

Technological Tools for Sustainable Development in Developing Countries: The Example of Africa, A Review

Solomon Omwoma^a, **Joseph O.Lalah***^b, Stephan Kueppers^c, Yawei Wang^d, Dieter Lenoire^e, Karl-Werner Schramme^e.

^a Jaramogi Oginga Odinga University of Science and Technology

^b **Department of Chemical Science and Technology, Technical University of Kenya,**

^c Forschungszentrum Juelich, Analytik (ZEA-3) Wilhelm-Johnen-Str, 52428 Jülich, Germany

^d State Key Laboratory of Environmental Chemistry and Ecotoxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences

^e Helmholtz Zentrum Muenchen, German National Research Centre for Environmental Health, Molecular EXposomics, Ingolstaedter Landstrasse 1, Neuherberg, Munich, Germany

Abstract

The development of Africa including industrialization such as chemical production, urbanization, agriculture, waste disposal, and electric power generation has a direct and diverse effect on the environment. These activities require effective planning, consultation, evaluation, risk assessment and monitoring techniques. Diverse environmental impacts can arise out of planning, construction, operation, and end-life of such activities. Impacts of global climate change, photochemical smog, and radioactive emissions have a direct link to development projects. Nevertheless, there is intensive research and innovation geared towards integrating development activities and the environment so as to achieve sustainable development. Herein, we review some of the technological innovation breakthroughs in various fields that include the built environment, chemical production, toxicants, municipal wastes, and electricity. The concept of sustainable chemistry is also discussed. It is found that Africa is at an advantage towards achieving sustainable development as it can easily adopt refined technological tools from developed countries. For instance, the use of comprehensive strategic environmental assessment tools for proposed policies plans and programs and environmental impact assessment for projects can see Africa achieve sustainable development. Mitigation measures for problems such as hazardous waste from chemical industries can be minimized using technological tools such as incineration of solid wastes, biological treatment of wastewater, batch and semi-batch conventional distillation, entrainer-based distillation, physical adsorption, and extraction etc. However, it is noted that although Africa should adopt some of these technological tools to help accelerate its sustainable development agenda, regional and cultural differences must be incorporated in the adoption process.

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