



MEETING THE MILLENNIUM DEVELOPMENT GOALS THROUGH INTEGRATED WATER RESOURCES MANAGEMENT FOR SUSTAINABLE AGRICULTURAL PRODUCTIVITY IN NIGERIA

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ABSTRACT

An important target of the Millennium Development Goals (MDGs) is eradicating poverty and hunger and reducing to at least half the population of the people lacking access to potable water supply to improve healthy living in Nigeria by the year 2015. However, any poverty alleviation without due recognition to sustainable agricultural productivity which ensures food sufficiency can hardly be successful in the country. Sustainable agricultural productivity on its own is anchored on the adequate supply of water through efficient water resources management for all-year round agricultural production. The reports that climate change is expected to impact on the economy of the African region through water, is already coming to reality in Nigeria as devastating floods have become a yearly occurrence in the country. Unfortunately, the series of flood events have had negative impacts on agricultural production as many croplands have been washed away in addition to reduction of arable lands amongst other losses. Thus, this paper examines the need to adopt integrated water resources management (IWRM) which involves the sustainable development, allocation and monitoring of water resources to achieve social, economic and environmental goals. Through this, all available water resources management facilities would be assessed, properly audited and upgraded where necessary for optimum utilization. Professionals in the water sector will also be provided with a platform to formulate policies that will bring sanity into the sector for efficient allocation and management of water resources. It is hoped that when fully implemented, the impacts of flood and drought will be minimized and therefore ensuring sustainable agricultural productivity. Similarly, availability of water for other sectors of the economy will be ensured for poverty reduction and therefore meet the Millennium Development Goals.

KEY WORDS: Poverty and Hunger, Sustainable Agricultural Productivity, Climate Change, IWRM.

INTRODUCTION

A major target of the Millennium Development Goals (MDGs) is eradication of extreme poverty and hunger by the year 2015. However, poverty and hunger are also directly related to healthy living, because health is wealth. Furthermore, access to potable water supply is an important requirement for healthy living and good sanitary condition which is included in the MDGs goals. In order to achieve all these, the Nigerian government has at different times formulated policies, created institutions and signed treaties that can help in poverty alleviation in the country. For instance, under the military administration of Ibrahim Babangida, institutions such as People's Bank, Community Bank, Directorate of Food Roads and Rural Infrastructure (DFRFRI), National Agricultural Land Development Authority (NALDA), etc. were created to fight poverty. While many of the institutions have become defunct, it is doubtful if they actually achieved their aims while they existed. Not surprising, therefore, that subsequent governments have also established more institutions for the same purpose without much success. Since the advent of democracy in Nigeria in 1999, programmes such as Poverty Alleviation Programme (PAP), National Poverty Eradication Programme (NAPEP) and most recently, Subsidy Reinvestment

Programme (SURE-P) have been created. That these programmes also have not fared better can be seen in the rising level of unemployment and poverty in the country (Anger, 2010; Ajadi, 2010).

The problem of poverty is not peculiar to Nigeria; it is widespread in most African countries, Asia, Latin America and the Caribbean. Recognizing this global phenomenon, member countries of the United Nations at a meeting held in the United States of America in the year 2000, formed the Millennium Development Goals (MDGs). At the meeting, 8 goals were targeted to be met by the year 2015 and the programme was immediately embraced by Nigeria. Of the 8 goals, eradication of extreme poverty and hunger was placed on the 1st position emphasizing the importance attached to the fight against the pervasive poverty amongst the member-countries. The incidence of poverty is, however more crucial to sub-Saharan African countries including Nigeria, where 54% of the people in the 1990s live below poverty level, because of its impact on other indices like literacy, health and general quality of life (Ali & Thornebecke, 2000). In fact, World Bank reported that up to 72.9% in this region are poor in view of the \$2 per day income index used. Consequently, the Nigerian government produced a policy document called the National Economic Empowerment and Development

Strategy (NEEDS) to enhance the attainment of the goals in an attempt to underscore the importance attached to meeting the targets. Despite this, the United Nation (2010) put over 70% of Nigeria's population as living below the poverty line of \$1.25 per day, while 83.9% of the population lives below the line using \$2 per day mark as a benchmark. This tends to show that Nigeria might be far from meeting the poverty eradication goal in 2015 and create a lacuna in the subsequent attainment of the Vision: 20:20:20 when the country hopes to be amongst the top 20 economies in the world.

