

ГЛОБАЛЬНІ ТА РЕГІОНАЛЬНІ ЕКОЛОГІЧНІ ПРОБЛЕМИ

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**Koleayo Omoyajowo¹, Sunday Amiolemen²,
Benjamin Mwadi Makengo³, Amos Ogunyebi¹**

¹*University of Lagos, Nigeria*

²*Department of Science Policy and
Innovation Studies, National Centre for
Technology Management, Nigeria*

³*University of Kinshasa,
Democratic Republic of Congo*

IMPACT OF COVID-19 PANDEMIC ON SINGLE-USE OF PLASTICS IN SOME AMERICAN FIRMS: POLICY INSIGHTS

As COVID-19 continues to present unimaginable threats to the future of the environment, it is not impossible to rethink that the continual existence of human race is at stake. More than 60% of toxic wastes released to the environment are largely contributed by manufacturing and service firms. Hence, this present study examined the impact of COVID-19 pandemic on corporate waste management program among selected American firms. A total of 42 notable firms across 3 cities in the US (Detroit, Atlanta and Houston) were successfully interviewed on their choices to reduce, reuse, recycle and recover their industrial waste since the outbreak of COVID-19. More than 80% of firms studied often generate plastics as waste; out of which, all firms (100%) agreed that COVID-19 encumbered their choices to manage plastic wastes. This study reasoned that COVID-19 will undoubtedly contribute to plastic pollution and its associated ecological risk in the US if appropriate measures are not painstakingly implemented. This study therefore recommends that Government and relevant stakeholders should restructure existing waste management policies and sensitize American firms on grave dangers of plastic pollution and other toxic wastes in the environment. Meanwhile, this study has great implications for countries in the developing world. This is because developing countries are already mired with the challenges of managing plastic wastes in the pre- COVID-19 era and are further overwhelmed with the unprecedented plastic waste generation during COVID-19. Considering that in Africa and other developing nation, standard waste management technologies and waste emergency policies to curb the pandemic is lacking or insufficient, and hence suggesting they may witness more serious impact of plastic pollution. Government at all tiers should not only make laudable waste management policies to curb environmental pollution, but must show sincerity of purpose and political-will to implement and enforce these policies to curtail impending global impact of plastic pollution aggravated by COVID-19 pandemic.

Keywords: Ecological Risks, Plastic pollution, American Firms, COVID-19 Pandemic

Introduction. The COVID-19 Pandemic has unprecedentedly affected and compromise the integrity of every existent natural and built system across ecological, economical, socio-cultural, and political spheres in ways unfathomable. Millions of firms face an existential threat, number of undernourished people have increased to about 690 million globally, while about half of the world's 3.3 billion global workforce are at risk of losing their livelihoods [1]. Hunger and poverty rates in developing climes have increased unprecedentedly as families without the means to earn income during lockdowns faced great difficulties feeding themselves. Border closures, trade restrictions and confinement measures have been preventing farmers and agricultural workers from accessing markets, to purchase inputs and sell their produce, thus disrupting domestic and international food supply chains and consequently reducing access to healthy, safe and diverse diets [1].

More than 33 million COVID-19 cases and 606,000 deaths have been reported in the US [2] and several millions lives of people have been lost on a global scale. The deadly impact of COVID-19

requires desperate, but calculated measures to urgently flatten the curve, and curb the incessant spread of COVID-19. As a result, countries across the globe including US implemented public health measures such as self-isolation, social (physical) distancing and compliance with personal hygiene rules, particularly regular and thorough hand washing [3]. Though stringent measures such as mandatory national lockdown and border closures were also enforced with remarkable result but the aftermath effect has increasingly and adversely attenuated food system, labor and productivity as well as the environment.

