



Absence of battery directives in Nigeria: Risks and implications

Chinedu Ogoke

Department of English and Communications, Studies Federal University Otuoke, Nigeria

Abstract

This paper examines the casual attitude of consumers, governments and producers in the utilization of alkaline batteries and the implications for Nigerian society. For many decades, people have been enjoying the pleasure of lighting up dark spots with torches, the energies supplied by these batteries. The batteries are used to power radios and bring commentaries on air waves into homes. Therefore, the batteries enable knowledge dissemination. The batteries are user friendly, making it difficult to detect the burden they constitute to everyone. They contain toxic materials that sip into the depths of the earth, poisoning the underground water and the atmosphere when not properly disposed. This study demonstrates that the harm caused by the batteries can be curbed if awareness is created about the hazards to the society. The study also exposes battery manufacturers and the various governments for their indifference and the absence of batteries' directives in Nigeria. Elsewhere in the world, new and used batteries are handled with care. The essay proffers ways in which the menace can be solved. It is hoped that this ecocritical work would inspire a new beginning, whereby writers and consumers of batteries would play their part in making our waters and the environment cleaner. The research is conducted with the aid of books, articles and interviews.

Keywords: Ecocriticism, writers, environmentalists, society, batteries

Introduction

Hazardous materials that are identified as such are moved from place to place in Nigeria without caution. In Germany, for instance, a highly hazardous content is packaged properly in a container. A seal indicating the type of content is plastered on the package. There is an accompanying large, red mark or danger sign symbol. A report is attached to it. This is important in case there is an accident or emergency on the road. The sender and recipient are aware of this disclosure. The measure is important in order to free one from any liability. In Nigeria, even if such measures are applicable, transporters, senders and receivers are hardly aware. Every item is treated according to its appearance. Large glasses are handled with care. Perishable items are treated in the same way. When this is so, a small battery that cannot even explode will not be seen to pose any problem to anybody. In some quarters, batteries the size of a pear litter the environment. The consumption rate is high, with the act going on for decades. While the battery manufacturing companies have been doing good business for over 50 years, they have kept sealed lips on the danger posed by these products to the environment. There are attempts at recycling, but the magnitude of air pollution as a result of the presence of facilities in neighborhoods is worrisome. Human rights organizations should sue these companies and the Nigerian government for billions of dollars for crimes against humanity. Writers should also be actively involved controlling the menace of these batteries.

Children have always played with the batteries. They pull out the covers of the batteries and use the same as caps that are fitted into the oblong covers of bios to produce what is called okoso. The okoso can be spun and made to roll on the biro cover. The player tackles the oscillating device, which now looks like a blue mushroom. When this is done, the device tumbles and drops on the spherical battery cover. It counts as a win for this player. What the innocent children and society do not know is that the carcass of the battery

that is left to rot is a time bomb. The only people who are informed about this tragic development are the battery manufacturers and the authorities that permit them to operate. The manufacturers are mostly global concerns who are aware of the implications of what they permit in the third world countries like Nigeria. They adopt other measures in their countries.

People in Nigeria never really attach importance to dangers in containers. Petrol tankers transport petrol from one point to the other in the country. The roads on which the tankers ply are ridden with holes. The long tankers can be upstaged and fall. It is the same with trailers conveying containers. The tankers are sometimes quite old and not properly checked to ascertain if there might be leakages or if the vehicles' engines are in good condition and pose no danger on the road. People sit quietly in vehicles driving beside the fuel-laden containers. A lot of times, the driver of a car contests a space with the tanker driver in a crowded road. Anything can cause accident that might result into a fireball that might consume dozens of people. This is how a tanker might fall and spill petrol, which will attract dozens of people who storm the scene to get free petrol, and perish. The incidents occur quite often. Therefore, when in Nigeria people see the sign 'highly inflammable,' they do not perceive any danger.

