Vol. 6 No. 2 Special Edition, September (2023)
**JOURNAL OF ENVIRONMENTAL AND TOURISM EDUCATION**
**ISSN: 2659-0794 (PRINT) ISSN:2659-0808(ONLINE)**
Content Available at: **https://jeate.net/index.php/Jete/issue/archive**

# Waste for Wealth. A Panacea for Economic Development in Nigeria: Implications of Environmental Education.

| | | |
|---|---|---|
| **Osang, Gabriel Ojie**<br>omolosang@yahoo.com | A | Department of Environmental Education<br>Faculty of Arts and Social Science Education<br>University of Calabar, Calabar |
| **Ojong, Aganyi Asu Ph.D**<br>aganyiojongasu@gmail.com | B | |
| **Omang, Theresa Nkim Ph.D**<br>nkimomang@gmail.com | C | Department of Continuing Education and Development Studies. Faculty of Arts and Social Science Education. University of Calabar-Calabar. |

**Keywords**
Waste
Wealth
Economic Development
Environmental Education
Nigeria

**Correspondence**
omolosang@yahoo.com

**Received: 09/08/23**
**Revised: 28/08/23**
**Accepted: 31/08/23**
**Published: 09/09/23**

**Abstract**

Due to the increasing environmental hazards of climate change phenomenon, it has become a major concern of most environmentalist. Currently the world struggles to manage waste which are generated from human activity and it affects the global climate either positively or negatively. Therefore, particular attention should be paid to sustainable waste management strategy so as to ameliorate the issue. To this end, the 3-R concept of waste management (reduction, reuse and recycle) have been variously pursued by municipalities towards a sustainable waste management system. This paper focused on the waste for wealth activities across Nigeria as a panacea for economic development. It discusses solid waste disposal and harvesting with a view to facilitating sustainable practices for enhanced environmental condition and wealth creation. The paramount theme is on the socio-economic networking of the waste for wealth activities in Nigeria and the derivable benefits towards addressing the effects of global climate change phenomenon in the city. Its research results highlight the ineffective waste management system within the metropolis and showed that huge financial gains could be harvested from waste product. Also it revealed that waste picking is done on informal scale across all neighbourhoods in the study area. It concludes and recommends measures towards enhancing waste for wealth as a panacea for economic development in Nigeria.

## Introduction

Wastes, mostly regarded as unwanted and harmful materials, are produced as a result of man's interaction with nature in an unsustainable manner. The interaction conflicting becomes constant due to the increasing human needs and desire to satisfy endless wants which in turn makes waste management an indispensable task in achieving sustainable development. Wastes are not prime products – produced for the market, do not occur in normal commercial and utility circles but possess potential for further use in production, transformation or consumption (EIONET, 2009 cited in Abiti, 2013). Waste can be understood based on three cardinal processes source, effect on humans/environment and the control which are appropriate to deal with it. In this study, reference is to the source and control of waste, which will have the possible effect of reducing negative impact on humans/environment. Here, control is identified here as the effective use of waste available, as waste is considered as posing a threat to human health or environment. The manner in which it may be disposed off and partly because the holder no longer has the same sense of obligation in relation to it. Waste can come in different forms; it could be solid-metal, gaseous-chemical or liquid. Akaninyere and Atser (2001) cited in Fakere, Fadairo and Oriye (2012) examined the typology, characteristics and future trends of solid waste in selected Nigerian urban cities and asserted that the major components of waste are degradable materials (food remnants, paper, and rags) and non-biodegradable (plastics, tins, metals, bottles, glass, and bones).

The finding was further buttressed by Fakere, Fadairo and Oriye (2012) who submitted that most activities which affect the environment stem from the need for food; its production, processing and preparation. As such, some of the wastes are likely to have socio-economic potentials if effective urban mining mechanisms are designed.

