

## ENVIRONMENTAL HEALTH HAZARD OF BLACK SOOT IN RIVERS STATE

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### ABSTRACT

*The purpose of this paper was to examine the environmental health hazard of black soot in Rivers State. This paper was reviewed discursively under the concepts; causes, and emergence of black soot. It also listed measures to reduce its impacts on the environment and a brief of the use of social marketing approach as a strategy to attack the problems of soot. Recommendations were made to the government and its agencies to checkmate the issues of unnecessary burning of crude oil to curb the menace of the soot. Emergency health care provision for those who have been already affected was recommended. Perhaps this will reduce the negative impact on them. It is concluded that the environmental impact of the soot is enormous as it transcends into all areas and facets of the natural environment polluting the air and sources of drinking water. No doubt, this impact cannot be overemphasizing as it has affected many families especially, the children.*

**Keywords:** Black soot, soot, social marketing approach

### INTRODUCTION

This paper examined the environmental health hazards of black soot. To achieve this, purpose, we discuss the concept of black soot; causes of black soot, ways of controlling black soot; the use of social marketing approach in solving the problem of black soot; recommendations and conclusion.

### CONCEPT OF SOOT

According to Stanmore, Brihac & Gilot (2011) soot is an output of incomplete combustion of carbonated fuels, usually petroleum-

based chemical substance in liquid or gaseous form. The materialization of soot is an intricate process of a development of particle matter which a number of fragments undertake various forms of physical and chemical reactions in few milliseconds. Meanwhile, the materialization of soot is largely contingent on the amount of fuel composition. The ordering of soothing inclination of fuel components is naphthalene-benzenes-aliphatic (Wikipedia the free online encyclopedia). Soot could be characterized based on oil base combustion, in-door soot deposits (i.e., soot produced

from burning candles which is alternatively 0.06 to 0.1 micrometer or that which is created by burning bush), plants, trees, and bush. Soot is the most common word used to describe a form of particle pollutant particulate matter that amount to  $\leq 2.5$  micrometers. These tiny particles are most usually smaller than particle dust, and approx. 1/30 of a variety of waste product such as that which emanates from acids, chemicals, dust, metal, and soils, which are held up in the atmosphere immediately after discharge, which is usually in either gaseous, liquid or solid states. (Safari, et al. 2012). Soot is a propensity of the gaseous-phase of a burning process of production that are extended to comprise the residual pyrolysed petroleum constituent part such as: Charred wood; chemosphere; coal; and petroleum coke (Haneis, 2016). Carabali et al. (2012) noted that black soot may also be referred to as 'carbon tracing'; 'carbon tracking'; 'dirty house syndrome'; or 'ghosting'. The size of the particulate matter determines the security of the soot which constitutes the totality of liquid and solid constituent part suspended in the atmosphere which are mostly hazardous which are found as dust; liquid droplets; pollen; soot; and smoke. It is commonly called black soot because its physical appearance tends to blacken any objects it affects.

### **CAUSES OF BLACK SOOT**

The causes of soot include, but are not limited to: The nucleation of substantial amount of molecules that occurs to form particles; by-product of burnt fossil fuels - emitted by various sources as burning coal for electricity; industrial manufacturing; motor vehicles exhaustion; oil refining process, etc. Some are released directly into the atmosphere, while others are formed as gases particles and conveyed thousands of

miles away from the source of pollution (Weldman & Marshall, 2012). Candles also have the potency to cause soot. Such candles include those produced with soft wax containing unsaturated hydrocarbons, thick long wick, one with a wire core, candle poured into glass jars, or ceramic containers, etc. Burning oil reservoir such as asphalt roads; old oil well; roof top made up of tar-base; and oil storage area. Though these are marginal sources of black soot, they tend to produce very dark when burnt and are transformed into element of carbon.

### **THE EMERGENCE OF SOOT IN RIVERS STATE**

The heavy emission of black soot containing PM2.5 is recurring environmental hazard in Port Harcourt (one of the coastal cities in Nigeria). Sequel to the fourth quarter of 2016 till date, large deposits of soot has continued to plague the city of Port Harcourt and environs. This situation leaves the over 6 million residents of Port Harcourt (most especially, children and the elderly) at risk of adverse health consequences. Aside the negative intricate health effect and carcinogenicity of the soot, Port Harcourt residents have continuously complained about the constant black coloration on their cars, floors, roofs, and household furniture surfaces which has warranted its repeated cleaning. Although laboratory reports have indicated the soot to be a by-product of petroleum combustion, the exact source is not precisely known. In an effort to address this situation, the Rivers State Ministry of Environment declared the air pollution an emergency situation after about 3 months of it constant emissions. Also three companies were found to be involved in discharging massive volumes of emissions were shut down. Other action taken to curb this situation is the seizure and destruction of illegal refineries in the coastal Niger Delta

region and creeks which many believe is the major source of black soot in River State.

