International Journal in Management and Social Science
Volume 6 Issue 04, April 2018 ISSN: 2321-1784 Impact Factor: 6.178
Journal Homepage: http://ijmr.net.in, Email: irjmss@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal

DEALING WITH THE PROBLEM OF HUNGER AND POVERTY ALLEVIATION BY SUSTAINABLE MANAGEMENT OF WATER RESOURCE SYSTEMS IN NIGERIA

CHUKWU, KEVIN EJIKE Ph.D.
Department of Geography and Meteorology,
Faculty of Environmental Sciences
Enugu State University of Science and Technology (ESUT), Enugu State

ABSTRACT
The paper examined the nature of poverty in Nigeria and the case for sustainable management of water resource systems as a suitable strategy to fighting poverty and hunger. The last century has been a period of unprecedented development, yet more than 40 million Nigerians continue to be trapped in absolute poverty and hunger beneath human decency. Present efforts to eliminate them are inadequate. Some hurdles against poverty alleviation in Nigeria are the willful component of choice by politicians, selfishness and ignorance. Poverty alleviation became a worldwide issue since 1950 and has been marked by three phases which were beset by inappropriate technical provisions, the impact of climate change and rapid land use reform. Hence predictions show that hunger and poverty will afflict many more Nigerians by the years 2025, if there are no positive changes in water resource system management to increase agricultural productivity. As degenerating land is becoming unproductive, it must be made more productive by sustainable management of water resource systems particularly in the sudan-sahel regions of Nigeria. Irrespective of adverse impact of climate change, if investments were channeled towards rain fed agriculture, reliable irrigation and effective soil moisture conservation, sufficient crops could be produced to deal with the problem of hunger and poverty in Nigeria.

Keywords: Hunger, Poverty alleviation, Water resource, Sudan-sahel, Nigeria

1. Introduction

Many have defined poverty variously. For instance, NEST (1991) defined poverty as "a situation and process of serious deprivation or lack of resources and materials necessary for living within a minimum standard conducive to human dignity and well being". Todaro (1997) has observed that in an absolute sense, poverty is "a condition which afflicts farm families whose output and income cannot produce some minimum standard of life". The more widespread the low uncertain farm incomes, the greater will be the grip of 'vicious circle of poverty', which characterize many developing countries today including Nigeria. Low income will not only render the farmer incapable but also unwiling to introduce new ideas and new methods to his farm to adapt to and cope with the changing climatic trend and so poverty and hunger perpetuate (Ogboi, 2003; Ajadike, 2003; Madu, 2003; Ezemonye and Emeribe, 2015).

Current food crop yield - forecasting models based on statistical analogues take the output of changing climate forecast models as their input (ECMWD, 2005). This implies that atmospheric, soil and surface water values must also be transferred between the food crop modeling system and the land surface scheme utilized in the land data assimilation system (LDAS) (ECWMF, 2005). However, the soil water levels for crop yield can be ameliorated or altered by appropriate local irrigation practice. A study of this type is therefore required to explain how sustainable water resource system management can be utilized for increasing agricultural productivity as a veritable tool in fighting hunger and alleviating the poverty levels in Nigeria today.

Previous workers have discovered Poverty has overwhelming negative effects on the economic advancement of any nation. Two groups of factors, which bring about poverty, are environmental (especially changing climate condition) and social factors (Okafor, 2000; Uche, 2000). The environmental component consists of the seldom natural environmental disasters such as earthquakes, volcanic eruptions, epidemics while the changing climate feud includes drought effects and desertification, flood losses, increasing temperatures, green house gases (GHG) and global warming. On The other hand, the social factors include social injustice (Chambers, 1998; Moshood, 2007) terrorism, kidnapping war and civil disturbances (Ugochukwu, 20011)

The most suitable approach to tackle this ugly impact of poverty on the Nigerian economy is the adoption of sustainable development of water resource system. This is because it is based on three issues of environmental protection, adaptation to climate change and sustainable economic development (WCED, 1987; NEST, 1991, Offodile, 2003). WCED (1987) wrote.

"Sustainable development seeks to meet the needs and aspiration of the present without compromising the ability of those of the future. It is a process in which the exploitation of resources, the direction of investment, the orientation of technological developments and institutional change are all in harmony and enhance both current and future environmental potential to meet human needs and aspirations". This problem informs the thrust and objectives of this paper in order to close the gap in literature.

