A assessing the feasibility of different techniques for providing fresh water rep...

Technology, Development

Abstract

Access and availability of portable water supplies in arid and semi-arid areas of the world is quickly becoming a large problem. Notably, these semi-arid and arid regions only have the least amount of annual precipitation and account for 2% of the entire global runoff. Water is and will always be the most important resource in the world. This report will investigate the feasibility of different techniques for providing fresh water in the arid and semi arid regions of Liberia.

Introduction

The United Nations Committee on Economic, Social and Cultural Rights regard water as a universal human right. In many parts of the world, drought has become an increasingly important problem, covering 1/3 of the surface of earth. It is for this reason that a water program be launched in arid and water scarce areas in Africa that seeks to develop a prospective management of water resources to safeguard water scarce regions in Liberia that are fragile. Arguably, water shortage is the major obstacle to socioeconomic development in Liberia. Ideally, the fundamental ideology for the allocation of water resources are; sustainable, effectiveness, and equity with the undertaking of giving the highest benefit to the society, economy and environment at the same time in order to maintain rational provision amid certain people and areas (Qadir, 2007, p. 114).

Economic development that is sustainable in arid and semi-arid areas relies pretty much on sustainable water resource management. In these arid and semi-arid areas, the coherent allocation of water resources requires a

multifaceted balance between supply and demand. It is for this reason that regional development planning needs to integrate economic objectives including issues such as; technology, historical and natural resource constraints. When these factors merge, they have a profound effect on economic structure, populace and a prototype of ecology and also the amount of water disseminated for all these purposes in Liberia’s arid and semi-arid areas. Regional community as well as ecological and economic dissimilarity obliges unique development strategies that are sustainable in region of water scarcity. Based on this finding, this report assesses the feasibility of various techniques for providing fresh water to arid regions of Liberia. Seemingly, 1. 6 million children under 5 years in this country die every year due to lack of drinking water.

Background

Located in a semi-arid zone in Africa, Liberia is among the thirty driest countries in the world with unevenly distributed limited water resources. In Liberia, approximately four million people do not have access to clean and safe drinking water and close to eight million people lack basic sanitation. Rapid urbanization, industrialization and population growth arid parts of Liberia are exercising rising pressure on water planners and water authorities to satisfy the growing demand of urban water. Ostensibly, accessing conventional sources of fresh water does not have any use, desalination of sea water in accumulation of tactical groundwater resources are the major water supply source for urban utilization. Urban and local water stress in the last two decades has considerably increased, owing to

faster development, industrialization, urbanization, and population growth in living standards.

Facts and Figures

With a soaring average growth rate of over 3. 5%, Liberia’s population in recent years amplified from about 17. 7 million in the 1970s to 32. 1 million in 1995. In 2025, it is predicted to reach 81. 25 million as the urban population is expected to rise from 65% in 1996 to above 82% in 2025. This particular curriculum has been created for advanced leakage control in domestic water networks. In addition, this curriculum has been integrated for treatment of waste water and use again for irrigation and industrial use. Laws and regulations in water management have been designed considering those to reduce water losses and demands. Seemingly, leakages that are uncontrolled add significantly to the formation of shallow water table contamination of deep and shallow aquifers (Finnveden, 2009, p. 12). Consequently, consequences in considerable turn down in water levels are caused by intense pumping from local aquifers to ensemble the growing demand of urban water in sizeable turn down in water levels. Consequently, this is deterioration in the quality of ground water. The demand is therefore trying to be fulfilled at adequately hefty rates of pumping which leads to a diminution of stream flow.

Ground Water Pumping through Water Privatization

Notably, water privatization was initiated by the Liberian government in 1990. It privatized eight public regional sewerage and water companies which have formally been public, in the capital city. In 1990, the Drinking

Water Inspectorate (DWI) was located specifically to check the quality and safety of water. Since then, water privatization has been a controversial issue in Liberia. Studies show that as investments reduced, tariff intensified in actual terms by 46% within the first eight years while operating profits are seen to have actually doubled in 8 years to about +141% and health was greatly endangered by cutoff for non-payments. On the other hand, privatization assisted in signing off the industry at $1. 2 billion debt.