Perhaps, a missing point in the recent approach is the relegation of the role agriculture can play in the eradication of extreme poverty and hunger. However, any poverty alleviation without due recognition to sustainable agricultural productivity which ensures food sufficiency can hardly be successful. This is because agriculture is the major occupation of the rural populace where poverty is more pervasive in the country. This was why all previous development plans in Nigeria have accorded agriculture the highest priority (Obadan, 2003). It is hard to believe that poverty can be eradicated by doling out N10,000 monthly to some selected graduates and school leavers. In the same vein, it is yet to be seen how many families have been rescued from the shackles of poverty through the distribution of grinding machines and motorcycles to women and youths, respectively that is common with our politicians. This is because many of the programmes are not sustainable.

On the contrary, through sustainable agriculture, hunger can be greatly reduced and invariably poverty since there is a common saying that elimination of hunger creates a big void on incidence of poverty. Similarly, agriculture can be practised in virtually everywhere in Nigeria with the vast fertile land and freshwater resources and thereby ensuring employment opportunities. Furthermore, the country GDP is dominated by agriculture. Unfortunately, reports have shown that the recent climate change might impact on agriculture (Chamhuri et al. 2009; Yu et al. 2010; Akudugu et al. 2012; Fazal and wahab, 2013) especially in many developing countries of Africa and Asia. Extreme weather events such as floods and droughts which are results of climate change on water resources can have devastating impacts on agriculture. Therefore, this paper attempts to examine the possibility of meeting the Millennium Development Goals (MDGs) through integrated water resources management for sustainable agricultural productivity in Nigeria.

INCIDENCE OF POVERTY AND HUNGER IN NIGERIA

As earlier mentioned, there is widespread poverty in the sub-Sahara Africa region especially in Nigeria; the menace is persistent in the country (Ajadi, 2010). According to African Foundation for Population and Development (2005) report, despite Nigeria's rich natural resources, it is currently ranked among the 13 poorest countries in the world. Sad enough, poverty and hunger are twin menace as the former implies the latter (UN, 1995) and there are indications that poverty is on the rise everyday (Ogunleye, 2010) considering the present high rate of unemployment in the country. Poverty may be defined as a measure of the

inability of the citizens to afford the basic necessities of life - food, shelter and housing (World Bank, 1990; Ogunleye, 2006); which may arise owing to lack of means of livelihood or the depletion of the means. It can also mean lack of access to basic infrastructures such as potable water supply, housing, electricity, education which are capable of determining the quality of life (Oriola, 2009). Therefore, once there is poverty the people will definitely face the challenges of feeding themselves and ultimately hunger. Hunger on its own can be described as lack of access to adequate provision of food in terms of quality and quantity. Nevertheless, poverty is usually defined in economic terms based on certain minimum income in Dollars.

Consequently, measurement of poverty has always been based on income as Income Poverty Index (IPI) which is based on the income or consumption definition of poverty or as Human Poverty Index (HPI) based on access to infrastructure (Abumere, 2004). Whatever yardstick is used, it is obvious that the phenomenon cannot be denied in Nigeria. For example, the United Nation (2010) put over 70% of Nigeria's population as living below the poverty line of \$1.25 per day, while 83.9% of the population lives below the line using \$2 per day mark as a benchmark. Also, the Human Development Report 2007/2008 on Nigeria put the Human Development Index (HDI) for Nigeria at 0.470 and subsequently ranked the country at 158th out of 177 countries. In addition, at 46.5 percent, Life Expectancy in Nigeria was ranked as 165th and adult literacy rate (% ages 15 and older) was 69.1, ranking Nigeria as 104th out of 177. The report also indicated the Human Poverty Index value of 37.3 percent for Nigeria, which ranked the country as 80th among 108 developing countries for which the index were calculated (UNDP, 2008). Available statistics (Table 1) also showed that Nigerians are lagging behind in many areas which are indicators of their low standard of living and indeed poverty.

The level of poverty in Nigeria is also multi-dimensional in nature, as there are differences in the nature of poverty in semi-urban/urban areas and rural areas of the country. Poverty is more prevalent and more intense in the rural areas of the country (FOS, 1999; Gbadamosi, 2001; Oyeranti and Olayiwola, 2005). According to FOS (2004) poverty incidence was 40.1% in urban areas compared with rural poverty incidence of 60% while World Bank (2008) stated that 75% of the world's poor live in rural areas in developing countries. Whereas it is possible for a household who lives in sprawls in Lagos, an urban city to be able to afford three-square-meal, have access to potable water supply and good health facilities, most rural poor cannot afford any of the basic requirements of life as developments in Nigeria are mostly pro-urban (Ajadi, 2010). In fact, apart from poor housing and deplorable roads, they drink from poor water sources; they are far from efficient health facilities and cannot clothe themselves adequately as a result of poor means of livelihood. Education which is generally agreed to have the capacity to bridge the gap between the rich and the poor is not also properly provided in the rural areas as most schools are in dilapidated conditions. Most rural dwellers are downcast and helpless in the face of many

deprivations. This also has negative implications for the country emerging democracy as many of the poor rural dwellers are sometimes cajoled with a cup of rice into voting against their conscience while some change their minds just because of N200.