2. Objectives

The specific objectives of the paper are designed to:

(i) examine the nature of poverty in Nigeria and the problems of various phases of poverty alleviation

(ii) Highlight the national policy on water resource systems development versus hunger and poverty.

(iii) investigate the role of sustainable management of our water resources as an appropriate strategy in adapting to adverse impact of climate change and alleviating the problems of poverty and hunger

3. The Nature and Indices of Poverty in Nigeria

The last century in Nigeria has been a period of unprecedented changes and progress in the areas of information and computer technology, economic, and industrial development (PSN, 2007) In spite of this remarkable record, at least some 60 million Nigerians continue to be trapped in what Uche (2000) Phil-Eze (2003) and Ogboi (2003a,b) described as "absolute poverty". This is a condition of existence so characterized by hunger, malnutrition, illiteracy, disease, squalid surroundings, high infant mortality and low life expectancy as to be beneath any sound definition of human decency. (Adelodum, 2007; Moshood, 2007 and PSN, 2007).

The extremes of rural poverty in Nigeria today are an outrage because avoidable deprivation, unemployment, hunger, sufferings and death coexist with affluence (World Bank, 1996; Okafor, 2000; Ogboi, 2003b; Phil-Eze, 2003

Generally, the eight indicators of poverty in Nigeria today can be outlined as (Uche, 2000; Ogboi, 2003a; 2003b):

(i) Hunger, malnutrition and disease

(ii) Lack of financial resources and basic necessities of life such as food, water and clothing

(iii) Environmental degradation and over exploitation of natural resources such as deforestation, over grazing and over fishing,

(iv) Illiteracy and inadequacy of schools in both quantity and quality

(v) Labour intensive technology and low technological base

(vi) Urban slum and housing congestion.

(vii) Political instability, terrorism, kidnapping and frequent social unrest

(viii) Vicious circle of poverty

Poverty according to World Bank (1999), is hunger, lack of shelter, to be sick and not able to go to school, not knowing how to read, not being able to speak properly, not having a job, fear for the future, losing a child to illness brought about by unclean water, powerlessness, lack of representation and freedom.

On measurement of poverty, Ravalion (1998), Osowole and Bamiduro (2013) observed that the most frequently favoured measurement indices are:

i. The head count poverty index given by the percentage of the population that live in the household with a consumption per capita less than the poverty line.
ii. Poverty gap index which reflects the depth of poverty by taking into consideration how far the average poor person's income is from the poverty line.
iii. The distributionally sensitive measure of squared poverty gap defined as the mean of the squared proportionate poverty gap which reflects the severity of poverty.

The three poverty indices outlined above are generally known as Foster-Grear-Thobeeke (FGT) poverty index. This is denoted in a formula as:

$$P_a = \frac{1}{N}\sum_{J=I}^{N}\left(\frac{z - y_j}{z}\right)^{\alpha} \quad I\,(y_j \leq z)$$

Where: Z is the poverty line Y_j is the per capita expenditure for household j, α is the total number of households $1(y \leq z)$ is an indicator function such that

$$I\,(y \leq Z) = \left\{\begin{array}{l} 1 \text{ if } y \leq z \\ 0 \text{ if } y > z \end{array}\right\}$$

The index becomes head count index (HCI) when a=o; poverty gap index (PGI) when a=I and square poverty gap index (SPG) when α=2 in that order (Osowole and Bamoduro, 2013)

Indeed, the incidence of poverty increased from 27.2 percent in I960 to 656 percent by 2000 representing over 67 million Nigerians (Said, 2001, Ajadike, 2003).

The World Bank Atlas report (2000) ranked Nigeria as the 1st poorest country in the world with a GNP of about $300 .00 US (per capita per annum).These poor Nigerians include (apart from the rural dwellers, unemployed University graduates, irrationally disengaged civil servants, women and the like who are so poor and misery that Federal government programs and efforts-such as poverty eradication program (PEP) and poverty alleviation program (PAP) designed to eliminate them are inadequate (Phil-Eze, 2003, Moshood, 2007)

It is usually argued particularly in the southern parts of Nigeria (with the possible exception of the few oil producing states) that the poorer, rural people and the unemployed graduates should help themselves. Unfortunately they often cannot do this being trapped in their unfortunate conditions and environments (Akpan-nso 2001, Ugochukwu, 2001, Adelodum, 2007).

The capacity, in reforming them better to assist themselves, lies with wealthy "outsiders" who have more political power, connections and resources.