Indeed, COVID-19 has engendered an economic crisis and a public health crisis in the United States; lives are disrupted, hospital system driven to its capacity, and economic slowdown aggravated. As lockdowns slowed the spread of COVID-19, also, the global demand for petroleum collapsed and oil prices plunged, making the production of virgin plastics from petroleum cheaper than recycling plastics [4]. The cost margin, in addition to changes in lifestyle of consumers due to COVID-19 heightens the use of plastic, thereby exacerbating plastic pollution and associated challenges. Furthermore, the global demand for personal protective equipment (PPE) has led to increased plastic pollution. In China for example, response to high PPE demand among the general public, health care workers, and providers made single-use face mask production rose to 116 million per day. [5]. If this scenario should hold true globally, considering that World Health Organization has called for the escalation of disposable PPE production [1], this then suggests that the United States could possibly generate a full year's medical waste in just about two months [6]. Individual coping strategies, habits and choices during lockdowns are also increasing plastic demand. More so, packaged home-delivered meal and groceries could contribute an additional ton of plastic waste as observed in the 8-weeks lockdown in Singapore [7]

Plastics constitutes a major part of every day's product; their application in the textile, machinery, medical supplies and food packaging is indispensable. The plastic industry is about the 8th largest economy in the US, and the global plastic packaging market size is projected to reach 1012.6 billion by 2021, at a growth rate of 5.5% annually, mainly due to increasing demand for PPE and other single-use plastic products such as masks and gloves [8]. COVID-19 has led to *waste emergency* due to sudden intensification of single-use products, panic buying and stockpiling of gloves, masks and other protective clothing and equipment, and the unusual production of waste from both households and health facilities [9][10]. Every year, the world generates over 300 million tons of plastics and the trend is still increasing at an alarming rate with its grave ecological implication [11]. The injudicious use and disposal of plastic products in COVID-19 era is accompanied with severe environmental consequence, as fossil fuel combustion and open burning of discarded plastic wastes causes global warming. Similarly, when plastics are discarded into water bodies, they slowly breakdown into tiny fragments called microplastics, accumulating and portending dangers to marine animals which feeds on them including humans involved in the food chain. Hence, biodiversity is at stake and this is why some scientists called the issue of plastic pollution, a *wicked problem*. According to Stokes [12], waterlogged COVID-19-related plastic has been observed on beaches and in water, possibly worsening the challenge of curbing microplastics, if not thwarting efforts so far made in the past to curtailing microplastics.

Government and its relevant authorities around the world are introducing single-use plastics ban to alleviate plastic marine pollution. This global effort started in the last decade and unfortunately, COVID-19 pandemic has compromised the outcome. Studies have raised scientific concerns projecting a more serious impact of COVID-19 on plastic pollution due to single use of plastics [10][13][14]. There is growing evidence that COVID will increase single use of plastics and hence, the effect would contribute massively to plastic pollution. Plastic pollution would affect health outcomes due to exposure to toxins [15]. Filho et al. [13] observed that 58% of household sampled affirmed that COVID-19 pandemic increased consumption of single use of plastics with increase in food packaging in 50% of households and of single use of plastic bags in 35% of the households that were sampled. Whilst, this report also observed that 66% increased the consumption of single use masks, given the mandatory use for health protective measures. This further raises a major concern, as developing countries without "standard waste management technologies and waste emergency policies to curb the pandemic" may witness more serious impact of plastic pollution.

Against this backdrop, this preliminary study intends to assess the impact of COVID-19 on corporate environmental responsibility (CER) and waste management programs with special interest on how plastic waste is been managed in firms amidst COVID-19 pandemic. The outcome of findings in this study could guide ecologists, public health scientist and policy actors to develop new strategy to circumvent plastic pollution in the community.

Materials and Method. A total of 42 American firms in 5 sub-sectors of the US economy were purposively sampled across Atlanta, Detroit and Houston. The sampling design was to reflect a spectrum of the geographic, cultural, and vulnerability characteristics of the study area. These sub-sectors include Hotels and Restaurants industry; Automobile Service industry; Food and Beverages manufacturing industry; Building and Construction industry; and Logistics and Cargo handling industry as depicted in Figure 1. Majority (45.2%) of firms sampled were hotels and restaurants, others assumed this order: Automobile Service Companies (28.6%) > Food and Beverages Companies (14.3%) > Building and Construction (7.1%) > Logistics and Cargo handling companies (4.8%).