## Objectives of study

Waste is defined as any unavoidable material resulting from domestic activity or industrial operation for which there is no economic demand and which must be disposed of (Sridhar 1996). In Russia, it is said that there is no precise word for waste but the usage is that "a material waiting to be reused". There are a variety of wastes, liquid or solid, emanating from human activities (domestic), agricultural or industrial activities (neither domestic nor hazardous), and hazardous or special. Faeces, indeed is also included in solid wastes. Among the liquid wastes, sullage, sewage, livestock and industrial wastes are known among communities. It is very important to understand the wastes, their nature, problems associated with them, and how to dispose them off hygienically. In Nigeria today, there are no sewers or underground drainage system and as a result all liquid wastes find their way into water courses. There are no urinals or toilet facilities in many public areas. Schools are devoid of functional toilets. Solid wastes are found everywhere and anywhere. In Nigeria, waste is generated at the rate of 0.43 kg/head per day and 60 to 80 per cent of it is organic in nature (Sridhar 2006; Ogwueleka 2009). A cow brought for slaughtering produces about 328.4 kg of wastes in the

form of dung, bone, blood, horn and hoof. Sheep and rams produce about 0.9 kg waste per head per day (based on observation).

The markets generate a variety of wastes, for example, corn cobs, vegetable wastes, packaging materials, metals etc. The household wastes also contain other materials such as paper, glass, metal, plastic, and other non-biodegradable materials and some of them are excellent raw materials for various industries in the country. People litter the roads with no civic concern. All these wastes contain a lot of valuable resources in the form of nitrogen, phosphorus, potassium and other chemicals which are useful (Hammed et al., 2011). Microorganisms play an important role in biogeochemical cycles and convert these valuable resources into harmless and useful products. However, there are certain wastes arising from industries or healthcare facilities which may be hazardous, infectious and need to be treated as special wastes.

This paper focused on the various ways waste can be harnessed to derive the economic benefits and also mitigate against the negative impact on global climate change. The study is relevant in that it exposes to investors, corporate bodies, urban managers and the government on ways waste; solid or liquid can be put to productive use for economic gain as well as enhance waste management and sustainable urban environment through waste for wealth approaches of reuse, recycle and reduce. It also advocates the need to improve and support healthy waste management practices for the good of our global climate and the environment.

## Literature review

### Waste Scavenging and Harnessing for Economic Development in Nigeria

Waste scavenging is fundamentally a solely profit-driven operation. Garbage picking has existed since antiquity, but modern waste picking began with the industrialization of the ninth century and has continued for the previous half-century, it has greatly expanded in the developing countries owing to urbanization (Martin, 2007). There are millions of waste pickers globally, mostly in developing nations, and post-industrial countries (Gowan, 1997). However, Egun (2012) reported that recycling activities are not widespread in Nigeria. Nonetheless, the reclamation of materials from wastes (otherwise known as scavenging) is done on a large scale. This material recovery occurs at a dump site, where scavengers search for valuable plastics, metals, and bottles that can be reused or recycled by selling to scrap buyers (Egun, 2012). ISWA (2009) reported that waste sector activities signify a prospect for the reduction of carbon which is not yet fully exploited and presents an important source of renewable energy. Sheehan, (2000) affirmed that a great number of scientists and concerned persons opined that contemporary materials levels and energy consumption have a threatening impact on the earth's atmosphere.

The concept of Waste-to-Wealth clearly denotes the transformation of trash from a state of useless utility to a useful and valuable form (Egun, 2012). For this conversion to take place requires certain amount of energy in engineering and factors of production in economics. He further asserted that "waste-to-wealth" generally means that waste management processes

must go beyond services delivery to production of goods. Hoornweg *et al.* (1999) demonstrated that waste characteristics differ based on season, population, level of income, social conduct, industrial productivity and climate, the size of waste materials market, the urbanization stage, work minimization and effectiveness of recycling. Currently, metal waste seems to be the most profitable waste material as these metals are gotten as scraps (either picked or assembled by owners) and sold back to the industries that are into steel materials production as additional raw materials for the formulation of new product (Egun, 2012).