The wonder is that this class of outsiders does not help much. They live in a country where millions of their fellow Nigerians cry daily of avoidable deaths, hunger and pain (Moshood, 2007) and where school leavers and university graduates suffer from frictional unemployment conditions and deprivation and yet for the most part these influential outsiders do little to solve such socio-economic problems (World Bank 1996).

4. Problems of Poverty Alleviation in Nigeria

Many problems create hurdles on the process of poverty alleviation in Nigeria, apart from the obvious problem of financial mismanagement elaborated elsewhere (World Bank, 1996; Uche, 2000).

(i) **Geographical Distance**: - One factor is simply the geographical distance separating the politicians, decision makers, water resources and rural developers outside from the poor rural masses in remote villages of different parts of the country, out of sight, sound, and mind. Hence Chambers (1998] has noted that time, energy, money, imagination and compassion are finite. Politicians, developers and decision makers deal first with what confronts them. Rural poverty is remote. It is even remote most of the time for politicians who are working “in their field” but who are urban-based like those in the Federal, regional and state government headquarters.

(ii) **The Element of Choice**: - Politicians and outsiders select what to do- - - where to go and develop, what project or program to consider and even whom or which community to visit and see. The politicians have their own interests and preferences and preconceptions. In reality they can make up and advance rationalizations and defences for excluding the most discordant, distressful and poorest individual or community from benefiting from a useful scheme, project or program.

(iii) **Selfishness: -** In Nigerian situation, putting one's family first before public interest seems normal and nice and a quick resort to such proverbs as 'Charity begins at home" is a great let

out (Chambers,1998). Disillusion with development failures such as river basin developments, water supply schemes and irrigation projects in some communities, as well as cynicism about where the fund goes' are flimsy reasons they usually advance for not taking any remedial action.

(iv) **Ignorance**:-Politicians and decision makers are often ignorant about the nature and seasonal climate dimension of rural poverty and hunger in Nigeria. But unfortunately, they often make little or no effort to discover what they do not know about this dubious environmental and social reward. This explains why Chambers (1998) observed that the less they have of direct and discordant contact of the rural poor, the less they know; hence the easier it is for myth to mask reality. For instance, the national poverty alleviation program (PAP) of Obasanjo's regime largely missed the targeted population (Phil-Eze, 2003). The beneficiaries were mainly political party supporters. Consequently majority of the unemployed school leavers and university graduates with apprenticeship of over 10 years could not even be given the PAP application forms.

(v) **Comforting Misleading Beliefs**:- Politicians and decision makers who are outsiders concerned with water resources and rural development and poverty eradication programs, require and enjoy comforting beliefs such as those enumerated by Moshood (2007), viz:

- Poverty and rural deprivation are not so bad
- Their prosperity is not based on their deprivation.
- They are lazy and improvident and have brought poverty on themselves,
- The poorer people are used to poverty and they like their life that way

Politicians and decision makers in Nigeria should therefore analyze the ways they learn, think, feel and act to discover how these might be changed to truly alleviate the sufferings of hungrier, poorer and more deprived rural masses particularly in remote areas of degenerating and unproductive farmland mainly caused by the global climate change and bad cultural activity (Luzan, *et al*; 2000; Madu, 2003).

5. The Past Phases of Poverty Alleviation in LDCs

The development of Nigeria and other less developed countries (LDCs) to alleviate their poverty became an issue of world concern as far back as 1950 (after World War II) (Hasewell, 1975; Chamber, 1998). Since then, the changes in development objectives of poverty alleviation in developing countries have been marked by three distinct though overlapping phases.

5.1 Phase I: Raising Production And Income

The first phase extended to the end of the 1970s and embraced the first

UN development decade. Its basic development objective was the rapid growth of gross national product (GNP).

FAO declared that the first cause of hunger and malnutrition is poverty and that the purpose of water resources and agricultural development was the alleviation of low standards of nutrition and living and its primary objectives were, therefore Increased food supplies and farm incomes (Chamber, J998). From a poverty alleviation point of view, the achievements of agricultural development in phase one were judged inadequate, though a large number, about 30 percent, of poor people were more affluent and better fed at the end of the period" (Clayton, 1983). The inability of conventional development strategy to remarkably thin, down the numbers living in poverty and without satisfactory employment gave rise to an examination of causal factors linking poverty, hunger, incomes and employment to economic development process . The realization that population -growth rather than the development objectives of phase one caused the major disappointment led to different strategies being recommended in phase two.