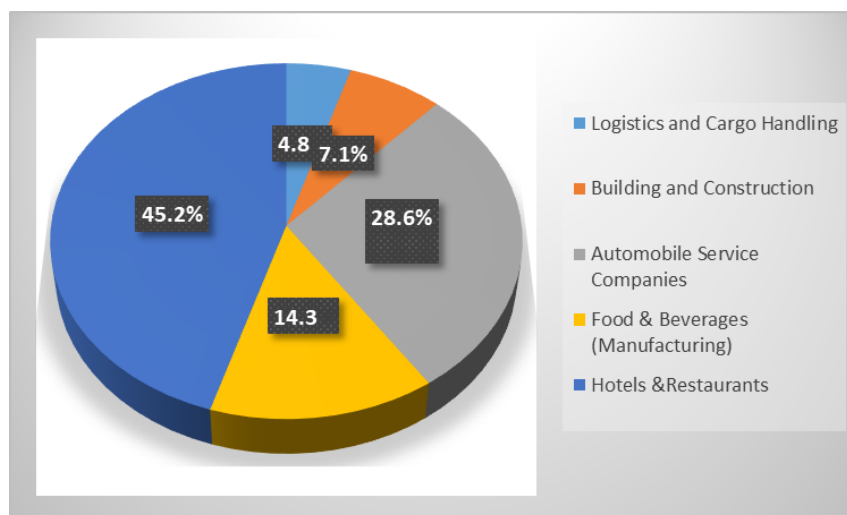


Fig. 1. Sectorial distribution of sampled firms

The study examined a 4-line of inquiry within its scope of investigation as follows: (a) How often do you use and generate plastic wastes, on a scale of 1 to 5? (b) Do you have a corporate waste management program? (c) Has COVID affected corporate waste management program in a negative way? Yes/No. (d). How serious would you describe the impact of COVID on the recycling effort of your company? A total of 42 copies questionnaire were administered, and same numbers collected, completely filled. Qualitative and descriptive analysis were deployed to ascertain and weigh the impact of COVID-19 on CER and waste management practices in firms.

Results. As shown in Table 1, it was clear that all sampled firms use and generate plastic wastes, 33 firms indicated they use plastic products and generate plastic wastes, 6 firms averred they sometimes use and generate plastic wastes, 2 firms claimed they always do that, while only 1 firm stated they rarely generate plastic wastes. The respondents followed this order: Very often (78.6) > Sometimes (14.3%) > Always (4.8%) > Rarely (2.4) > Never (0.00%). This further validates that COVID-19 significantly impacts the use and accumulation of plastic products and materials [5].

Table 1

Impact of COVID on Corporate Environmental Responsibility and Waste Management Program

	VARIABLES		F (%)
i.	How often do you use and generate plastic wastes, on a scale (1 to 5)?	Always	2(4.8)
		Very Often	33 (78.6)
		Sometimes	6(14.3)
		Rarely	1(2.4)
		Never	0(0.00)
ii.	Prior to COVID 19, does your company have a waste management program especially plastic waste?	Yes	42 (100)
		No	0(0.00)
iii.	Has COVID affected corporate waste management program in a negative way?	Yes	42 (100)
		No	0(0.00)
iv.	How serious would you describe the impact of COVID on the waste recycling (or reduction) policy of your company?	Not at all Serious	0(0.00)
		Moderately Serious	6 (14.3)
		Extremely Serious	36 (85.7)

F=Frequency, with % values in bracket.

Similarly, all the sampled firms as tabulated in Table 1 claimed to have an existing corporate waste management program that has been negatively impacted by COVID 19, out of which 36 firms, representing 85.7% of the sampled population firms asserted that the impact was very serious, while the remaining 6 firms, representing 14.3% of the sampled population claimed the impact was moderately serious as depicted in Figure 2.

This holds true that COVID-19 pandemic puts extra pressure on regular waste management practices, and there is an urgent need for a concerted commitment towards a circular economy [10][16], as firms are pressingly persuaded to avoid virgin plastic (VPET) use and increase recycling of plastic for corporate environmental responsibility (CER). Environmental health should be prioritized at both global and regional to attaining United Nations Sustainable Development Goals (SDG).