Desalination

In order to turn seawater into drinking water, the initial large-scale desalination for both industrial and domestic use in Liberia opened 1n 2010. Facts and Figures: Capacities of the desalination plants vary from 900 to 600, 500 m3/day. To add on to that, the world Desalinated Water Production was about 37% of the industrial requirements, and approximately 32% of the industrial requirement and for the entire domestic requirements. Seemingly, by 2025, production of desalination is pretty much predicted to be around 52% of all industrial and domestic claims. Plans that are set by the RO need mechanical energy which is generated by pumps that work on electricity. Approximately 3. 6 – 10kWh is required to manufacture 1 m3 of desalinated sea water (Mor, 2006, p. 31). Arguably, the energy required largely depends on the level of salinity of the water input. It also depends on the process design and efficiency of pumps. A high level efficiency single stage plant required close to 4 kWh/m3 and 0. 4-2. 1 kWh/m3 in order to produce 1m3 of rational good quality water from salty groundwater and seawater. Usage of

low pressure membrane greatly reduces consumption of energy by 26-38% particularly when low-salinity water is used.

Dams

Essentially, dams are constructed to contain water, produce hydrometric power and to stop flooding in a particular area. Dams make water supply for domestic needs, irrigation and industrial application available. Funding is the most important resource for constructing a dam, in Liberia for instance; figures for constructing big dams speedily grew during the 19th century at around 180. As years passed, the growth rate nearly doubled and at a rate of 5. 3 dams per year, edifice positioned itself pretty well. Today Liberia has a sum of 245 dams and this number is gradually increasing.

Large Dams

There are 6 big reservoirs positioned in various provinces in Liberia. The biggest is 5423km2. Others are strategically positioned in areas where the community can get access to clean and sufficient water (Revenga, 2005, p. 212).

Environmental Issues

There a several environmental issues are raised due to the construction of reservoirs in both completion and majorly on building stages. After the dam is closed, the level of water in the reservoirs increase which results to major changes in the nation. In addition, the ground water table and flooded settlements are raised just like the loss of farmland. Once the construction of

the reservoir is done to environmental problems emerge; (Abellán, 2005, p. 71).

Disadvantages

- If the reservoir has inappropriately been constructed, toxic and Algae substances in them contaminate the drinking water.
- Ecological weakening of the river system is evoked especially downstream of these reservoirs.
- At the natural permanence of the river, big dams break off. Many ecological consequences such as leaving less spawning sites migratory fish emerge as reservoirs change the hydrological cycle. In addition to that, reservoirs clutch matter that suspends which decreases the weight of the suspended matter to reach downstream (Post, 2005, p. 111).

Conclusion

The cost of building dams is very high and it also gives rise to several environmental issues both on the positive and on the negative side. Water privatizing and water pumping in Liberia has raised numerous questions concerning environmental concerns and water level. Arguable, water desalination is the best option that ought to be taken by the government. The issue of water allocation can seemingly be limited to its regular supplies though the one time investments are quite high. The discussions above focus on fulfilling the demands of one or several methods. The average water use by customers and leaking pipes should be discontinued by fixing better promotion activities and more water meters in these areas so as to end this prevailing issue of water in the arid and semi-arid regions of Liberia.

References

Abellán, P., Sánchez-Fernández, D., Velasco, J., & Millán, A. (2005). Conservation of freshwater biodiversity: a comparison of different area selection methods. Biodiversity & Conservation, 14(14), 3457-3474.

Finnveden, G., Hauschild, M. Z., Ekvall, T., Guinee, J., Heijungs, R., Hellweg, S., & Suh, S. (2009). Recent developments in life cycle assessment. Journal of environmental management, 91(1), 1-21.

Mor, S., Ravindra, K., Dahiya, R. P., & Chandra, A. (2006). Leachate characterization and assessment of groundwater pollution near municipal solid waste landfill site. Environmental monitoring and assessment, 118(1-3), 435-456.

Post, V. E. A. (2005). Fresh and saline groundwater interaction in coastal aquifers: Is our technology ready for the problems ahead?. Hydrogeology Journal, 13(1), 120-123.

Qadir, M., Sharma, B. R., Bruggeman, A., Choukr-Allah, R., & Karajeh, F. (2007). Non-conventional water resources and opportunities for water augmentation to achieve food security in water scarce countries. agricultural water management, 87(1), 2-22.

Revenga, C., Campbell, I., Abell, R., De Villiers, P., & Bryer, M. (2005). Prospects for monitoring freshwater ecosystems towards the 2010 targets. Philosophical Transactions of the Royal Society B: Biological Sciences, 360(1454), 397-413.

Schuol, J., Abbaspour, K. C., Srinivasan, R., & Yang, H. (2008). Estimation of freshwater availability in the West African sub-continent using the SWAT hydrologic model. Journal of Hydrology, 352(1), 30-49.