5.2 Phase ii: Employment Creation and Income Redistribution:

With the failure of GNP, a new set of development objectives was postulated to deal directly with the twin problems of unemployment and income distribution (ILO, 1976). So at the onset of the second development decade, pride of place was given lo creation of employment and reduction of income disparity (vis-avis) poverty alleviation.

In Nigeria, against unprecedented rates of population growth (5 percent per annum) and rural urban migration and a tendency for industry to become capital intensive, graduate as well as urban and rural unemployment was growing (Adelodum, 2007)

Hence, its major impact in Nigeria has been more on the thinkers than the doers and the poor applicants without any social security allowance continue to suffer (Akpanso, 2001; Ugochukwu, 2001)

An important consequence of the analysis of the unemployment problem was that it highlighted what many governments and policy makers had been ignoring before. That is the role, which water resources and agricultural improvement must play in the alleviation of poverty, hunger and malnutrition in Nigeria

as in other developing countries. Currently, agriculture is the main employer of labor in Nigeria. Over 70% of the population are employed directly or indirectly in agriculture and this is likely going to continue well into the third millennium. Indeed, the fact that water resources and agricultural development must be the main generator of future employment in Nigeria and other developing countries influenced the project priorities of the World Bank and the governments visited by ILO employment missions up to the present day. This explains why the third phase was launched

5.3 Phase III: Basic Needs (BN)

The third phase of development objectives was launched in 1976 by ILO with the specific aim of alleviating absolute poverty by achieving basic needs. Minimum targets were set for food consumption, clothing, housing and ' the provision of essential services in the areas of water, sanitation, electricity, education, health and public transport. The need for the provision of productive and satisfying employment opportunities was also emphasized as a means towards achieving the goals in such a way that is sustainable in the long run and in harmony with man's nature and environment

The proposal in short is for a change in the structure of production and distribution as well as consumption (Barrow, 1978) with the following strategies.

a. Increasing agriculture and food production business and raising the income of the poverty group.
b. Providing essential consumer services including water supply to the entire population and reducing inequality
c. Expanding trade to satisfy import requirement

5.4 Obstacles to BN Objectives

BN claims that the worst aspects of poverty can be eradicated in the relatively short period. But the reduction of poverty in Nigeria and other LDCs, the goal of development is made more difficult by extreme idealism and a disregard of overriding political interest, economic and population constraints. This trend is a problem because it consumes the huge and quick profits derived from oil sector of the economy and so presses on limited agricultural and land resources available. Other problems are:

i. **Sources of Funding the BN Program**: Estimated amount of 30 to 40 million (US) dollars was required. Unfortunately this sum could not be locally sourced. A great percentage of the internally generated government revenue is from taxation and this can even decrease agricultural output. Moreover, the usual assumption is that the tax revenue

will be gainfully invested to help in alleviating poverty (Clayton, 1903) but this is false because common experience in Nigeria runs counter to this.

ii. **Technical Problems**: Another set of obstacles relates to the appropriateness of technical provision and maintenance of services for achieving basic needs. Implementation and operation of modest water supply and irrigation schemes also face many difficult technical and environmental problems.

iii. **Land Use Reform**: Though the land use act of 1970 tried to achieve this in Nigeria but unfortunately it was beset by a number of social, economic and political problems. Its achievement may be more feasible if its application adopts a piece meal approach at a slower speed This is because rapid land use reform in Nigeria has always been vehemently opposed in some states as a result of its likely import of social and economic disadvantages in such areas.

iv. **Community Participation and Self Help Efforts**: Community participation has worked wonders at the local levels especially among the Igbo people in the southern states of Nigeria. It must be noted that despite its desirability at the provision of water supply schemes at the grass root level, its planning and operation are a difficult exercise at the national level

v. Climate change problem: The climate change issues especially losses in soil moisture conservation and surface runoff, excessive high temperature adversely affect agricultural yield.

vi. Social/civil unrest, terrorism and kidnapping which were previously unforeseen problems brought to fore the dangers of mass destruction and insecurity to developments in general.

6. National Policy on Water Resource System Development Versus Hunger and Poverty

The national policy on Water Resources Development is contained in the Water Resources Decree 101 of 1993 (FGN, 1993; Chukwu, 2015). Unfortunately, this decree recognizes only two sources of water in Nigeria as comprising all surface and ground water including all water in any water course affecting more than one state as described in schedule to this Decree, together with the bed and banks thereof- - - ". Not much attention is given to the atmospheric resource component which is the only one water source of rain fed agriculture.