Discussions and Policy Insights. The findings show that more than 80% of firms sampled use plastics and generates plastic waste in their operational activities (Table 1). All sampled firms claimed to having a corporate waste management program prior to COVID-19. This is an indication that sampled firms are top performers in their corporate environment responsibility (CER). Nonetheless, all sampled firms in this study admitted that COVID-19 pandemic has negatively impacted their waste management programs in that plastic wastes are overwhelmingly generated and accumulated. However, more than 80 % (85.7%) agreed that COVID-19 pandemic had an “extremely serious impact” on their choice to manage plastic waste appropriately. These findings are corroborated by Silva et al. [10] and Awale and Kumar [17] that COVID-19 has led to increased plastic waste volume due to panic buying and single use of plastics and hence, exposing the world to several environmental issues. Similarly, Filho et al [13] observed that 90% of sampled firms indicated “that they intend to reduce the use of single use plastics in their daily activities after pandemic”. This further corroborates the findings in this study on the serious impact of COVID on the growth of single-use-plastics.

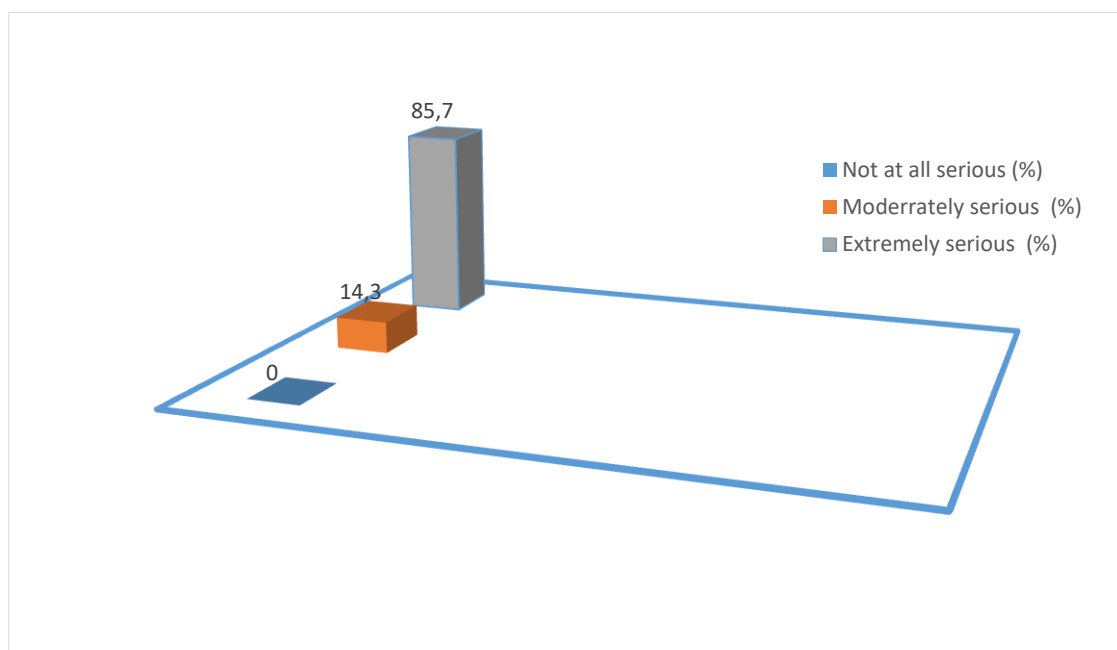


Fig. 2. Impact of COVID-19 on Firm's Waste Management Practices

This study thoughtfully embraces the insight about the adoption of circular economy in plastic production and consumption. As highlighted by Ibn-Mohammed et al. [18], the adoption of circular economy (CE) – “a systemic approach that satisfies the multiple roles of decoupling of economic growth from resource consumption, waste management and wealth creation” – has been recognized as a viable solution to promoting environmental sustainability. The foregoing describes a model of sustainable production and consumption, which reduces waste to a minimum by simply creating further value to a product.

Conclusion. The findings revealed that all sampled American firms use and generates lots plastic wastes but managing volumes of plastic waste generated during COVID-19 pandemic becomes a big concern. More importantly, it was obvious that COVID-19 pandemic really had “extremely serious” impact on firms’ choice to responsibly manage plastic waste and other waste resources perhaps because of the fear of COVID-19 exposure and associated health risks. The impact of COVID-19 pandemic

coupled with increase in plastic production would add a momentous pressure to developing countries struggling with handling of plastic waste prior to pandemic

Most industries rely on plastic production in order to function perhaps because of its cheapness and durability, but the rate at which they are discarded into the environment remains a pressing global concern. Indiscriminate disposal of virgin plastics and non-biodegradable plastic products by companies into the ocean poses damning danger to marine life. Several large patches of plastic garbage are floating in the Pacific Ocean, called Western and Eastern garbage patches. These plastics are non-biodegradable, and may only break down into smaller pieces of micro plastics, constituting a menace to marine life and by extension humans who are involved in the food chain of sea foods mostly contaminated by bisphenol-A [19]. It is therefore pertinent to rethink and optimize plastic recycling, and sustain waste management strategies that will effectively curtail the ecological footprint of plastic.

