

April 2011

Appropriate Technology for Water Supply, Sanitation in Developing Countries.



The Use of Appropriate
Technology for Water Supply
and Sanitation in Nigeria
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INTRODUCTION

The term appropriate technology may have different meaning depending first on the context for which purpose the technology is intended for and secondly, in or for which region the technology would be or being used.

Appropriate technology can therefore be said to be a technology designed with particular concerns given to the environmental characteristics of a given region, the ethical tenets, cultural background of a people or community, social hierarchy and composition, political stability and instability, and economic aspects of the community/country. For the purpose of this lecture, our main focus would be on the appropriate technologies which are suitable and adaptable to improve water supply and sanitation in developing countries.

Since the last 4 decades, the term appropriate technology could be said to have taken the center stage when taking/making decisions for which kind of technology would be suitable to meet the needs of communities. Put differently, the term appropriate technology has become a popular phrase when considering the factors which influences the selection of technology for rural or semi-urban water supply and sanitation. In general, the term is being used in two arenas: utilizing the most effective technology to address the needs of developing areas, and using socially and environmentally acceptable technologies in industrialized nations.

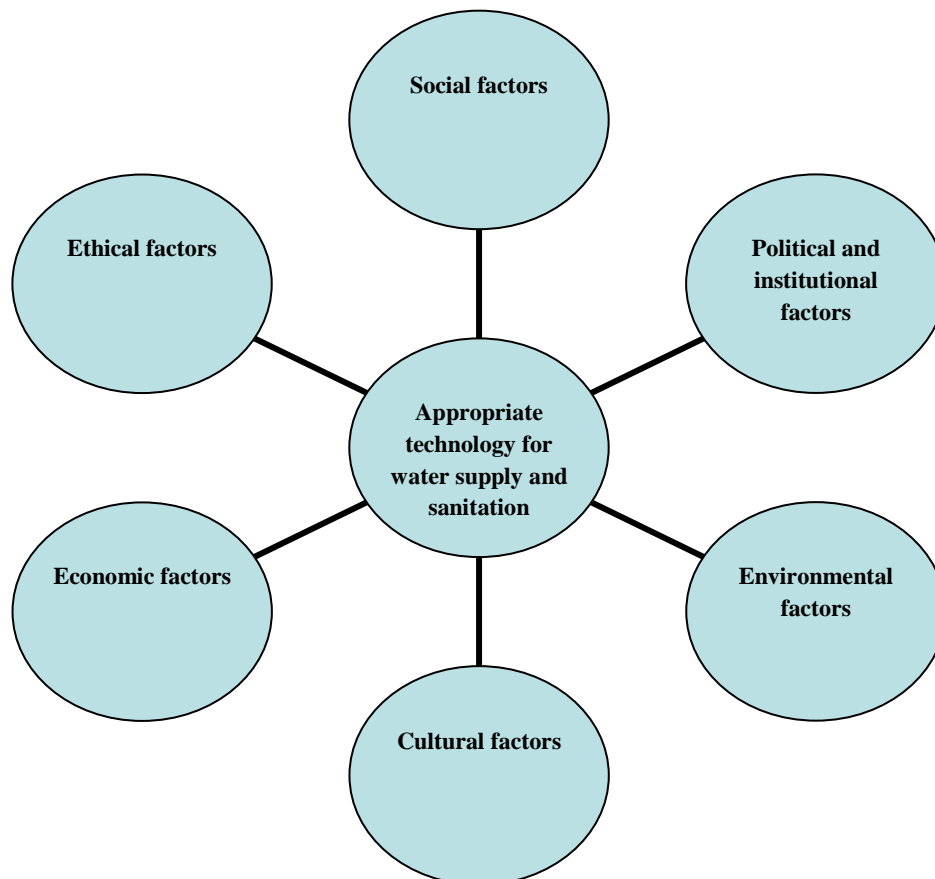
The goals of appropriate technologies for water supply and sanitation in most developing countries can be summarized into the two categories which are first, to make use of locally available technologies and skills that require fewer resources and are easier to maintain and have less impact on the environment while giving due consideration to cost and quality of production as compared to techniques from mainstream technologies. However, it would be noteworthy to state here that, there exist the possibilities that in some regions in developing countries (and in developed countries), the available technologies and materials needed to meet the water supply and sanitation would not be able to satisfy the original goal of providing portable drinking water and proper sanitation. Hence what would be necessary is upgrading local technologies and modifying them in a way that these local technologies would same efficiency as those of mainstream technologies from developed countries.