#### **RECOMMENDED MEASURES FOR THE REDUCTION OF THE EFFECT OF SOOT**

1. Surfaces should be cleaned daily to avoid the accumulation of black soot around the house
2. Windows and doors should be shut as often as possible to prevent the soot from infiltrating the house.
3. Hands should be washed regularly, before and after meals. Also, residents should have their bathes twice or thrice daily.
4. Eating of fruits and vegetable is recommended. Research has shown that certain fruits which are rich in vitamin 'C' and 'E' can help to clean the body system and counteract the effects of particle matter pollution in the body system. These fruits are rich in antioxidants and have anti-inflammatory qualities. Example of such fruits/ food include: avocado, tomatoes, flaxseed, olive oil, white wine, spinach, and broccoli.
5. Food should always be covered. Avoid eating exposed food
6. Long/Protective clothing can be worn to reduce the area of the skin coming in contact with the soot.
7. Nose mask can be worn to reduce the quantity of particle matter inhaled.
8. Gadgets, equipment's, and vehicles not in use should be covered with protective materials.

#### **ENVIRONMENTAL AND HEALTH EFFECTS OF BLACK SOOT**

Black Soot aggravates respiratory tract infection, or illness in the general air pollution. It hazes and acidifies watercourses such as: Streams, rivers and lakes. Formation of haze occurs when heavy sunlight interacts with tiny

air particles. This particles having been associated with series of dangerous health effects tend to infiltrate deeply into the lungs aggravating asthma in children, causes premature death in adults resulting from heart attacks, strokes, and acute bronchitis. Breathing air pollution is subject to a possible cause of cancer, and damaged reproductive system (Safari, et al, 2012) as diesel exhaust gas soot has been directly linked to acute vascular dysfunction and increasing thrombus formation. Similarly effect of black soot increase the rate of cardiovascular morbidity and mortality rate.

#### **SOCIAL MARKETING APPROACH AS A STRATEGY FOR SOLVING PROBLEM OF SOOT**

According to Malaha (2002) social marketing was developed as a discipline in the early 1790s, when Philip Kotler and Gerald Zaltman discovered that the same marketing philosophies that applies to sells of products and services can also be adopted to selling ideas, behaviours and attitudes. Kotler and Anderson defined social marketing as the process of differing from the areas of marketing only of the marketer and his or her organization (cited in Crielimi, 2004.) Social marketing pursues the influence of social behaviour not only to the benefits of the marketer, but also to advantage of the targeted audience and the society at large. Social marketing approach according Limehi in Ohilih (2006) is an excellent tool for changing people's behavior through creation of awareness on how best to solve a particular problem facing the society. This marketing strategy (social marketing) effects behaviour modification through a comprehensive and multifaceted method that delivers coordinated interventions to a specified audience. With recourse to black soot, social marketing approach can be applied to change peoples' behaviour on what black soot is, its causes and effects, and possible ways of avoiding the

hazards associated with it. Social marketing approach on black soot could be achieved through media campaigns by a social marketer.

### COMPONENTS OF SOCIAL MARKETING

1. Identification of the problem for instance, black soot.
2. Target Audience: Target audience represents individuals or groups whose behaviour is expected to change. Social marketing focus on the audience and use a variety of tools to understand it. The target audience could be those affected by black soot and how to change their social behaviour so that their negative behaviour on soot may not affect the buying and selling and even production of goods and services in the society.
3. Target behaviour: The goal of social marketing is always to inform people about the best approach to change their behaviour on a particular problem and product. Social marketing approach will help people affected by soot to adopt good measures to live well in their respective home.

Combating black soot with the social marketing approach will properly educated the society about its harmful effect and the possible ways through which various measures can help over-come the problems associated with it. The essence of social marketing is to create an enabling atmosphere that will redirect people's behaviour towards ensuring the existence of ensuring a safe environment for an effective buying and selling transaction.

### CONCLUSION

The emergency of black soot in Nigeria especially, Rivers State has been a recent development to the residence of the state. However, serious measures that will forestall its escalation should be put in place by the

federal government and other relevant authorities. This is because the environmental and health impact of soot could be very costly for only individuals to combat.

### RECOMMENDATIONS

The following recommendations were made:

1. The unnecessary burning of crude oil in various parts of the country should be properly checked by the responsible agency, as this will help in combating the existence of soot in the area.
2. Government should embark on emergency health care provision for people that are affected by black soot so as to reduce its negative impact on them.
3. Private individual should avoid acts that may trigger off the existence of soot in their homes, communities and states.

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