Developing countries already encumbered with the challenges of managing plastic wastes pre-COVID-19, are further overwhelmed with the unprecedented of plastic waste generation amidst COVID-19, considering that standard waste management technologies and waste emergency policies to curb the pandemic is lacking or insufficient, suggesting they may witness more serious impact of plastic pollution. The importance of politics and politicking on the dynamics of waste management is critical in developing countries [20]. Government at all tiers should not only make laudable waste management policies to curb environmental pollution, but must show sincerity of purpose and political-will to implement and enforce these policies to curtail impending global impact of plastic pollution aggravated by COVID-19 pandemic.

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*Колейо Омояджово¹, Сандей Аміолемен²,
Бенджамін Мваді Макенго³, Амос Огуньсбі¹*

¹ Університет Лагосу, Нігерія

*² Департамент наукової політики та
інноваційних досліджень,*

*Національний центр управління
Науково-технологічним розвитком, Нігерія*

*³ Університет Кіншаси,
Демократична Республіка Конго*

ВПЛИВ ПАНДЕМІЇ COVID-19 НА ОДНОРАЗОВЕ ВИКОРИСТАННЯ ПЛАСТМАС У ДЕЯКИХ АМЕРИКАНСЬКИХ ФІРМАХ: АНАЛІТИЧНА ОЦІНКА ПОЛІТИК

Оскільки COVID-19 продовжує створювати неймовірні загрози для майбутнього довкілля, неможливо переосмислити, що постійне існування людської раси поставлено на карту. Більше 60% токсичних відходів, що викидаються в навколишнє середовище, в значній мірі створюються виробничими та сервісними компаніями. Отже, у цьому дослідженні вивчався вплив пандемії COVID-19 на корпоративну програму управління відходами серед вибраних американських фірм. Загалом опитано 42 відомі фірми в 3 містах США (Детройт, Атланта та Х'юстон) щодо вибору скорочення, повторного використання, переробки та утилізації промислових відходів після спалаху COVID-19. Більше 80% досліджених фірм утворюють пластмаси як відходи; з яких усі фірми (100%) погодилися з тим, що COVID-19 ускладнив їхній вибір щодо поводження з пластиковими відходами. У цьому дослідженні доведено, що COVID-19, безсумнівно, сприятиме забрудненню пластиком та пов'язаному з ним екологічному ризику в США, якщо відповідні заходи не буде впроваджено. Дослідження рекомендує уряду та відповідним зацікавленим сторонам реструктуризувати існуючу політику поводження з відходами та інформувати американські фірми про серйозні небезпеки забруднення навколишнього середовища пластиком та іншими токсичними відходами. Дослідження має також рекомендації для країн, що розвиваються. Це пов'язано з тим, що країни, що розвиваються, вже зіштовхнулися з невирішеними проблемами поводження з пластиковими відходами в епоху до COVID-19 і ще більше перевантажені безпрецедентним утворенням пластикових відходів під час COVID-19. В Африці та інших країнах, що розвиваються, стандартні технології поводження з відходами та політика щодо надзвичайних ситуацій поводження з відходами відсутні або є недостатніми, і, отже, можна припустити, що вони можуть бути свідками більш серйозного впливу пластикового забруднення під час пандемії. Уряд на всіх рівнях має не лише проводити належну політику щодо поводження з відходами для стримування забруднення навколишнього середовища, але й має виявляти щирість цілей та політичну волю для впровадження та дотримання цієї політики, щоб зменшити глобальний вплив пластикового забруднення, що посилюється пандемією COVID-19.

Ключові слова: екологічні ризики, пластикове забруднення, американські фірми, пандемія COVID-19.