WATER, SANITATION AND HYGIENE FOR SUSTAINABLE DEVELOPMENT: THE NEED FOR INCLUSIVE BIOLOGY EDUCATION IN SECONDARY SCHOOLS

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Abstract

The Water, Sanitation, and Hygiene (WASH) burden is not small; WASH issues constitute the central content of Goal 6 of the Sustainable Development Goals- Clean Water and Sanitation for the world by the year 2030, which developing countries especially, sees as an ambitious target. The task of finding effective solution to the WASH burden in Nigeria is being compounded by the seeming neglect or ignorance about the significance of an inclusive, formal biology education in our secondary schools. Currently, biology in senior secondary schools in the country is restricted to only the science class as against the previous policy with a window of opportunity that allows all the students take biology. Biology content is a part of the curriculum that cannot be neglected if an efficient and effective solution is desired. Biology offers the right science strategy in achieving the vision of education for national development as far as WASH is concerned. This paper recommends a quick review of the exclusive status of the subject in our secondary schools.

Keywords: *water, sanitation, and hygiene; sustainable development; biology education*

Introduction

The Sustainable Development Goals (SDGs) stems from the Millennium Development Goals (MDGs) of the last decades past; set then, to usher in the 21st century. The SDGs are expansions and extensions of the global targets for human development, made to conserve, ensure continuity and consolidation of efforts already invested by countries to meet the MDGs which many countries including Nigeria, failed to achieve in many areas. Massive human and material efforts and investments went into the MDGs but results were not at the targeted rates. Water, Sanitation and Hygiene (WASH) is a key programme of the United Nations Children's Fund (UNICEF) in Nigeria and many developing countries which focus on making clean water available for the population while improving sanitation and hygiene status of the society (UNICEF, 2019a). This programme represents an important pathway to achieving Goal 6 of the United Nations (UN) Sustainable Development Goals (SDGs), which is Clean Water and Sanitation for the entire world population by the year 2030.

Concerns for a healthy WASH status for the population and society cannot be over emphasized. Water occupies 70% of the Earth. Water is life; it is an indispensable natural resource essential for life existence (Ajibade, Adewumi, Ojo and Oguntuase (2015). According to Roland (2019), water constitute an average of 60% of the

total body weight in humans, and about 70% of the weight of an average living cell, and this is apart from its importance in numerous human and industrial activities. Sanitation and hygiene equally touches directly on life and survival and cannot be separated from water availability. Human development and productivity greatly depends on healthy well-being, otherwise, that population cannot achieve.

The Water, Sanitation and Hygiene (WASH) Burden

The water, sanitation and hygiene challenge is a global concern but it has its base in developing countries across sub-Sahara Africa, Asia and Latin America, with Nigeria representing a significant portion of the global burden in many areas. UNICEF (2019b), reports that globally, about 790 million people lack clean water at home while 2 billion do not have toilet at home. According to Ajibade *et al*. (2015), sub-Saharan Africa with 63% mark has done little to pull the world from a 2011 global off-track position when compared to others like Latin America and Caribbean with 82% of the population having access to improved water sources.

In Nigeria, only 26.5% of the population has access to improved drinking water and sanitation facilities while 23.5% of the population actively practice open defecation (UNICEF, 2019a). UN (2015), reports that while there has been massive MDG-driven sanitation coverage in Eastern Asia with over 630 million pulled out of unsanitary conditions of open defecation, sub-Saharan Africa still rely heavily on open defecation, with Nigeria still ranked in the topmost positions. According to Ajibade *et al* (2015), Nigeria dropped from over 50% sanitation coverage in 1990 to 42% in 2015, with a projection of further drop to reach 40% in 2020. It is estimated that 67% of the population have basic water supply but with an uneven urban-rural access (Odume and Slaughter, 2018), while 130 million do not have access to basic sanitation (RTI, 2019).

A very important consequence of the state of water, sanitation and hygiene in Nigeria and sub-Saharan African is the under-5 mortality rate, which is one of the highest in the world. More than 100,000 children below 5 years die each year due to diarrhea with 90% of incidences directly linked to unsafe water sanitation (WaterAid 2019). The report further states that 1 in 4 children below 5 years exhibit severe stunting, while 1 in 10 are wasted, due to frequent episodes of diarrhea and other water, sanitation and hygiene related diseases.

Poor state of water, sanitation and hygiene is equally linked to low productivity due to absence from school or work as a result of WASH-related illness and/or taking care of a sick relative. Enrolment, attendance and poor education outcomes have equally been linked to time consuming activity of children who search for clean water for the home, usually from a far distance (Osakwe, 2015).

In Nigeria, government at the top and lower levels have made efforts at improving water, sanitation and hygiene status but all the shortcomings have yet stayed. There is the National Roadmap for zero open-defecation by 2025; Partnership for Expanded Water Supply and Sanitation (PEWASH); community-based WASH committees (WASHCOMs) for broad range local-level interventions among many others. Odume and Slaughter (2018) report that the lack of accessibile, reliable safe drinking water, along with poor sanitation and hygiene is estimated to be about $1.3 billion annually in access time, premature death, loss of productive time

and health care costs to Nigeria; and WaterAid (2019) reports a 1.3% of total GDP annual cost to Nigeria due to poor sanitation.

