which sand mining could inhibit or serve as drivers of SDGs attainment in sub-Saharan Africa.

Conceptualizing Sand Mining

'The earth is the Lord and the fullness therein' is a biblical injunction that depicts natural endowment on the planet earth meant for the satisfaction of numerous wants confronting human beings. Thus, human beings as higher animal always create utility from the abundance of resources. Reiterating this fact, Johnbull and Brown (2018) were of the view that natural resources are all life supporting elements bestowed on the mother earth for the good of mankind, hence, dependency on the environment (Oladiti, 2019). Giving a vivid description of natural resources, Rais et al, (2019) enthused that everything that comes from the nature which can be used to meet the needs of human life in terms of biotic and abiotic components constitute natural resources. Basic in the said components is sand, a variant of soil which is prevalent in the environment. Sand according to Putra and Purnaweni (2018) is soil component extractable for both domestic and industrial use. It constitutes underground geological sources that are formed from the eroding mountain rocks that are being carried by rivers. Sand has also been described as low-priced readily available natural resource emanating from weathering as well as constituent parts of other minerals and rock associated with deserts and seashores (Saviour, 2012; Nwangi, 2007).

Mining generally belongs to the primary sector of the nation's economy which entails extraction of raw materials from their source or location. Thus, mining sites according to Devi and Prayogo (2013) are usually located in areas characterized by significant biological and environmental features in small islands and tropical rainforests, they can as a result of development found in populated areas. Sand mining constitutes business activity in the field of extraction of natural resources. Rais, et al (2019) opined that sand mining operates under agrarian law, the basic law of laws that have areas of processing earth bodies, water, space and natural resources. The law is an offshoot Article 33 paragraph 3 of 1945 constitution which stipulated that all activities involving the earth, water, space, and natural resources must be beneficial for the prosperity of the people.

Sand mining entails activities involved in the process of harvesting sand from an open pit as well as such areas such as rivers, streams, lakes, to mention few. It entails the removal of sand from their natural configuration (Adedeji, Adebayo & Sotayo, 2014) which occurs at both small and large scale in major parts of Nigeria. Describing sand mining from the perspective of

a study carried out on socio-economic consequences of sand mining, Johnbull and Brown (2017) averred that sand mining relates to processes involved in the mining of sand over open pits that often takes place around island dunes, river bed, as well as along beaches. Sand mining according to UNEP (2023) involve removal of sand from rivers and marine ecosystem which may be for individual, domestic and industrial usage.

Prevalence, Typologies and Trends of Sand Mining

In a bid to satisfy a number of needs, human beings as a social animal have used his native intelligence in obtaining the best from the environment in a quest to finding solution and clarifications to problems being confronted in the course of interacting with fellow beings and the environment. Subscribing to this, Oladiti (2023) asserts that human beings has transformed the environment to their advantage and thus, proofed not to be a slave to the environment. One of such action is the extraction and conversion of mineral resources to further domestics and economic uses. Confirming this stance, Putra and Purnawemi (2018) indicated that land entails all resources which are domicile both inside as well as above its surface being utilized by human beings in satisfying their needs. Prominent in such resources is sand and by extension, sand mining activities.

Tracing the debut of sand mining among other resources being extracted as primary sector of the nation's economy, Semarang (2013) associated pan cosmism and anthropocentrism to the origin of the rise of nature for satisfying their wants with the former relating to sacred nature of relationship between human and nature while the latter secluding human beings from nature associated with increasing number of people and their needs which must be met. Thus, sand mining as one of such necessities increase in leaps and bounds which thus underscores the prevalence of sand mining and mining and associated activities, Hemalatha (2005) adduced further that the use of sand and gravel, a product of sand mining have been used in construction sector of the economy for thousands of years.