**Recyclables and their uses from solid wastes**

| Waste | Recyclable value or use |
|---|---|
| Hair, bristles, wool, feather | Brushes, lanol, fertilizer, wigs, blankets, carpets, fabrics, yarns pillows Mattresses |
| Hoofs, horns | Buttons, combs, hair pins, novelties, washers, glue, gelatin fertilizer |
| Bones | Buttons, cutlery, handles, ornaments, glue, gelatin, bone meal |
| Hides, skins, feet | Horse whips, seats, belts, hand bags, book binding, shoes, gloves, Oil, Glue, Gelatin |
| Intestines | Stock feed, surgical ligature, musical (guitar) strings, tennis strings, sausages and Putty containers |
| Blood | Fibrin foam, purified bovine albumin, dried blood and blood meal |
| Ruminal contents, excreta | Methane gas, manure |
| Fats | Soap, machine oil, candles, leather dressings |
| Glands and special organs | Pharmaceutical products (insulin, gall stones, corticosteroids), Pepsin, Cholesterol, Liver extract, Cartilage |
| Aluminum | Soft drink and beer cans, cutlery |
| Paper | Newspaper, packaging materials, crate of egg, tissue paper |
| Plastics (various types)PETE/1 | Bottles, milk jugs, pipes, thin film packing, battery casings etc. |
| Glass | Various glass products, decorative pieces, brick aggregates |
| Ferrous metal | Tin cans, metal works |
| Non-ferrous metal | Aluminum, copper, lead, etc, various items |
| Yard wastes, organic wastes | Compost, biogas |
| Construction wastes | Filling materials |
| Tyres | Road paving, building, shoe soles |
| Batteries | Recycling for lead, cupper, plastics and reuse |
| Waste oil Rice husk | Reuse after refining Briquettes, cement substitute etc |

## Problems of waste management and it sustainability

### Waste to Wealth Options

As much as possible, one should aim at waste minimization or reduction, reuse, and recycling before dumping the wastes into a dust bin. Recycling the non-biodegradables will help the individual and also the local industry. In recent years, many industries are starved of raw materials. For recycling to be successful, separation should start at household level. If paper, plastic, aluminum, iron and glass can be separated and kept in separate bins or baskets, it is normal that our waste will be reduced for the clearing agent and we will pay less for his services? Besides saving some money from the agent one makes some extra money from the sale of these recyclables. Ask the picker boy on the refuse dump site: 'How much money he makes at the end of the day in Nigeria?' The reply is very modest with a smile. He makes at least a N100 a day if he is regular and is early enough at the dump site. There are many industries that recycle these materials. There are over 100 plastic recyclers in Lagos, in Ibadan and practically every city in Nigeria. The sustainable development report 2018 analyses gain all through the 0.33 year of the 2030 Sustainable Development Agenda. This highlights achievements and ongoing demanding situations across all 17 Sustainable Development Goals (SDGs), primarily based on the contemporary evidence to be herd and discusses a number of the interconnections between priorities and goals, while people are living better lives common than they had been a decade ago, progress toward making sure that no person is left at the back, because it's has no longer been fast sufficient to satisfy the 2030 Agenda targets. (Onnoghen, Aganyi, Omang, Obibessong & Asor 2020).There is money in it both for the householder, the picker and even the industry. Some researchers have introduced source segregation in some eight pilot communities in Ibadan and Lagos whereby they are able to separate plastic/nylon, metal and organic fraction from the household wastes. They have fabricated necessary machinery locally (without any imported component) to recycle plastic/nylon, metal scrap and organic matter and established the facilities (with various production capacities) at the following locations:

(i) A 10-ton per day capacity "Pace Setter Organo-mineral Fertilizer Plant" was designed and built for Bodija market in Ibadan (1998), Nigeria which is the first prototype demonstration project in the country. This has aroused interest all over the country and the Federal Government has recommended similar prototype for the entire country as a part of "Waste to Wealth Initiative" and as a strategy for "Poverty Alleviation" and Sustainable Development. Based on this, UNDP and UNCHS have engaged our expertise in propagating this technology to 36 States in the country through Workshops. University of Ibadan, Sustainable Ibadan Project and Ibadan Waste Management Authority have bagged National and International Merit Awards and appreciation. The Technology is available under the Team "Environmental Development Foundation".

