

A call to strengthen eco-innovation using indigenous resources and waste products

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Abstract

Waste is often taken for granted, as a broad category, which encompasses materials we no longer need. Another category of waste would be local resources that we have hitherto not found use for. Although waste management has always existed, recent studies seem to suggest that waste management needs to be addressed principally in poorer countries, given that since the 1970s the ‘developed’ world has promoted techniques and policies to tackle waste (Jørgensen, 2013) and has also advanced innovative measures and practices often associated with green ideas and care for the environment. However, waste management associated with indigenous practices have long been in existence in Africa. For example, according to Solomon *et al.* (2016) the old use of ash and recycled material to make the soil fertile among indigenous groups in Liberia and Ghana, West Africa, has been ignored (Salim *et al.*, 2018).

The concept of innovation refers to a broad guiding principle that mobilizes science and technology in the service of the goals of national development. Today as a favourite concept eco-innovation is developing new ideas, promoting new operations, products, and processes to protect the environment, thus obtaining environmental sustainability. Worldwide, eco-innovation is one of the leading strategies to promote resource and energy efficiency and create a low carbon society.

Some of the articles published in this regular edition support the eco-innovation principle, which imagines resources with a life cycle perspective, they consider all phases of the product life cycle, from the extraction of raw materials through material processing, manufacturing, distribution, use, repair and maintenance to disposal or re-use. From the outcome of the publications in this edition, it is recommended that eco-innovative research should be fostered through strategic investment in exploiting local resources and waste products for home grown solutions to sustainable development challenges. This provides opportunities to improve resource management and ensure the reuse of waste or prevent waste by developing indigenous resources.

Keywords: *Eco-innovation, waste management, indigenous resources, sustainable development*

INTRODUCTION

The term home- grown or indigenous is used to describe a type of innovation. “Indigenous innovation” refers to “genuinely original innovation; integrated innovation, the fusing together of existing technology in new ways, and ‘re-innovation,’ which involves the assimilation and improvement of imported technology” signifying an approach to science inspired by a nationalist drive for self-reliance (Cao, Suttmeier, and Simon 2006). Indigenous innovation was adopted in an

attempt to shift China from manufacturing to a knowledge economy and in the process develop its own intellectual property and technical standards (Lazonick, Zhou, and Sun 2016). In concrete terms, these approaches in China have translated to investments in the material sciences, the physical sciences, agriculture, energy, the environment, and health, as well as reforms to Research and Development (Cao, Suttmeier, and Simon 2006).

In Nigeria, the value of local resources, including wastes, and in particular their purposive exploitation, is not fully determined. For example, considering the assumption that waste is a natural category, which we need to ‘dispose of’, the scholarship on waste management and its sustainability offers mainly problem-solving propositions (re-cycling, re-using, and reducing—or ‘*circular economy*’). The innovation which decreases the environmental damages and thereby ensures sustainability, including eco-products, eco-processes and eco-organizational factors is called eco-innovation. In recent times, this have evolved into the development of products and processes that contribute to sustainable development, thereby resulting in reduced emissions and wastes (*Ganapathy, et al., 2014*). Examples of eco-innovation are renewable energy sources, energy recovery from solid waste, waste usage for materials recovery, fertilizer production from wastewater, eco-products and several types of management systems.

INNOVATION TOWARD SUSTAINABLE DEVELOPMENT

The general definition of innovation is neutral concerning the content of change and open in all directions. In contrast, putting emphasis on innovation toward sustainable development is motivated by concern about the direction and content of progress. Thus, the additional attribute of innovations toward sustainability is that they reduce environmental burdens. The main classes of eco-innovation domains according to *Panapanaan, et al., 2014*, are:

- *Eco-construction*: Housing design, urban design, rehabilitation of sites.
- *Spatial planning and wellness*: Medicine development, food product quality improvement and increasing the quantity of green territories.
- *Energy*: Production, distribution, utilization of new types of fuel and energy efficiency improvement.
- *Clean technology*: Eco-friendly product design, production and distribution.
- *Pollution prevention and rehabilitation*: Life cycle assessment, controlling air, water and soil, noise minimization.

In this edition, researchers assessed the performance of waste polycarbonate as a bitumen modifier. Refining and commercializing the outcome of this finding will be beneficial both for improving the quality of bitumen for the purpose of roofing, road construction and other industrial benefits. But the outcome also serves as a valuable recycling strategy for waste polycarbonate. Another article evaluated the performance and emission characteristics of Baobab (*Adansonia digitata*) bio-lubricant in four stroke spark ignition engines, also innovation research towards sustainable development.

The article that determined the antiplasmodial effects of aqueous leaf extracts of *Senna alata* and *Dennettia tripetalla* in chloroquine-sensitive *Plasmodium berghei berghei* (NK65) infected mice falls into the category of research using indigenous natural resources to provide alternatives to malaria resistant medications. This is particularly important because Nigeria has been reported to have the highest number of malaria infections, accounting for nearly 31.9% of the entire global malaria burden. Another article provides an eco-innovative idea in the water pollution domain by looking at the efficiency of animal bones and neem leaves as adsorbents to remove cadmium ions from aqueous medium.

We, therefore, conclude that wastes or locally available resources could provide innovative solutions to sustainable development challenges. Local resources offer valuable and diverse opportunities for innovation, with the potential to extend and upgrade national development paths and operate as ingredients to enrich existing paths with additional functions and, thereby, make them more future-oriented. Investment in and commercialization of research, with innovative and promising findings, is hereby recommended.

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