Secondly, the goal of using appropriate technology for water supply and sanitation in developing countries is to ensure that the technological skills available within and around a given region employs the simplest level of technology in order to provide access to portable drinking water sources and proper sanitation while understanding the need for simple but effective operation and maintenance of the technologies.

INFLUENCING FACTORS FOR THE SELECTION OF APPROPRIATE TECHNOLOGIES

The selection of appropriate technologies for water supply and sanitation differs from country to country and from region to region (even within same country). For developed and developing countries, it can be said that apart from the economic factors which seemed to be outstanding, there are some other underlying factors which influences the selection of appropriate technologies. These other underlying factors include political/institutional factors, environmental factors, ethical factors, cultural factors and social factors.

Influencing factors for the selection of appropriate technology for water supply and sanitation



In a culturally and politically diversified country like Nigeria in western Africa, all of the above mentioned factors are very crucial and given same priorities when selecting an appropriate technology for water supply and sanitation. Nigeria is country with over 150 million inhabitants comprising of over 250 ethnic groups with more than 300 languages and dialects with 52% of the population Muslim, 40% Christians and 8% are of other beliefs. Water supply and sanitation requirements by the inhabitants are chiefly based on the religion, social life style, occupation/income level, and geographical region of the country.

According to the UNDP Human Development Report (2006), Nigeria is rated 159th out of 177 countries in the Human Development Index. The Gross Domestic Product per capita is \$1,154; Gross National Income is \$1,160 and when adjusted by Purchasing Power Parity it is \$1,940 (World Bank, 2009). In Nigeria, the Gini Coefficient¹ is 43.7 (based on a 2003 evaluation) with a life expectancy level at 43.4 years and adult literacy level of 67%. According to the UNICEF's Report Card on Water and Sanitation (2006), 48% of Nigeria's populations who live in urban and semi-urban areas have access to improved drinking water sources and sanitation.

The Federal Ministry of Water Resources and the National Bureau of Statistics (NBS) however estimated that, out of the estimated 48% of the total population living in urban and semi-urban areas less than 53% have reliable access to improved water supply in 2006. Of the estimated 52% population living in rural areas, only 30% have access to a reliable water supply which implies that 70% of the rural population do not have adequate water supply.

Nigeria has abundant water resources that are unevenly distributed all over the country. Christopher et al. (2002) estimated that Nigeria has about 50 million trillion l/year of groundwater and Hanidu (1990) estimated that Nigeria has about 224 trillion l/year of surface water for a population of over 140 million. With this seemly richness in water resources, the access to good portable drinking water and proper sanitation are limited due to 4 main factors which are political/institutional arrangements; economic factors (occupation and income levels), socio-cultural factors and settlement patterns.

¹ The Gini coefficient is an inequality indicator that measures the inequality of income distribution within a country.

On the one hand, due to weak legal framework and policies coupled with little or no regulatory strategies to providing water supply and sanitation by the government, there seemed to a no regulatory framework that enforces the use of appropriate technology for water supply. On the other hand, the low level of income and subsistence occupation and the overall local economy of most rural and semi-urban communities in Nigeria, determines the selection and use of available technologies that are considered appropriate to meet their needs. In addition, the settlement patterns which are entirely different from those in developed countries also contribute to the reasons why the use of borehole water supply systems are employed and constructed using appropriate technologies and skills.

BEST AVAILABLE TECHNOLOGIES AND BEST ENVIRONMENTAL PRACTICES (BATS, BETS)

The overall goal when choosing an appropriate technology for water supply and sanitation in developing countries is to ensure that while making use of upgraded and adaptable technologies that are available in any given region, much emphasis are given to the protection of water sources, hence enforcing suitable environmental and resource management principles even in the local level. However, the BATs and BETs of developing countries are quite different from those of developed countries mainly because of the socio-cultural and economic realities of developed countries and developed countries are different. It can be said that while in most developed countries, BATs and BETs are given much emphases; the situations in developing countries are mainly focused on daily subsistence and as such technologies that are perceived to be suitable for water supply and sanitation in developed countries may not be economical and socially suitable and acceptable for developing countries while considering their GDP, GNP and other socio-economic indicators.

SUMMARY

When planning for an appropriate technology for water supply and sanitation in developing countries, there is no “*one-size fit all approach*” since the economic and socio-cultural realities of developing countries are very different when compared to those of developed countries. However, despite the economic inequalities and socio-cultural differences, the overall goal of

appropriate technologies for water supply and sanitation for developing countries are to provide portable drinking water that cheap and affordable, accessible with reliable availability. The principles of sustainability which seek to ensure the protection and management of water resources should be given much consideration.

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