Containers of contents described as hazardous are hardly recovered by the manufacturers of those products. Most people are unconcerned about what happens to those objects. Someone is satisfied once unwanted objects leave their homes. Dump sites constitute enough environmental problems. The problems range from pollution of the air to gas that is generated in those places. To throw in the containers referred to above is even worrisome. Nigeria has an environment monitoring agency that is called Federal Environmental Agency (FEMA). FEMA does very little in protecting citizens. Its report card in creating awareness among the people about hazards posed by these objects is

poor. Since the agency neglects its duties, individuals and other bodies can rise up and fill the gap. We must not keep quiet while we consume poison by the hour. We are entitled to living in a cleaner environment. We must halt the drift with regard to climate change (Jain and Pruyn).

Benjamin Franklin is believed to have first mentioned the word battery in the course of experiments he was conducting. He set up units of jars he tagged "battery," with the understanding of weapons that go off rapidly and simultaneously. According to Alarco and Talbot, Italian physicist Alessandro Volta built and described the first electrochemical battery, the voltaic pile, in 1800. This was a stack of copper and zinc plates, separated by brine-soaked paper disks, that could produce a steady current for a considerable length of time. Batteries appear in different structures and sizes. Some are tiny pieces that aid hearing. Some are wristwatch batteries. Many others are vehicle batteries, laptop batteries and phone batteries (Pauling 539). Discussing battery sizes, Sky News writes that

[p]rimary batteries readily available to consumers range from tiny button cells used for electric watches, to the No. 6 cell used for signal circuits or other long duration applications. Secondary cells are made in very large sizes; very large batteries can power a submarine or stabilize an electrical grid and help level out peak loads.

Many concerns utilize varieties of hazardous materials. These can be explosive chemicals, flammable materials, corrosive materials, toxic chemicals, heat-sensitive materials, radioactive materials, water-sensitive chemicals, gases under high pressure and oxidizing agents. (Jain and Pruyn). Primary or single-use batteries are not reused, as their electrode are permanently altered. The alkaline battery is one of such batteries. Secondary or rechargeable batteries' lives can be renewed, "using an applied electric current; the original composition of the electrodes can be restored by reverse current" (Pauling). Pauling describes these types of batteries as "lead-acid batteries used in vehicles and lithium-ion batteries used for portable electronics such as laptops and mobile phones (539)."

They have "high pressure and oxidizing agents." This may lead to disorders in the body. The agents can get into our body through different forms. They gain access into our bodies through a process called "route of exposure." The mediums can be by breathing, through cuts in the skin or by consumption. Where the hygiene level is low, as we eat, drink and smoke with hands that are not sanitized. There are also implications for the environment. Toxic materials are essential features "in factories, universities, hospitals, and research institutions (Jain and Pruyn).

Battery and Man

There has been an exciting relationship between man and batteries in the 21st century. The battery has become indispensable. The appetite for it continues to rise. The battery has even greater roles to play in our lives in the years ahead. With innovation in technology, the stage is set, as the scope of consumption keeps expanding. The trend should be accompanied by appropriate responses directed at the impact on the environment. According to Gianvincenzi *et al*, forecasts for the global battery market suggest a rapid expansion, with projections pointing to a market value exceeding 400 billion dollars and a total size reaching 4.7 TWh by 2030. The prognosis is worrisome. With monumental expansion in the use of battery, various

problems associated with the battery will not only persist, but the prospects will be dire. The entire process has to be reviewed. For instance, there should be appropriate response to the development. After a prolonged inactivity, a country may be overwhelmed if it attempts to grapple with the issue. In Nigeria, there is no strong tradition of collection and recycling. The government has only recently shown interest in managing the situation. How to fill the vacuum from the points of use is not being discussed. The people indulge in throwing the batteries away, leaving batteries dispersed all over the place; on the streets and push parts and landfills. Unknown to the populace, the exhausted batteries are not valueless. Surely, something of that kind that is economically important deserves to be treated with a different attitude. The habit of being disconnected from something you release into society at such scale as observed in Nigeria among battery manufacturers is condemnable. Investment is required in this sector, but the central government in Nigeria has limited its role to collecting shipment charges for export of battery scraps to mainly China. Lack of competition from other countries is an indication of a common problem around the world. Gianvincenzi *et al* inform us that "[p]rojected data for 2030 highlight an expected increase in end-of-life batteries across Europe, estimated to be around 264.000t." It is currently at 80,000t.

