

SUSTAINABLE WATERSHED MANAGEMENT FOR RURAL LIVELIHOODS IN NIGERIA

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Abstract

The quest for improved life and advancement in science and technology has made watershed easy targets for human over-exploitation. It is therefore necessary to ensure management of the watershed ecosystem for continuous provision of its goods and services. Watershed management encompasses the holistic approach to managing watershed resources that integrates forestry, agriculture, pasture and water management, which can be broadened to rural development with a strong link to the livelihoods of the local people. This paper reviewed factors responsible for degradation of watershed, management strategies that could be employed and its values to rural livelihood. Recommendations were made towards sustainable watershed management.

Keywords: Watershed, Management, Natural resources, Ecosystem, Utilization

Introduction

The basic human life-support systems of the biological environment have always been characterized by change. In recent times, watershed has become easy targets for human over-exploitation due to burgeoning human populations and the quest for improved life and advancement in science and technology. Watershed and forest ecosystem are therefore being exploited at much faster rates than ever before with negative implications for sustainable human livelihood (Turner *et. al.*, 1990).

Watershed can be defined as an area of land from which surface and subsurface water drains downhill into the river, lake, wetland, sea or ocean. It is also an area of land that drains down slope until a common point is reached housing diversity of vegetation along the course of the flow as a form of protection to the soil and other factor aiding continuous flow. As water flows downhill in small to progressively larger streams and rivers, it moves over land and provides water for urban, agricultural, and environmental needs. The watershed community is made up of everyone who lives there plus all other animal and plant life. The community of humans, plants and animals depends on the watershed and influence it in some ways (Matthew, 2008).

Watershed have been historically considered “wastelands” (Ryan and Ntiamoa-Baidu, 2000) and, therefore, subjected to degradation through dredging, flooding, filling and excavation for various agricultural and industrial uses. Its ecosystems are being collapsed due to human activities and results in threatening of watershed ecology. In many cases,

local population growth has played a primary role in this process. For instance, increase in population has led to upland forest being cleared and turned into agricultural or grazing land. This eventually resulted in increased upstream erosion and downstream sedimentation due to loss of forest cover. Because of these changes, many watersheds are losing their capacity to regulate runoff, upland soil has become more arid and lowland areas are being exposed to seasonal flooding (Ryan and Ntiamoa-Baidu, 2000). In recent times, however, the attraction and value of watershed as important wildlife habitats, provision of fin and shell fish, salt, thatch, wood, etc. (Ryan and Ntiamoa-Baidu, 2000) have been increasingly recognized. Watershed is especially important as nutrient-rich habitats for fish spawning and nursery (Ntiamoa-Baidu and Gordon, 1991). Its conservation can therefore be achieved by protecting the present forest cover of the aquatic environment from anthropogenic disturbance.

According to National Bureau of Statistics (2009), at least 27% Nigerians depended absolutely on streams, ponds, river and rainwater for their drinking water source. Research has shown high prevalence of waterborne diseases such as cholera, diarrhoea, dysentery, hepatitis etc. among Nigerians (Oguntoke *et al.*, 2009; Raji and Ibrahim, 2011). The need for watershed management is paramount to safeguard the public health and also to protect the water resources in Nigeria. Nigeria has abundant water resources covering an enormous and diverse landscape, although they are unevenly distributed over the country (WHO/UNEP, 1997). The four major drainage systems in the Nigeria are:

- The Niger watershed with its major tributaries of Benue, Sokoto- Rima, Kaduna, Gongola, Katsina-Ala, Donga, Tarabe, Hawal and Anambara Rivers.
- The Lake Chad watershed comprising the Kano, Hadejia, Jama'are Misau, Komadougou-Yobe, Yedoseram and Ebeji Rivers.
- The Atlantic watershed (east of the Niger) comprising the Cross, Imo, Qua Iboe and Kwa Rivers.
- The Atlantic watershed (west of Niger) made up of the Ogun, Oshun, Owena and Benin Rivers.

Apart from the Lake Chad watershed, the remaining three drainage systems terminate in the Atlantic Ocean with an extensive network of delta channels (WHO/UNEP, 1997). Having recognized the importance of watersheds on livelihoods and influence of anthropogenic activities on them, several efforts have been put in place by Nigerian government to safeguard the water resources of the nation through periodic monitoring. Among these efforts was establishment of The Federal Environmental Protection Agency (FEPA) which some of its responsibilities were to regulate discharge of effluences from industries and protect environment from other sources of pollution (Ekiye and Zejjiao, 2010). Watershed and water quality degradation had been found most severe in Lagos, Rivers, Kano and Kaduna where most of the country's industries are located (Ekiye and

Zejjiao, 2010) with subsequent effects on public health and economic development (Ajibade, 2004, Adewolu *et al.*, 2009). Therefore, it was necessitated that watershed management should be ensured to enhance sustainable livelihood.

Watershed management encompasses the holistic approach to managing watershed resources that integrates forestry, agriculture, pasture and water management, which can be broadened to rural development with a strong link to the livelihoods of the local people (Moffatt *et al.*, 2004).

Livelihood is defined as adequate stocks and flows of food and cash to meet basic needs while security refers to secured ownership of or access to resources and incoming earnings, activities, including reserve and assets to offset risks, ease shocks and meet contingencies (Matthew, 2008). Sustainability refers to the maintenance or enhancement of resources' productivity on a long term basis. A household may be enabled to gain a sustainable livelihood security in many ways through management of watershed for production of arable crops, pasture, tree crops, fishes with adequate income as a result of stable employment (Matthew, 2008). This paper therefore reviewed importance of management of watershed on sustainable livelihood, the menace of indiscriminate human activities and the way out.