(ii) A 5-ton per day capacity organo-mineral fertilizer plant was designed and built for Ayeye community, Ibadan (2002) where sorting of non-biodegradable and biodegradables were practiced; recyclables and the organo-mineral fertilizer are being sold.

(iii) A 5-ton per day capacity food residual conversion to compost (2002) was developed for a flow station at Shell Petroleum Development Company, Forcados, Delta Sate;

**Waste management strategies (Solid waste harnessing hierarchies)**

Waste hierarchy is the ranking of measures to be followed in order to reduce trash production and improve overall waste management processes and programs. Reduction, reuse, and recycling are the three R's of the waste hierarchy. This waste hierarchy, also known as the "three R's" of waste management, is the suggested guideline for living a sustainable life.

(a) Waste Reduction: The waste hierarchy is based on the idea of reducing trash generation and consumption. It's a simple argument: if there's less waste, there's less to recycle or reuse. The first step in the reduction process is to assess what you are using and why you are using it.

(b) Waste Reuse: In waste hierarchy, the re-purposing of materials for a different use other than what they were meant for is critical. The modular construction of residential and commercial buildings made from recycled cargo containers is an example of this in action today. These semi-truck-sized large metal canisters pose a significant waste problem. Repositioning them as apartment blocks and offices keeps them out of landfills and avoid the use of additional natural resources to melt down and reconfigure the metals used to make them.

(c) Waste Recycling: Recycling is the final phase in waste hierarchy. It entails converting anything into a raw material that can then be fashioned into something else. Only a few materials on the planet cannot be easily recycled. However, while the collection and sorting procedures may be affordable to implement, adequate capacity to absorb and transform discarded garbage into raw material, which is currently missing, is a hurdle that communities that want to become more involved in recycling face.

**Implication for Environmental Education**

According to Eneji, Otu,Ita, Onnoghen, Ojong, Esuabana, Petters, Arop,Essien, Omini and Monity, 2023, asserted the following implications as explained below.

a) **Awareness**- to help social groups and individuals acquire awareness and sensitivity to the total environment and it's allied problems.
b) **Knowledge**- to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of the environment and it's associated problems.
c) **Attitudes**- to help social groups and individuals acquire a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection.
d) **Skills**- to help social groups and individuals acquire the skills for identifying and solving environmental problems.
e) **Participation**- to provide individuals, groups and societies with opportunities and the motivation to be actively involved at all levels in creating a sustainable environment. This participation includes the individual taking up careers in environmentally related organizations where the skills and values acquired can be used to solve environmental problems, while preventing the occurrence of new ones.

Environmental Education is all educational activities that foster the development of environmentally literate citizens. Environmental Education is an organized effort to teach people about how the eco-system functions and how human beings manage their eco-system in order to live a sustainable life (Smith, 2010).

Environmental Education is a learning process that increases people's knowledge and awareness about the environment and its associated challenges, and foster's attitude, motivations and commitments to make informed decisions and take responsible action (Ford Foundation, 2005 cited in Eneji, 2017). It also refers to organized efforts to teach about how natural environment function and particularly, how human beings can manage their behavior and ecosystems in order to live sustainably (Gruenewald, 2004 in Eneji, 2017). Note that Environmental Education does not advocate a particular viewpoint or course of action, rather, Environmental Education teaches individuals how to weigh various sides of an issue through critical thinking thereby enhancing their own problem solving and decision-making skill, (Pakpour, Zeidi, Emamjomeh, Asefzadeh and Pearson, 2014).

Eneji, (2017) observed that Environmental Education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decision. Socio-economic aimed at ending poverty, sexual crime, drugs abuse, cultism, reduction of environmental social violence, income inequality, lack of education and negligence etc. (Omang, Patrick, Obibessong & Ojong 2023),

It has been repeatedly emphasized that there is irrepressible need for entrenching Environmental Education as a leading approach to solving environmental problems and creating a sustainable society. The poor as well as the affluent are equally vulnerable to environmental damage. The poor and poverty- stricken people, wherever they may live, are generally preoccupied with issue of physical survival. They lack money, skills and knowledge and therefore often times, tend to over- utilized local resources beyond sustainable levels. They, therefore need to be empowered to be able to control their resources and therefore their lives according to the tenets of sustainable, safe and clean environment for a healthy living in our societies. Omang, Ojong, Anthony and Kujoh (2021) opine that, economic development also refers to the process by which the overall health, well-being, and academic level of the general population improves. During the development, there is a population shift from agriculture to industry, and then to services. A longer average life expectancy, for example, is one of the results of economic development. Improved productivity, higher literacy rates, and better public education, are also consequences of economic development.