The black mass (BM) presents a most serious problem. Black particles of dust, it is difficult to recycle or degrade. Gianvincenzi *et al* reveals that a

crucial aspect of this challenge is the processing of black mass (BM), a complex powder byproduct, difficult to recycle. It results from initial processing stages such as disassembly and pre-treatment, including mechanical size reduction, thermal processes, and density-based separation. Gianvincenzi *et al* provide more information, saying that it results from initial processing stages such as disassembly and pre-treatment, including mechanical size reduction, thermal processes, and density-based separation. This complexity leads to a critical shortfall in efficient and cost-effective technologies for subsequent recycling steps.

Yet, it causes a recycling nightmare. For instance, "projections for 2030 underscore a significant challenge in Europe with the management of an estimated 105.000t to 132.000t of this material." It is shipped to countries where treatment of this material is advanced. It appears like resignation from the role of self-improvement. It denies the country revenue. The technology is clearly not an easy one to acquire. The problem in some countries is insufficient facilities, as the leakage is not desirable. It is immense cash outflow (Gianvincenzi *et al*). By applying this method, Europe relies less on raw materials for batteries. In some countries it has really undergone. The industry in the country would have gone through the rigors of getting a deeper understanding of how it works and achieving enviable results. It is hazardous material that is quite delicate to handle. Certain skills and equipment are required to move it around. That is why exportation of such items should be discouraged. Gianvincenzi *et al* provide more facts, stating that, "starting from the Classification, Labeling, and Packaging (CLP) Regulation (EU) No. 1272/2008 [9], which adheres to the United Nations' Globally Harmonized System (GHS) for the classification and labeling of chemicals" Gianvincenzi *et al* go further to say that these substances are regulated under REACH

(Registration, Evaluation, Authorization, and Restriction of Chemicals) Regulation (EU) No. 1907/2006, which is directly applicable in all EU member states.

Guidelines have been set already in the European Union. It will be compulsory to retrieve 50% by 2027 of the lithium batteries. This will be raised to 80 in 2031. Gianvincenzi *et al* disclose a new plan by the European Union, which set up plans for “the development of dedicated waste codes for lithium-ion batteries and their intermediate waste streams, with a particular focus on BM. The alkaline batteries that are mostly preferred are the ones that have zinc and manganese dioxide as components. They are cheaper and more user friendly (Sibi) The attitude to unwanted batteries is troubling. This is due to the magnitude of toxic and hazardous materials traced to Batteries. The AA and AAA brands constitute 90% of the litter of batteries in urban areas. Sibi says, though, that “Pollution caused by the alkaline batteries was less than that of zinc carbon because the former contains less lead (Pb) and cadmium (Cd) than the latter.”

Encountering hazardous materials in the manufacture, haulage, use and recycling of batteries is inevitable. According to Sibi, battery is discarded through “composting, incineration, land filling and recycling.” In most countries, the most common end point of batteries is the landfill. Environmentalists and producers choose recycling. Sibi remarks that,

with any battery disposal method, the potential exists to release heavy metals into the environment through landfill leachate or incineration stack gases. The disposal of batteries into the environment leads to leaching of heavy metals from landfills into ground water, or volatilize into the atmosphere during combustion at open dumpsites.

Statistics

Unlike Nigeria, in the advanced countries, statistics of battery usage are kept. Estimated consumption and disposal are provided. This is how Bruder Müller, Benedikt and Waughray got the information which they share as follows: Between 2010 and 2018, annual battery demand grew by 30%, reaching a total of 180 Gwh in 2018. Conservatively, the growth rate is expected to be maintained at an estimated 25%, culminating in demand reaching 2600 Gwh in 2030. In addition, cost reductions are expected to further increase the demand to as much as 3562 Gwh.

Items we use contain some levels of toxic substances. Authorities prescribe labelling, to specify and identify toxic elements. Consumers should not disregard the warnings. This will determine how the products will be used and how they will be disposed. Workers must exhaust all safety measures while tampering with such materials. They must be devoted to protecting themselves (Jain and Pruyne).