Another dimension into the phenomenon is the high level of unemployment of the youth especially young graduates. According to FOS (2011), unemployment rate was said to have increased to 23.9% in 2011 from 21.1% in 2010 and that the rate is higher in the rural areas (25.6 percent) than in the urban areas (17.1 percent). Destruction of means of livelihood as a result of exploration of mineral resources sometimes without adequate compensation has also contributed to poverty. For instance, exploration of oil in the Niger Delta area of the country has made fishing, which is the traditional occupation of the people of the area, virtually become impossible because the rivers are daily polluted by oil spillage. In the same vein, many people have also become poor due to many natural hazards such as climate change, erosion, fire outbreak, etc. These natural hazards contribute to poverty since they reduce the quality of land which could serve as source of income and upon which all agricultural activities take place.

TABLE 1: Selected Poverty Indicators in Nigeria

Variable	Value (%)
Population living on less than \$1.00/day	70
Population living on less than \$2.00/day	91
Poverty Gap \$1.00/day	35
Poverty Gap \$2/day	35
Access to improved sanitation	59
Access to improved water source	62
Life expectancy (both sexes) 52 years	

Source: World Resources Institute, 2004 (Anger, 2010)

POVERTY AND HUNGER ALLEVIATION THROUGH SUSTAINABLE AGRICULTURAL PRODUCTIVITY

Sequel to the fact that poverty is more pronounced and stricken in the rural areas of Nigeria (FOS, 1999; EC, 2012), it becomes imperative that its eradication cannot be achieved without adequate attention to the commonest means of livelihood in the rural areas (Adebayo, 1998). As a matter of fact, available evidence has shown that the best way to reduce poverty and promote growth is to invest in smallholder agriculture (EC, 2012). More so, at least 80% of Nigerians are said to be living in the rural areas (IFAD, 2010) emphasizing the need to show adequate concern to this sector of the populace. Further to this, most rural dwellers are involved in agricultural activities from which they earn their living (World Bank, 2008); some in fishing while some are in crop production apart from the rural women who trade in various farm products. Agriculture provides employment for at least 65% of Nigerians (Emeka, 2007; Ifeanyi-obi, et al. 2012) and furthermore, statistics show that Nigerian GDP is dominated by agriculture (Table 2). This implies that agriculture has the capacity to provide people with means of livelihood and enhance economic growth.

However, for agriculture to continue to serve the aforementioned purposes, it must be sustainable. Sustainable agricultural productivity can be described as

that which ensures all-year-round supply of agricultural products through the maintenance of the right environment and supply of appropriate farm inputs and technology. For agricultural productivity to be sustainable, it must emanate from the type of agriculture that is environmentally, economically and socially sustainable (EC, 2012). Sustainable agriculture on its own is aimed at producing safe and healthy food, ensure economic viability, deliver services for the ecosystem and improve quality of life in farming areas (EC, 2012). This is because, through sustainable agricultural productivity the food need of the expected future rise in world population can be met and thus reduction in hunger. Also, it can help in securing the livelihoods of rural populations, generate decent income and provide a basis for inclusive growth and poverty reduction. In the face of the threat posed by climate change, it help farmers to adapt to changes and to reduce greenhouse gas emissions since it opens the door to innovation that can help to make farming cleaner, less exposed to volatility in the prices of inputs and more resistant to disasters (EC, 2012).

From the aforementioned, it shows that with sustainable agricultural productivity, food supply can be ensured throughout the year. Apart from the direct employment for many jobless youths and by implication provision of means of livelihood, there will be adequate and sustained provision of raw materials for the agro-allied industries that are very common in the rural areas of Nigeria where many can earn their living. With this, less people will be lacking in means of livelihood and therefore poverty will be reduced. Similarly, the contribution of the agricultural sector to the GDP will be more sustainable and less erratic. This will enhance the overall growth of the economy and reduce its overdependence on oil with its high price instability. Traders, especially women who trade in agricultural commodities, will have something to sell throughout the year and as such enjoy sustainable means of livelihood. The rural populace who are mostly engaged in agriculture will now enjoy sustainable means of income. In general, there will be less hunger in the country since there will be supply of food throughout the year and most rural dwellers would be able to afford other basic needs of life.

TABLE 2: Contribution of Agriculture to the Total Gross Domestic Product (2000 – 2007)

Period	Total GDP (#billion)	Agric. Share of PDP	% Share of Agric. in Total GDP
2001	431.28	182.66	42.3
2002	451.71	190.37	42.14
2003	495.01	203.01	41.01
2004	526.83	216.21	40.98
2005	561.83	231.46	41.19
2006	595.82	248.60	41.72
2007	632.86	267.06	42.20

Source: Adapted from Oriola (2009) as sourced from CBN (2005 and 2007).