1. Increase awareness and participation on protecting the quality of environment in schools, by practicing the following

- School sessions run continuously, so a day per week can be kept for clearing, sweeping and cleaning the school environment.

- Summer camps can be held during the holidays (bringing multiple schools together or in one school, hold for youth groups etc).

2. Implement efficient solid waste management by doing thus,

- Compost pits, Eco Street, segregation of plastic / metal and glass, papers into degradable and non-degradable waste
- Recycling, reduce and reuse, integrating waste to wealth creation

3. Reduce the use of plastic in the school and in communities

- Cotton bag actions involving churches and temples
-preference for leave wrapped goods instead of plastic and polythene wrapped goods
- Cotton bag actions targeting those who buy groceries instead of polythene bags
- Shop owner support by not using these plastic bags.

4. Improve ties and communication with the community on waste problems including ecological problems and conservation. - Improve communication with the municipality through opportunities for active member participation in waste management and environmental sanitation.

- Improve communication with self-help groups and others NGOs.
- Improve advertisement against plastic.
- Motivation on community participation in waste management and ecological conservation activities and all other activities which are related to ecology. The activities associated with the management of solid waste from generation point to final disposal normally include generation, reduction, reuse, recycling, handling, collection, transfer and transport, transformation (e.g. recovery and treatment), and disposal. Depending on site specific conditions, a sound waste management program can be established by combining some of the necessary activities into integrated solid waste management. On the other hand, legislative efforts and effective implementation are vital for the safe management and disposal of solid waste. Incentives may be provided for the development and practice of safe treatments, harmless manufacturing processes and methods for converting solid waste into valuable resource by recycling and reuse.

## Conclusion

Waste management in Nigeria is mostly construed as a public policy problem which is a major source of public health challenges. The research has however documented proven processes which ensure the possibility of wealth creation through specific wastes. As Nigeria contends with the vast array of wastes, the study identifies the fact that corn/maize husk provides a good source of paper production. The study identifies the economic and environmental benefit that such utilization process encourages. In examining the production process of paving stones through pure water nylons (which are in large deposits across cities in Nigeria), the study emerged with a frame work for the manufacturing of building materials.

## Recommendations

Due to the ubiquitous nature of pure water nylons, it has emerged with equally large productive ends at minimal cost for business start-ups. Also, the process of transforming Banana stem,

Sisalina leaves and Pineapple leaves into fibres suitable for producing mats and other fibre related purposes was examined. Although the production process can occur within small-scale business structures, it was identified as a technologically-demanding and capital intensive venture, because the process of fibre extraction requires significant effort. In the use of Arecanut leaves/palms as parent material for the production of disposable spoons and plates, the study identified the process of deriving such utensils and the potentials that it assures. Its potentials in terms of cost effectiveness and employment are significant. It is important that local and foreign investors understand the business opportunities and government also provides an enabling environment for business investments and funding. This is good for young entrepreneurs who are readily interested in harnessing the wastes potential in Nigeria. The policy environment should also be enabling for local production and consumption of the products that are developed through this process.

**References**

Abati, B. 2013. Waste–To–Wealth Potentials of Municipal Solid Waste: The Case of GA-East Municipal Assembly, Ghana. M.Sc Project Report Presented to Faculty of the Graduate School of Asia Pacific Studies, Ritsumeikan Asia Pacific University

Akaninyere. M. and Atser. J. (2001). Solid Waste Characterization and Management Issues In Uyo Municipalities, Nigeria. Libro-Gem, Lagos, Nigeria.

Eionet. (2009). Waste. Retrieved from http://scp.eionet.europa.eu/definitions/waste on July, 2023.