The level of mercury “in the anode” in alkaline batteries has been considerably adjusted and eliminated recently. The presence of mercury can only now be traced to other ingredients connected to the battery. They accounted significantly to mercury levels in municipal solid waste (MSW). The development was facilitated by environmental activism around the world. The amount of leaching in landfills is determined by the number of batteries discarded at a landfill or waste dump. Xará clarifies this fact when he states that the “direct disposal of spent household batteries in to MSW landfill can increase the heavy metals contents in the landfill leachate.” Referring to a finding, he submits

that “the leaching of alkaline batteries cause enrichment of 70 and 11 times the Zn and Mn concentration of the topsoil, respectively.” Xara concludes in his research that “cadmium, nickel, zinc, copper, lead, chromium and mercury” were detected. They are derived from batteries deposited in the MSW.

Once devices become unusable, battery users acquire new items with improved technologies and put away the obsolete ones, thereby accumulating burdens that end up in landfills or in the bushes or roadsides. Therefore, a buildup of end-of-life (EOL) gadgets ensues. If they are batteries, they are retired with useful and harmful materials. The materials are extractable through recycling. The threat is not recognized in some countries. People do not care where the batteries end up. Recycling is not popular even in countries like South Korea. where there exists the “extended producer responsibility (EPR) policy,” which was introduced in 2003 (Jang *et al*). Jang *et al* took some measures to ascertain the level of management of battery waste in South Korea. It involved assessing the degree of attention paid to battery recycling in the country. They interacted with officials who monitor adherence to management of batteries. It was discovered that, in 2015, what was deposited at landfills and at incinerators consisted 558 tons of “manganese-alkaline batteries (Jang *et al*).” 2,000 were reclaimed at a recycling site. The materials may be ruinous to us and the environment. Due to the risks they constitute, certain measures should be taken in handling them. There must be permissible procedures for their use, to make them less harmful. The guidelines usually follow international guidelines, one of which is taken from the Basel Convention (Jain and Pruyne).

Ernest Cause of Action

Diverse other measures can be applied to obtain better results especially if earnest cause of action is adopted and a certain degree of consciousness is awakened among the populace. Centers where people can turn in unwanted batteries can be set up. Everybody in the battery consumption chain should be involved. People should cease throwing away used or unused batteries. Nigeria has only recently taken the first step to protect man and the environment from these batteries (Jang *et al*). Knowledge of potential dangers from hazardous materials at the work place or at home is important. The degree of risks varies with the material. The amount of risk determines the level information made available to the people. Thus, items must be properly labelled. When a gadget is correctly labelled, the individual will evaluate the exposure to danger. One should be sensitive and cautious while handling harmful objects or chemicals. There is grave concern when the person is unaware of these dangers. Contact with petrol, for instance, at the filling station or at home, poses harm to the individual, as petrol “contains benzene, which is classified as a carcinogenic substance (Prüse).”

Fröhlich says it is cheery news that many people now have insights into the components and nature of the gadgets. In Germany, this is made possible, especially through the Deutsche Gesetzlich (Prüse) Unfallversicherung (DGUV); the German Social Accident Insurance. It is difficult for information on asbestos to elude people in Germany, though the information may not be available to some people. Hans-Peter Fröhlich recalls how asbestos was scooped with bare

hands in the past. It has long been listed by the EU as a dangerous material.

A lot has been achieved in the “hazard identification and risk assessment” by The German Occupational Health and Safety Act - Arbeitsschutzgesetz (Prüse),” which is occupied with providing safety regulations for various substances. It ensures that alternative products are acquired as substitute for the dangerous ones. Risk to the skin and the quality of the air where these products are concentrated are examined. This is where the “Personal protective equipment (PPE)” plays a role. It becomes compulsory to wear protective gears like hand gloves, respiratory gadgets and suits while handling these substances and items (Prüse).

It became necessary to establish the Hazardous Substance Check (GDA Gefahrstoff-Check, which makes available tools and information on how to detect and identify hazardous materials and the risks these substances cause. According to Froechlich, The GDA Hazardous Substance Check requires a certain level of prior knowledge or the proper assistance from occupational safety and health service experts to obtain a reliable assessment. (Prüse) Single use batteries and rechargeable batteries should be kept away from the home refuse bin. The instruction is clearly depicted on a seal with a crossed-out waste bin. Before gadgets get to recycling plants, the batteries should be extracted. The customer gives up used batteries where batteries are sold. There is usually a container with a battery recovery sign at the supermarket, where the dead battery is thrown into. Recycling centers can retrieve inbuilt batteries from gadgets. Provided are addresses of municipal disposal companies. Information is passed through websites and other publications on where and how to dispose the batteries.