Because of this the policy fails to be an appropriate sustainable tool in winning the war against hunger and poverty in Nigeria in the face of changing climate. Rain fed agriculture is still being practiced by over 70% or Nigerian farmers today.

The Decree stipulates that these water resources are vested in the authority of the Federal Government. It also stipulates the provision of adequate supplies of suitable water for livestock, animals, irrigation, agricultural purposes, domestic and non domestic uses, hydroelectric power generation, navigation, fisheries, recreation, drainage, land reclamation soil erosion and flood control. The decree focused on the utility of the preexisting river basins established by the Federal Government in 1976 and the ground water provinces of 1975 (Offodile, 2003).

The eleven River Basin Development Authorities in Nigeria are:

(a) Sokoto - Rima Basin
(b) Hadeija - Jemare Basin
(c) Lake Chad Basin
(d) Upper Benue Basin
(e) Lower Benue Basin
(f) Cross River Basin
(g| Anambra - Imo River Basin
(h) Niger Basin
(i) Ogun-Oshun Basin
(j) Benin Basin
(k) Niger Delta

Similarly, the eleven ground water provinces identified by FGN (1975) include:

(a) Coastal alluvium mangrove and fresh water swamps
(b) River coarse alluvium
(c) Coastal sedimentary lowlands
(d) Chad basin confined aquifer
(e) Kerri - Kerri sandstone
(f) Sokoto (cretaceous)
(g) Nupe sandstone of the Niger Basin
(h) Anambra Basin
(i) Cross River Basin
(j) Benue Basin

(k) Crystalline (Basement) Area.

The underground water boundaries do not necessarily coincide with the surface water shed boundaries of the river basins. Rather some of them criss-cross the catchment systems. All these rivers are either trans-national or within the boundary of Nigeria. The national water policy therefore takes cognizance of the fact that the management and development of the water resources present both inter basin and international boundary problems in addition to those of changes and adjustments of hydrological and climatological parameters that need to be monitored (Offodile, 2003).

The policy is not without fault especially as it neglected the major component of rain fed agricultural water supply and the major input in the basin hydrological cycle Rainfall is the major input that should have enabled the River Basin Development Authority analyse the output parameters of the hydrological cycle within the catchment area for identifying the crop water need, and the water year for maximum crop production in a simple hydrologic relation.

Input = output- - - - - - - - - (1)

Where input is rainfall; output is all other outlets.

Hence:

$Pa = Qs + F + ET + U + \Delta Sm + \Delta Gw$- - - - - (2)

Where: Pa is precipitation (or rainfall), ET is evaporation and transpiration. Qs is runoff; F is infiltration, U is underground flow; ΔSm is change in soil moisture, while ΔGw is change In groundwater storage.

Indeed, the Nigeria food shortage problem and poverty today are mainly a direct consequence of the failure to recognize that changes in climate have had tremendous impact on the yielding capacity of essential crops. This justifies our reason to support the adoption of climatologically appropriate rain fed agricultural and moisture conservation techniques to sustain food production in Order to win the war against poverty and hunger in Nigeria.

7. Adapting Soil Moisture Conservation Techniques to Changing Climate for Food Crop Sustainability.

In rain fed agricultural practice soil moisture conservation techniques should be utilized to reduce soil moisture losses and arrest runoff from the land for sustaining farm yield in the face of changing climate in the sahel-sudan regions of the country. Such techniques include overland flow interception, runoff farming, mulching, soil moisture trap, humid culture and contour seepage furrow.

Overland flow interception ridges can be practiced in highland regions of northern Nigeria. It enables larger quantity of water to be absorbed by the soil and reduces the erosion and leaching of fertile soils on hill slopes (Stern, 1994).

Runoff farming is the method of concentrating surface runoff in semi arid regions where sustained stream flow is nonexistent. Here the cultivation can be supported where the total annual rainfall is below 100mm. The ancient agricultural system of the Negev Desert is based on this method.

Mulching involves placing of materials like plant leaves, sticks and fine grass on soil which, suppresses evaporation and conserves water within the crop root zone. A thin layer (5 - 10mm) of gravel can also be utilized. Synthetic mulching can also be adopted but it is costly to provide.

Soil moisture trap is a technique where a thin, cheap plastic sheet perforated with holes, 20mm diameter at 100mm intervals is laid over sandy soil and covered with a 50mm layer of soil material. A soil ridge is formed to enclose this prepared) area. At the end of any rainfall event, the layer of the soil material on top of the membrane dries fast but moisture remains in the soil below for much longer period and this is utilized for growing crops to maturity in the face of adverse impacts of changing climate.