Egun, N. K. (2012). The Waste to Wealth Concept: Waste Market Operation in Delta State, Nigeria. Greener Journal of Social Sciences. 2 (6): 206-212.

Eneji, C.V.O., (2017). Introduction to Environmental Education. Potsdam, UMC Press.

Eneji, C. V. O., Otu, B. D.,Ita, C. I.,Onnoghen, U. N.,Ojong, A.A.,Esuabana, S. B., Petters, J. S.,Arop, L. O., Essien, C. K.Omini, E. E. and Monity, M. F. M. (2023). Products Evaluation of Environmental Education Curriculum/Program Implementation in the University of Calabar, Nigeria. International Journal of Learning, Teaching and Educational Research, 22(4), 380, https://doi.org/10.26803/ijlter.22.4.22.

Fakere, A. A., Fadairo, G and Oriye, O. (2012). Domestic Waste Management and Urban Residential Environment: Focus on Akure, Nigeria. International Journal of Engineering and Technology Vol. 2 No. 5 pp: 878-887.

Gowan, T. (1997). "American Untouchables: Homeless Scavengers in San Francisco's Underground Economy". International Journal of Sociology and Social Policy 17 (3/4):159.

Hammed, T. B. (2013). Challenges of environmental waste management on social economic development of Nigeria- A case study of AMAC, Abuja. International Journal of Innovations in Medical Science, 3(1): 14-24.

Hoornweg, D. and Thomas, L. and Otten, L. (1999). Composting and its applicability in developing countries. Urban waste management working paper series 8. Washington.

ISWA (International Solid Waste Association) White Paper 2009; Waste and Climate Change. Sourced from https://www.google.com (Accessed on 20 July, 2023).

Martin, M. (2007). The World's Scavengers: Salvaging for Sustainable Consumption and Production. New York: Altamira Press. [17]

Ogwueleka, T. C. (2009). Municipal solid waste characteristics and management in Nigeria. Iran J Environ Health Sci and Eng, 6(3): 173-180.

Omang, T. N., Patrick, E. O., Obibessong, V. M., and Ojong, A. A. (2023). Socio-Economic Variables and Reduction of Environmental Social Violence in Boki Local Government Area of Cross River State, Nigeria. Journal of Continuing and Development Education, Volum 3(1), 2023|ISSN: 2714-3376.

Omang, T. N., Ojong, A. A., Anthony, G. B. and Kujoh, J. U. (2021). Tourism Education: A Veritable tool for Economic Development of Cross River State, Nigeria. Community Journal Vol. II, 26-40.

Onnoghen, U. N., Ojong, A. A., Omang, T. N., Obibessong, V. M., and Dr. Asor, L. J. (2020). Environmental Education: A Potent Tool for the Attainment of Sustainable Development Goals (Good Health & Wellbeing, Clean Water and Sanitation, Affordable and Clean Energy and Sustainable Cities and Communities) in South-South, Nigeria. PalArch's Journal of Archaeology of Egypt/Egyptology. PJAEE, 17(18).

Pakpour, A.H., Zeidi, I.M., Emamjomeh, M.M., Asefzadeh, S. and Pearson, H., (2014). Household waste behaviours among a community sample in Iran: An application of the theory of planned behaviour. Waste Management; 34(6): 980-986.

Sheehan B, (2000). Zero Waste, Recycling and Climate Change. Retrieved from: http://www.grrn .org/zero -waste-and-climate-change (Accessed July 20, 2023).

Smith, G. (2010). Sustainability and schools education for interconnection, adaptability education 1, (10) 67-80.

Sridhar, M. K. C (1996). Women in Waste Management. A Seminar Paper Sponsored by LHHP and the British Council on Educating Women for Sustainable Environmental Management, Owerri, Nigeria, March 5- 7.

Sridhar, M. K. C (2006). From urban wastes to sustainable waste management in Nigeria: A case study. In: MFA Ivbijaro, F Akintola, RU Okechukwu ((Eds.): Sustainable Environmental Management in Nigeria. Ibadan, Nigeria: Mattivi Productions, pp. 337-353.