Commenting on the prevalence of sand mining in Nigeria, studies have shown that sand mining has become a regular activity exemplified by both pit and river sands being ferry by tippers, trucks of different sizes across different parts of the environment. This includes uncontrollable sand mining activities taking place around rivers and open field generally. The said activity is a global phenomenon relating to the extraction of natural resources which has constituted income streams across its value chain strata which starts from extraction to its haulage and made available to the end users which could be domestic or industrial (Aromolaran, 2012; Johnbull & Brown, 2017; Adedeji, Adebayo & Sotayo, 2018). The value chain includes a number of ample processes of head cutting which produces channel incision as well as hungry water techniques especially in excavation of in stream sand, skimming of bars and pit excavation (Stebbing, 2006).

In a description of nature and prevalence of sand mining generally, Draggan (2008) indicated the existence of worldwide intensive sand mining, a common phenomenon in a number of unindustrialized as well as industrialized nations noted for processing of sand as raw materials especially in the construction as well as other industries. For instance, Stebbings (2006)

affirmed that the United States of America top the list of industrialized nations engaging in sand mining and its production and usage with great concern for the ecological impact compared to African countries such as Nigeria, Kenya with emerging economies characteristic of intensive sand mining and the associated environmental impacts. Adedeji, Adebayo and Sotayo (2014) also affirmed that sand mining at both small and large scale is a major occurrence in major parts of Nigeria. This claim is buttressed by the day to day activities of sand mining and associated activities taking place at increase pace on daily basis across the whole nation with haulage being witnessed in virtually all roads, trunk A,B and C inclusive. Further asserting the prevalence of sand mining phenomenon, Johnbull and Brown (2017) adduced intricacies surrounding the activity by stating that excavation of natural resources, sand mining inclusive especially in the Global North developing countries have become a knotty issue over the years especially on the issues of implementation of laws on the issue. This notwithstanding, Draggan (2008) while establishing the prevalence of sand mining averred that the nature of sand as available construction material, its mining constitutes the foremost raw materials prevalent in most African societies which might not be unconnected with avalanche of sand as natural resources in the continent.

Typology-wise, as there are different resources imbued in both in-depth and outer surface of land as resources, so also are the different raw materials being obtained from sand mining. As a component of soil characterized by colour, texture, feature (Oladiti, 2019) among others, sand generated from mining are of different types such as sand, gravel, river sand, silt, gutter sand, sharp sand, laterites among others. As such, sand, gravel, river sand, allied derivatives from sand mining which are a product of their sources as well as the use to which such are subjected (Devi, 2013; Kori, 2012).

Sand mining as an important component of mining sector since its inception continues to experience various dimensions arising from the increased industrialization and urbanization activities. As such, the demand both at domestic and industrial level has improved and promoted sand mining activities including the method of extraction, number of processes involved, the use of technology and innovation right from extraction to haulage, distribution and eventual end users. This perhaps informed the assertion of Devi (2013) that the rapid development era has led to the exploration of rivers and flood plains in search of sand, gravel and other allied resources imbued therein. Similarly, the issue of concentration of development in the urban centres in Africa as an emerging economy has resulted in mining of sand at an alarming rate, all in a bid to meet up with the sand required by the construction sector (Johnbull & Brown, 2017). The earlier submission of Lupande (2012) that the sand mining especially in Harare in Zimbabwe was not as popular as it is today until year 2009. Adedeji, et al (2014) capped it all by fingering rapid urbanization as the sole factor responsible for incessant and continuous sand excavation culminating in many illegals in land sand mining cutting across the length and breadth of the country.

Sustainable Development Indicators of Sand Mining

It is instructive to state at this juncture that sand is a foremost valuable resource driving socio-economic development especially in the construction parlance which could be domestic,

commercial or industrial in nature. Thus, sand mining as a significant component of the primary sector provides a number of sustainable economic and development indicators such as exploration and exploitation of the natural resources to facilitate economic growth and sustainable development at large. For instance, generation of household income and reduction of poverty and hunger which are akin to the SDGs and its targets is made possible through sand mining. Its employment generation prowess is also one of its outstanding development indicators coupled with indirect socio-economic benefits to hosts and neighbouring communities. Sand mining cannot be over-emphasized in terms of industrial and infrastructural development with concomitant potentials for tourist attraction which can invariably enhance generation of income as well as foreign exchange earnings. Subscribing in the same vein, Kori (2012) advanced that sand mining do impact on the local economy with sand and gravel as well as their allied materials contributing in both developed and developing economies. Putra and Puraweni (2018) also identified sand mining as a means of meeting human needs.