Humid culture also provides solution where water is very scarce under severe changing climatic conditions It is a method in which the crops can be grown in an enclosed system where the water used is recycled This techniques has been demonstrated to work well under very severe changing climate condition in Saudi Arabia (Stern, 1994),

In hydromorphic soils which are seasonally water logged during the rains such as the Argungu area in Sokoto plains, contour seepage furrows (contour - wise ditches) about 450mm base width and 150mm depth, spaced 20m on a 2% slope should be applied. This is one aspect where this system is superior to large scale irrigation scheme

8. PROBLEMS AND PROSPECTS

Hunger and poverty will affect many more Nigerians by the end of the year 2025 if there is no positive significant change in water resources management to increase agricultural productivity in the country. It has been estimated that as climate changes, as many as thirty out of fifty one countries of Africa alone may be unable to feed their predicted populations by the end of the year 2025 (Barrow, 1967; Ogboi, 2003a; 2003b). As degenerating land is becoming unproductive as a result of changing climate unused and underused land must somehow be protected and made more productive.

Much of the land, which is degenerating under the influence of climate change, could be rehabilitated by sustainable management of water resources. A large proportion of damaged farmland in the sudan-sahel

regions of Nigeria is the dubious reward of poorly managed irrigation schemes. In Nigeria, most of the accessible lakes and big rivers have been developed through the establishment of eleven river basin development authorities and artificial dams. On the other hand, streams in Nigerian urban centers have been much polluted by urban and industrial wastes (Ezenwaji, 2003) Domestic and industrial water consumption has increased by over 80% and now competes with those of agriculture (DFID, 2001; Zwingini, 2001;Chukwu, 2015). The improvement of poor irrigation schemes in Nigeria requires not only urgent attention, (Agu, 1997) but also permanent attention.

There is plenty of useful land that could be farmed and also much that could be better farmed. Irrespective of unfavorable future predictions of adverse impacts of climate change, if investments were channelled towards developing climatologically appropriate rain fed agriculture, sufficient and reliable irrigation and effective soil moisture conservation techniques, more than sufficient cash and food crops could be produced to solve the present and future problems of hunger and poverty in Nigeria. Some countries have successfully alleviated poverty and hunger resulting from climate change impact by opening up new land through the sustainable management of their water resources,. For example, Brazil through her water resources management policy has settled poor "Nordestinos" in parts of Amazon basin.

Some states in Nigeria especially Anambra, Enugu, Imo and Abia in southeast have no good land with its original climatic climax vegetation. To raise their agricultural yield they intensify farming on the already farmed land and crop marginal land. In each of the two cases, negligible progress will be made without better rain fed cultivation strategy and suitable method of irrigation agriculture.

It is important to note that our country at present is in a dilemma. Why? If she delays efforts to intensify agricultural production, she may face severe hunger because she will be incapable of feeding her growing population. Invariably, this may lead to malnutrition, starvation and poverty. Moreover, land degeneration may equally set in if she proceeds, she may adopt present but inappropriate technology and agricultural techniques which may in the long run prove to be incompatible and unfavorable with both the changing climate trend and environment. This may result lo more serious dimension of environmental degradation (Madu, 2003).

The current aggressive campaign strategy on family planning (birth control) as one of the most significant ways of fighting poverty, hunger, and deprivation in Nigeria is a suspect. For example, Barrow (1987) assessing the interrelationship of physical environment, climate change, population growth, hunger and agricultural improvement in Indonesia suggested that although too rapid population increase may out grow food production, a steady build up even to a high density in the face of changing

climate can indeed trigger off intensification of agricultural production. Furthermore, a community undergoing sustained population increase as climate changes has a brighter prospect of increasing agricultural productivity to fight hunger and poverty than one with a stagnant population. Japan increased her agricultural yield under harsh conditions of climate change and severe over population in the 1920s and within just about three decades, had a production that outstripped her domestic food requirements and thus eradicated hunger and poverty in that country (Barrow, 1987).