Nigeria aims to provide clean, safe, accessible water for every citizen but poor practice, regulation, legal and institutional frameworks is preventing this. According to Odume and Slaughter (2018), Nigeria adopts a control and command approach to water resources management, focusing on engineering and physical infrastructure and neglecting broad stakeholder and human dimensions of management including critical education and advocacy. This is in contrast to what in other countries such as European Commission Water Framework Directive and South African National Water Act which prescribes minimum availability of water for humans and to maintain and protect the ecosystem.

The Biology Education gap

The Sustainable Development Goal 6 of Clean Water and Sanitation is ambitious but attainable. Odume and Slaughter (2018) prescribes raising public awareness about the value of healthy WASH status as one of the recommendations to solve the challenge. A good proportion of the Nigerian population is below 18 but with poor knowledge on WASH, whereas a strategic approach that involves the active youths is vital for Nigeria to achieve the goal of reaching everyone with safe water and sanitation by 2030 (Yahaya 2019).

One sustainable way of achieving this is to take advantage of the potential of the school science curriculum, and Biology presents as the subject that is best relevant to educate and improve on current WASH status. However, the students, except science oriented students have passed through secondary schools in recent times without taking the subject. The secondary education policy that compels all students in the senior school to take at least one science subject and to sit for it in the final examinations have since been abolished and replaced with a new senior secondary education curricular (Orji, 2011).

Biology and Relevant WASH Content

The role of science and science education to national development cannot be over-emphasised, and this has been succinctly stated by the Federal Government of Nigeria (FGN) in the National Policy of Education (FGN, 2013). This policy underscored the vital role of science education in the development of a nation scientifically and technologically. It is widely and generally acknowledged that the gateway to the survival of a nation scientifically and technologically is a good minimal and individualistic scientific literacy, and this can only be achieved through science education. This scientific literacy and education has to involve the entire population to a good extent, not to exclude important groups such as secondary school students.

Over the years, biology has become the science subject of choice to all students throughout the 3-year duration of senior secondary education. Restricting the study of biology, a broad-based science with a content that has many immediate and life-long applications, to only science students will not complement efforts at achieving sustainable development in water, sanitation and hygiene. This is because many aspect of biology touch directly on relevant areas such as food and water, nutrition and digestive system, micro-organisms and disease, sanitation, hygiene, habitat, environment and ecosystems, water and other biogeochemical cycles, natural resources, habitat and population, pollution and natural resources protection.

The study of biology revolves around

living organisms in all of their entirety and diversity including the factors, both living and non-living, which influence and affect their functioning, survival and continued existence. The relevance of the study of biology includes answering fundamental questions about life, its diversity and the relationships between life forms. Also, biology helps us to provide answers to large scale problems such as food shortages, pollution and other many environmental issues. (Bioexplorer, 2018). According to the National Examination Council, NECO, (2004), objectives of the study of biology include the following which are directly relevant to water, sanitation and hygiene:

- Appreciation of nature and the needs to conserve it;
- Acquisition of acceptable scientific attitudes for solving problems; and
- Ability to apply knowledge of biology to everyday life in matters of personal, social, economic, environmental and community health.

When a society has water challenges, already imbibed biological ideas can help the population to develop or enhance efficient and long-lasting methods for water usage and conservation. For evident problems such as pollution and unsanitary conditions, the knowledge of biology can assist solutions such as recycling, composting and biodegradation to eradicate such environmental issue in the society. Furthermore, biology lays explains how human population have become a primary factor of the degradation and depletion of the Earth and its natural resources, while also giving hope and proffering mitigation and/or solution to the various deleterious anthropogenic activities. More importantly, the significance of biology can be the key to the formation of a healthy biosphere where all living things and non-living things have a balanced interaction.

Conclusion

The tuning down of the study of science and discontinuation of the exposure of a critical mass of senior secondary school students to the study of biology is a deficiency in the new senior secondary education policy and it is a step that will increase water, sanitation and hygiene burden in the country. This is because the policy limits or completely eliminates that potential of complementary efforts due from an informed populace in meeting WASH and the SDGs Goal 6 targets. The country will be losing out on the immeasurable results of the synergy of biology education and relevant public education and advocacy in improving and meeting the country's WASH targets. Having a sizeable proportion of the population, especially in the young, active and productive age-group, with in-built, formal education in relevant areas of water, sanitation and hygiene will help the effectiveness and efficiency with which the targets are met.

Recommendations

This work recommends that in order to meet the national water, sanitation and hygiene target, and also the SDGs Goal 6 target, government and other relevant agencies should review the new and current senior school education policy. There should be a reversal of the current restriction of the study of biology, to include non-science and all students, as an indication of all-inclusive science education for national and sustainable development. Also, it is recommended that teachers, researchers, and other stakeholders in the field of biology should make representations to government on the desirability of having biology studied by all students in secondary schools, and its implications to national development.

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