Relating sand mining to sustainable development, Dubinsky (2013) presented sustainable development as a function of three infallible pillars of economic growth, protection of the national resources of the environment and social responsibility. These are major drivers of sustainable development and part of the 17 goals of SDGs. In terms of urban and infrastructural development, sand mining does enhance urban and city development. Attesting to this, Madyise (2013) identify global city spaces enhancement through sand mining since sand so extracted coupled with their allied derivatives constitute major constituent of infrastructural and physical development and the resultant developed economies. Similar view is credited to Adedeji, Adebayo and Sotayo (2014) who described sand generally as a valuable resource as well as one of the major inputs in the construction sector the world over.

Sand has also been described as useful and easily available construction material. Giving a vivid posture of sand mining as a strong indicator of economic growth and sustainable development, Johnbull and Brown (2017) gave the following analysis: Sand mining assists in riverbeds and waterways clearance of silt and sediments useful in grading waterways, control the degree of inundation and stabilizes the river. This invariably made waterways more navigable as well as economizes inland water transport system, development of tourism potentials, revenue generation to the government and communities, employment creation and reduction of social vices coupled with the reduction of economic hardship (p.4)

The foregoing among others are sustainable development drivers. Little wonder the submission of Adedeji et al, (2014) that sand mining multiplier economic significance include among others, industrialization and urbanization which culminates in expansion manifesting in infrastructural growth, road construction, building commercial malls as well as construction of residential areas. Without mincing words, sand mining as an appendage of environmental resource utilization is sine-qua-none of sustainable development.

Sand Mining and Sustainable Development Interplay

As could be observed, sand mining as a component of environmental resources is akin to construction sector of the economy that cannot be over-emphasized in terms of its significant contributions to the economy. The activity surrounding sand mining however, is like a double-edged sword, corollary of which is its environment impact and sustainable development attainment implications. The largess from sand mining and the allied materials notwithstanding, literature is replete on the ills associated with the practice which invariably impinges on some of the SDGs goals. For instance, sustainable environment, health as well as quality water are tangential to SDGs goals which are constantly being affected by sand mining activities across the globe. Subscribing to the foregoing, the UNEP (2023) adduced that sand mining which could be from rivers and marine ecosystem is capable of generating among others, erosion, salination of aquifers, loss of protection against storm surges with concomitant impacts on bio-diversity thereby posing threat to livelihoods such as water supply, food production, fisheries as well as tourism as industry. Closely associated with the foregoing is the turning of burrow pits to ponds with attendant menace to people living in such areas such as waste dumping, noise and offensive odours (Adedeji, Adebayo & Sotayo, 2014).

Other SDGs related impact of sand mining is the peace and justice as well as clean environment. For instance, studies such as Willis and Garrod (1999), Abdus-saleque (2008) identified among others, issues of conflicts with regards to both environmental and social issues of noise, truck traffic, dust, quality of stream water, reclamation, biodegradation, pollution as well as landscapes that are unpleasant to behold. Other issues include waste management, biodiversity and habitat impact, deforestation and subsequent elimination of the vegetation coupled with pollution of all sort. The negative stance of sand mining capable of affecting attainment of the SDGS goals is the youth involvement in the act. Berating the impact of sand mining on youths, Johnbull and Brown (2017) advanced that in most communities where the act is taking place is bereft of active age population expected to be at their peak of productive cycle that are not being constructively engaged in mining activities which by extension, degenerated into the emergence and institutionalization of urban and rural gangs that in most cases, aggravate inter and intra- community conflicts, loss of precious life inclusive.