The Role of Watershed Management.

In lieu of support of watershed to sustainable livelihood, its management is essential in order to:

- increase the availability of water resources and promote their rational utilization, including environmental and socio-economic assessment of water resources.
- prevent soil erosion and improve soil fertility.
- maintain and improve vegetative cover and nutritive value of pasture land through sound management of livestock; restore denuded landscapes, balance regeneration of wood biomass with off take, establish sustained yield management for hardwoods.
- work towards food security preparedness scheme, combining irrigated agriculture, food processing, preservation and storage.
- maintain and improve the protection of biological diversity.
- collect the disappearing cultivars for farmers and agroforestry practices.
- protect the unique ecosystems and species of special concern (Matthew, 2008; Ekiye and Zejjiao, 2010).

Implications of Unsustainable Anthropogenic activities on watershed

Unsustainable human activities on watershed will lead to the following:

1. The diminishing water resources in the watershed will compound the problem of water security or scarcity.
2. The shrinking of the lake water will pose the biggest single threat to food security, leading to the exacerbation of poverty.
3. It will intensify the rate of migration and cross border movement with the basin which will heighten resource and identity conflict in the region and even beyond.
4. Flooding.
5. Extinction of biological species.
6. It leads to soil and water erosion.
7. Impaired air quality.
8. There will be increase in temperature.
9. Farm lands become impoverished reducing yield and production
10. Over used of ground water (Ekiye and Zejiao, 2010; Ajibade, 2004, Adewolu *et al.*, 2009 Moffatt *et al.*, 2004).

Conclusion

Degradation of watershed in Nigeria reflects improper management of the physical environment. The degradation occurs as a result of over exploitation, industrialization and urban development. Understanding the condition of watersheds is critical if Nigeria is to develop effective plans to maintain, manage, and restore them. The management and restoration of watershed are important so as to ensure sustainable livelihood. Management of watershed in consonance with increasing population of Nigerians cannot be over emphasized. Without proper management, water supply, agricultural practices, recreational and industrial activities will suffer. Therefore, watershed management is highly essential and must be put in place by all Federal and State Agencies concerned.

Recommendations

In order to enhance sustainable watershed management for rural livelihoods, protection, enhancement and rehabilitation of water resources through watershed establishment and management of the forest/water basin under the sustained yield principles must be ensured. This must be accompanied with orientation of people living in the watershed on the need to adopt tree planting culture through extension services.

Sustainable urban and agricultural irrigation practices in addition to agroforestry in watershed must be encouraged, with more efforts on increasing the number of browse plants along the water course and development of an action plan for establishment of range land where there will be controlled grazing of livestock.

References

- Adewolu, M. A., Akintola, S. L., Jimoh, A. A., Owodehinde, F. G., Whenu, O. O. and Fakoya, K. A. 2009. Environmental Threats to the Development of Aquaculture in Lagos State, Nigeria. *European Journal of Scientific Research*, Vol. 34, No 3, pp. 337-347.
- Ajibade, L.T. 2004. Assessment of Water Quality Near River Asa, Ilorin, Nigeria. *The Environmentalist*, Vol. 24, No 1: 11-18.
- Ekiye, E. and Zejiao, L. 2010. Water Quality Monitoring in Nigeria; Case Study of Nigeria's Industrial Cities. *Journal of American Science*, Vol. 6, No. 4: 22-28.
- Matthew C. 2008. Indicators for Assessing Environmental Performance of Watersheds in Southern Alberta. (<http://www.gov.ab.ca/env/protenf/publications/SurfWtrQual>). Accessed on 12th day of April, 2014.
- Moffatt, S., McLachlan, S., and Kenkel, N. 2004. Impacts of land Use on Riparian Forest along an Urban - Rural Gradient in Southern Manitoba. *Plant Ecology*, 174: 119-135.
- National Bureau of Statistics 2009. Social Statistics in Nigeria. 399 p. http://www.nigerianstat.gov.ng/ext/latest_release/ssd09.pdf. Accessed: 10/10/2011.
- Ntiamoa-Baidu, Y and Gordon, C. 1991. Coastal Wetlands Management Plans: Ghana. Environmental Protection Council and World Bank. *Ghana Environmental Resource Management Project (GERMP) Report*, Accra, p. 89.
- Oguntoke, O., Aboderin, O. J, Bankole, A. M. 2009. Association of Water-borne Diseases Morbidity Pattern and Water Quality in Parts of Ibadan City, Nigeria. *Tanzania Journal of Health Research*, Vol. 11, No. 4, 2009: 189-195.
- Raji, M. I. O. and Ibrahim Y. K. E. 2011. Prevalence of Waterborne Infections in Northwest Nigeria: A Retrospective Study. *Journal of Public Health and Epidemiology*, Vol. 3, No. 8: 382-385.
- Ryan J. M. and Ntiamoa-Baidu Y. 2000. Biodiversity and Ecology of Coastal Wetlands in Ghana. *Biodiv. Conserv.* 9: 445-446.
- Turner B. L., Clark W. C., Kates R. W., Richards J. F., Matthews J. T. and Meyers W. B (ed.) 1990.: *The Earth as Ttransformed by Human Action*. Cambridge University Press, Cambridge, p. 61.
- WHO/UNEP 1997. Water Pollution Control - A Guide to the Use of Water Quality Management Principles. In: Helmer, R. and Hespanhol, I. (eds). United Nations Environment Programme, the Water Supply & Sanitation Collaborative Council and the World Health Organization. http://www.who.int/water_sanitation_health/resourcesquality/wpcasestudy4.p df.