Some countries have prohibitive laws guiding the disposal and recycling of batteries. There is accepted labelling format for single use batteries and rechargeable batteries. The battery, for instance, must be detachable. In New York and California, it is an offense to discard rechargeable batteries in solid waste. There are collection points at supermarkets for batteries, which are linked to the manufacturers. It is a requirement for running a supermarket business. Similar policies operate in the EU. Research centers come up with new ideas on recycling and improvement in the battery technology. Batteries sold in the EU bear the collection sign, which is a crossed-out wheeled bin.

New Development in Nigeria

Lead-acid batteries are the most common types of batteries. Nigeria leads the rest of the Africa south of the Maghreb in the recycling of lead-acid batteries. Through a partnership with some Germans, facilitated through German organization GIZ, a Nigerian company had the opportunity of improving on its management of batteries. A team that comprised one Frederick Adjei and Andreas Manhart of Germany’s Öko-Institut and Franziska Weber came to Ogun state, in Nigeria, to inspect a battery recycling factory. The working relationship was tagged “Partnership for Responsible Battery and Metal Recycling (ProBaMet).” The mission was meant to acquaint various peoples with the innovations in battery manufacturing and recycling, thereby creating easier forms of battery waste management.

Nigeria’s recycling of these batteries is actually appalling. The lives of the neighbors around factory locations are at great risk. Most of the recycling plants are consigned in

Ogun state, and number about ten. Just a few are involved in manufacture of new lead-acid batteries while the others are in business for export of processed lead acid. It is really depressing for environmentalists to note the level of pollution from the plants. They release pollutants into the air, with piles of powdery dunes of battery waste. The range is expanding by the day and the conditions progressively bad. Prüse, qualifies the situation thus, While all plants use rotary furnaces linked to off-gas treatment systems, most recycling steps such as battery breaking, furnace charging, tapping, lead refining and casting are subject to numerous shortcomings and are far from established good practices. Moreover, housekeeping, dust control and hygiene standards are dire, with lead dust accumulations within and around the facilities, insufficient personal protection equipment or workwear, amenities and widely inadequate health monitoring and blood lead testing.

Therefore, the reverse of what was intended is the outcome. This is why the German group tried to lend a support (Prüse). The Nigerian government had responded lately with the battery handling oversight organization in 2024.

Conclusion

Current batteries are more efficient and more environmentally friendly. Energy stored in batteries generates power and makes devices functional. Their capacities are comparatively lower than petrol and diesel. In automobiles, Pauling clarifies that “[t]his is somewhat offset by the higher efficiency of electric motors in converting electrical energy to mechanical work, compared to combustion engines (539). In terms of recycling, Recycling is still not considered in most parts of Nigeria. People do not now what else to do with the batteries other than throwing them away. they re dropped by the people carelessly. Nobody has provided them with provisions where they can drop these things, with minimal consideration for the health conditions at the recycling plants.

The government does not feel any discomfort in leaving such fortune in the hands of the Chinese. There is excessive litter of discarded batteries. Children in search of battery covers and other parts can easily find them everywhere partly buried or lying on the surface. In Nigeria, the authorities are indifferent to the use of batteries. Around the world, The state of the battery production, distribution, consumption and disposal is unsettling. Whereas in some countries it has been cultivated that not a single battery either used or unused is unaccounted for or allowed to litter. Nigeria must join the race in improving the battery technology, which should include bent on extensive life span through recharge and recycling.

A lot is happening to the climate. Writers should be heard. This is especially so if they love mankind. Will they be an adamant party? They should pick up these bits of information and draw attention of readers to them. If they are as ignorant as the rest of the people, then it is regrettable. Their input will boost the environmental discourse. Let them educate the readers that small battery in the remote device constitutes danger to life if not properly taken care of. They should also invest time and energy to engage in the destructive nature of a discarded battery. When more and more people refer to the problem, people become enlightened and take steps to solve the problems. The problem mounts when players on environmental issues like writers ignore these issues.

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