Advocating the detritus nature of sand mining to sustainable environment and development, Johnbull and Brown (2017) revealed that despite the short-term practice of sand mining in the area of their study of less than 15years, the intensity and resultant consequences on the communities will take more than 30years to find recourse to. Similar posture was reported by Lawal (2014) in some Northern parts of Nigeria which were not devoid of environmental consequences as well as impending ecological disaster. All these attests to the intricacies surrounding sand mining and its potential debacle to sustainable environment and development. The more reason why Aromolaran (2012) adduced that the adverse sand mining outcomes in terms of economic consequences of the act by no means overweighs its positive impact. This might not be unconnected with the assertion of Oladiti (2023) that human beings in attempt to find solution to one problem tend to create more problems in the environment. Johnbull and Brown (2017) also indicated that sand mining has catastrophic

ecological consequences that do displace the flora and fauna as well as distortion of ecosystem balanced.

Furthermore, sand mining is associated with a number of environmental issues, physical and social inclusive while excessive mining is hazardous as it constitutes potential non-reversible impacts on the environment as well as increased risk of natural disaster. More so, sand mining also contributes significantly to environmental devaluation manifesting in distorted topography, unproductive agricultural terrain, deforestation, degradation and pollution among others (Putra & Purnaweni, 2018; Koro & Mathada, 2012; Purnaweni, 2014).

Sand mining is also noted for potential damage to private and public poverty as well as constituting threat to aquatic life, water quality, and damage of water sheds which has been described as a common feature of developing countries. Lending their voice in this direction in the socio-economic consequences of sand mining, Rais, et al (2019) stated that dredging of sand continuously over a long period of time is capable of generating decrease in the stocks of river sand which can result in deeper river bed, changes in the physical environment of the active river, widening of river surface, movement of rivers and collapse of river banks that can lead to erosion which is detrimental to resident on the cliffs. It also generates change in surface of the land, nesting site for mosquitoes, disease and eventual death. Such situation portends grave consequences for sustainable environment and development at large.

Considering the way and manner by which sand mining is being carried out especially in most developing countries, Subagia and Sutrisno (2013) advanced that illegal activity associated with sand mining is a potential threat in terms of the deterioration especially in the carrying capacity of the river against the life of the surroundings biotic environment. Summing up the pros and cons of sand mining and its deterioration effects on the environmental resources and sustainable development, Abdullah, Malik Prativvi, Abdullah and Sulili (2019) advanced that despite the lucrativeness of sand mining business, sand mining is noted for its threat of disaster such as disruption to the preservation of environmental ecosystem and surrounding buildings. The more reason why Astraran (2014) submitted that sand mining is one of the serious environmental problem around the globe in recent years in terms of exploitation of rivers for river bed materials like sand in the quest for satisfying human beings insatiable needs with associated effect such as land degradation, land aesthetic beauty loss, agricultural land loss, degradation of river bed as well as riparian habitants. The foregoing among others is inimical to sustainable environment and development.

Conclusion

At this juncture, it is obvious that arising from the unquantifiable contributions of sand in infrastructural development coupled with increased industrialization, urbanization and population growth, sand mining will continue to increase. This might be as a result of insufficient housing infrastructural development, construction, and employment and income generation, tourism, among others. These reasons are also important for development and achievement of sustainable development goals generally. The foregoing notwithstanding, it is instructive to state that sand mining on its own is by no means economically irrelevant but the

associated factors that are of grave consequences to environment and environmental resources that tends to affect sustainable environment and development especially in the third world countries rift with illegal sand mining, little or no concern for environmental impact, lack of requisite laws governing sand mining as well as enforcement of the available ones. Selfishness and self-aggrandizement are also one of the factors affecting sustainable sand mining. Illegality, insecurity, gangsterism as well as unproductive engagement of youth who are of active age, a requisite for sustainable labour force is inimical for achieving sustainable development at large.

Suggestions

This study premieres the pros and cons of sand mining on the environment and natural resources at large. The danger of continuous illicit sand mining is of grave consequences for environment and environmental resources generally. It is therefore incumbent for the nation to work towards achieving environmentally friendly sand mining that is guided by laws and regulations. Consequently, to be SDGs compliant in the 21st century therefore calls for a rethink on a number of activities that are not environmentally friendly resulting from illicit, illegal and lack of requisite concern for the environment. Efforts must therefore be garnered in ensuring sustainable sand mining to serve as a driver of sustainable environment, development and attainment of SDGs.

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