It is usually argued that such countries as Japan, South Korea and Taiwan which have increased their agricultural productivity achieved it on a cultural foundation of paddy farming implying that the indigenous farmers were *ab initio* well skilled. In Nigeria like in many other countries of Africa some hydrologists have argued that there is less of a tradition of irrigation agriculture and that the intensification of small scale farming through irrigation schemes may consequently take more time. As a result fund may be better spent on improving rain fed agriculture. But this might also be misleading as a basis for formulating water resources and agricultural development policies. No wonder Barrow (1987) has warned also that "population pressure" is far from being a unique significant stimulus to "grass root" agricultural improvement, hunger and poverty reduction than sustainable water resources management in the face of changing climate.

In Nigeria, most recently (from 2006 to date, 2016) the ugly face of terrorism from the Boko Haram Islamic Extremist in the north, their recent attacks on water supply schemes in the northeastern parts of Nigeria have stunned most Nigerians who considered their country violence-free and heightened security concerns among government officials, security operatives and Nigerian citizens in general. The Niger Delta militants from the south are also a menace. They target their activities towards blowing up and vandalization of water and oil pipelines and installation of electrical facilities.

Poverty, hunger and unemployment have been implicated as social factors which promote terrorism apart from religious fundamentalism and extremism which are well known.

9. Conclusion

This paper has examined the nature and indices of poverty in Nigeria in relation to sustainable water resource development with the central theme of poverty and hunger alleviation. The extremes of rural poverty in Nigeria today are an outrage because avoidable deprivation, hunger, unemployment and suffering coexist with affluence. Obstacles to poverty alleviation in Nigeria are; geographical distance, the willful component of choice, selfish interest, ignorance and misleading but comforting beliefs. The development objectives to alleviate poverty in LDCs by FAO have been marked by three phases which include raising production and income, employment creation and redistribution, and basic needs.

Unfortunately, the reduction of poverty in Nigeria (the goal of development) is made more difficult because of the extreme idealism and disregard of research support funds on climate change as well as overriding political and economic constraints especially high population growth rate. Based on these research findings, the writer suggests that sustainable management of water resources should be used as a strategy in rehabilitating much of the degenerating land. Improvement of poor Irrigation schemes therefore requires urgent attention. The development of appropriate rain fed agriculture, effective soil moisture conservation techniques, with a sustained population increase to drive agriculture are recommended to solve the present problem of developmental dilemma in food crop production in Nigeria.

Finally the author strongly urges future researchers to throw more light on case studies of specific poverty alleviation programs and projects such as irrigation schemes, agricultural and rural development as well as the attainability of the objectives of the poverty alleviation program (PAP) and poverty eradication program (PEP) of the previous federal government of Nigeria.

References

ADELODUM (2007): "NDE Striving to reduce unemployment and poverty". *Employment Creation and Poverty Reduction Workshop*. NDE, Ado Etiti, 2nd–3rd May

AJADJKE, J. C. (2003). "Poverty as a major challenge to sustainable Environmental development' in Onokala, P C. Phil-Eze P. 0. and Madu I.A (eds): *Environment and poverty in Nigeria*. Jamoe Pub, Enugu; PP. 28-41

AGU, A. N. (1997] "Conjuctive Water Supply Management and climate Variability". *ESUT Journal of Environmental Management*. Vol. 1, No 1; pp. 55-62.

AKPA-NSO, INEM (2001): "Low industrialization and youth unemployment". *Daily Champoin*, Friday, Vol. 14, NO. 150; pp. 17- 18.

BARROW .C. (1987): *Water Resources and Agricultural Development in the Tropics.* Longman Scientific and Technical Pub. Co-published with John Wiley & Sons, New York.

CHAMBERS, R. (1998): *Rural-Development* Putting. The last first Longman Group Lid, London.

CHUKWU, K.E. (2015): Water supply management policy in Nigeria: Challenges in the Niger-Delta wetland. *European Scientific Journal.* 11(26); 303-323

CLAYTON, E. (1983): Agriculture, *Poverty and Freedom in Development Countries*. McMillan Press Ltd., London.

DFID (2001): *Addressing the Water Crises – Healthier and more Productive Lives for Poor People*. UK Department for International Development, London.

ECMWF (2005). ECMWF / ELDAS Workshop on Land Surface Assimilation *Workshop Proceeding*, European Centre for Medium -Weather Forecasts, 8-11 November, 2004

EZEMONYE, M. N and EMERIBE C.N (2015); spatial and temporal patterns of climate change in the Sokoto-Rima, River Basin, Sudano-Sahel region, Nigeria" European scientific journal. 11 (26); 392-403.

EZENWAJI, E (2003): "Improved water supply as a strategy for poverty alleviation in rural areas of Anambra State" Inonokala P. C. et al. (eds): *Environmental and poverty in Nigeria*. JAMES Pub. Enugu; pp. 275-295,

GROOTAERT, C. and BRAITHWAITE, J. (1998); Poverty and Indicator based Targetting in E. Europe and Soviet Union. Washinton DC, World Bank policy research working paper No. 1994.

HASEWELL, M. (1975): *The Nature of Poverty: a case History of the First Quarter Century, After WWII*. McMillan Pub London.

INTERNATIONAL LABOUR ORGANIZATION ILO, (1976): *Employment, Growth and Basic Needs: a one World Problem*. United Nations, Geneva.

LOZAN, J.L; HUPPER, P. and GRAB, H. (2000); *Climate of the 21st Century: Change and Risks –Scientific Facts. (2nd ed.).* St. Pauli -Druckerei, Hamburg.

MADU, I. A (2003) Agricultural Landuse Intensification and environmental degradation in southeastern Nigeria. The need for a sustainable land management system". In Onokala P. C. et al (eds.): *Environment and poverty in Nigeria*. JAMOE Pub., Enugu; pp. 100-133.

MOSHOOD, Y. (2007) Belter Life for Rural Women and Maternal Deaths. *PHARMANEWS*. Vol. 29, No. *2*, p 32.

NEST (1991): *Nigeria's Threatened Environment: a National Profile*. Nigeria Environmental Study /Action Team; Ibadan.

OFFODILE, M. E. (2003) "Spatial data exploration for water resources development in Nigeria: Need for NGDI (National Geospatial Data Infrastructure)". *NGDl Stakeholders Workshop*. NASRDA, NUC Auditorium, Abuja. 0 – 12th February.

OGBOI, K. C. (2003a.). "Poverty, Environment and Sustainable development: the spatial dimension". In Onokala P. C. el al (eds,) Environment and poverty in Nigeria: JAMOE Pub. Enugu; pp. 15-27.

OGBOI, K. C. (2003b): "Political economy of poverty alleviation: theoretical, methodological and institutional issues "in Onokala P. C et al. (eds.): Ibid; pp. 3- 14.

OKAPOR, A. A (2000): "*Poverty Eradication in Nigeria". The path to True Democracy in*

Nigeria in Onokala P. C et al (eds.):Environment and P JAMOE Pub. Eugu; pp. 62 – 65

OSOWOLE, O. J.I and BAMIDURO A.T. (2013); On the derivation of Estimators of Foster-Greer-Thorbecke (FGT) Poverty Indices" CBN journal of Applied statistics. 4(I); 1-13.

PHIL-EZE, P. 0. (2003): "Sustainable environment: a Neglected strategy for poverty alleviation in Nigeria". In Onokals, P C et al (eds.) Ibid, pp. 42 - 53

PSN (2007) "Information, Communication and Technology in Health Care Services" *National Workshop on ICT.* Pharmaceutical Society of Nigeria. Nisrel Training Centre, Ikeja Lagos, 23rd – 24th May.

REVALLION, M (1996):" Issues in measuring and modeling poverty". The Economic Journal 106 (Sept); 1328-1343

STERN, P. N. (1994). *Small Scale Irrigation - a Manual of Low - Cost Technology*. Intermediate Tech. Pub. & International Irrigation Information Centre: Nottingham.

TODARO, M P. (1997). *Economic Development in the Third World*. Longman Ltd, London

UCHE, C. U (2000): "Poverty alleviation programs in Nigeria: past, present, and future" . *Nigerian Journal of Banking and Finance*. Issue 3, March, 2000

UGO CHUKWU (2001): "Low industrialization and youth unemployment in the Niger Delia Area" Niger Delta Environment *World .Conference of Mayors,* Eket, Nigeria.

WCED (World Commission on Environment and Development) (1987): *Our Comon Future*, Oixford University Press, Ozford.

WORLD BANK (1982): *World Development Report*. Oxford University Press, Oxford.

WORLD BANK (1996): "Nigeria: Poverty in the midst of plenty: the challenges of Growth within elusion" *World Bank Poverty Assessment* Washington DC. USA; 1– 129.

World Bank (1999): "Understanding and Responding to Poverty" htt//www.worldbank.org/poverty/mission/up/i.htm.

WORLD BANK (2000): *World Bank* Atlas. Oxford University Press, Oxford.

ZWINGINI, P. 0. (2001): "Ensuring the supply of clean water for the poor". *Journal of Rural Development*. Vol. 5, No. I; 60 - 68.