CLIMATE CHANGE, WATER RESOURCES AND SUSTAINABLE AGRICULTURAL PRODUCTIVITY

Agricultural productivity can hardly be sustainable without adequate water supply, yet agriculture in Nigeria is predominantly rain-fed. Besides, adequate potable water supply is required for good sanitary condition and healthy living which are both determinants of standard of living and a measure of level of poverty. In spite of this, recent climate change has created an imbalance in the natural supply of water through extreme cases of weather events—floods and droughts. Countries in Africa face either floods or drought and sometimes both in different parts of the country resulting in loss of livestock and a whole year's crop (Desanker and Justice, 2001) while sub-Saharan countries are projected to be more vulnerable (Nwafor, 2007; Jagtap, 2007; Thurlon, 2009). This assertion has been corroborated by the recent flood events in some states in Nigeria during which human lives, croplands and many other resources were lost. With global warming and decreasing rainfall together with the erratic pattern of rainfall, recharge of groundwater resources such as wells, lakes and rivers in most parts of the world especially in Africa has been hampered (Odjugo, 2010). In Nigeria, reports showed that many rivers have dried up or are becoming more seasonally navigable while Lake Chad shrunk in area from 22,902 km² in 1963 to a mere 1304 km² in 2000 (Odjugo, 2010). The disappearance of water from streams and rivers has actually increased pressure and rate of pollution on the remaining ones. This will cause water scarcity for both agricultural and domestic purposes especially in the rural areas.

In addition, incessant droughts in the north eastern parts of the country are detrimental to crop production. This can exacerbate hunger as Abdul-Quasem et al. (2011) stated that climate change could reduce crop yield and areas vulnerable to drought could become marginal for cultivation thus posing a threat to national food security and exports earnings. Odjugo (2010) reported a shortening of the growing season, crops failure and food shortage resulting from frequent droughts and lesser rains in the semi-arid region of Northern Nigeria. In an attempt to adapt to this, most farmers are already avoiding the growth of certain highly economic crops in favour of lesser ones which they feel can perform well under a changing climate. This can lead to increase in the prices of certain food items as Nelson et al. (2009) stated that climate change would result in additional price increases of 32 to 37 percent for rice, 52 to 55 percent for maize, 11 to 14 percent for soybeans, and 94 to 111 percent for wheat. Climate change has also increased desert encroachment in the semi-arid region of Northern Nigeria and is already drifting down south to cover more areas in the country. This also has the capacity to reduce availability of pasture for the feeding of livestock animals, limit the movement of nomadic farmers and reduce animal production. The overall impact of this is low income to farmers arising from poor harvest and thus poverty.

On the other hand, climate change can lead to rise in sea water level and salt water intrusion, both of which can impact adversely on water resources and sustainable agricultural productivity. Sea level rise reduces the size of arable land (Odjugo, 2010), while salt water intrusion can

hinder the breeding and growth of fish, thereby reducing opportunities for farming in the coastal areas of the country. Reduction in arable land sometimes create land conflict amongst the inhabitants of the areas where it happens which can as well cause loss of lives and high level of insecurity. This also leads to the reduction of the number of people involved in farming and overall agricultural productivity. With salt water intrusion, availability of potable water for domestic uses is also adversely affected since many fresh water sources will be polluted. Enete and Amusa (2010) had earlier stated that climate change might be the most serious environmental threat to the fight against hunger, malnutrition, disease and poverty in Africa, mainly through its impact on agricultural productivity. This might have been the reason for the dwindling contribution of the agricultural sector to the GDP in Nigeria.

From the foregoing, it follows that sustainable agricultural productivity can only be achieved through the developments of agricultural innovations that are environmentally sensitive. There is a common agreement that climate change will have impacts on agriculture through water, especially in the African region. Poverty is said to be especially prevalent among small-scale farmers cultivating food crops and amongst the fishing communities (IFAD, 2010) and this might become worse as rainfall variability will continue to push many below the absolute poverty line (Musa, 2011). To this end, in order to stabilize agricultural produce supply and farm income and therefore reducing poverty amongst the rural populace and meet the MDGs in 2015, innovations that can ensure efficient water resources management conserve soil nutrient and are less harmful to climate need to be evolved. This will help farmers to overcome the various uncertainties that can arise as a result of climatic changes.

INTEGRATED WATER RESOURCES MANAGEMENT FOR SUSTAINABLE AGRICULTURAL PRODUCTIVITY

The IPCC (2007) report has stated that by 2020, between 75 and 250 million of people are projected to be exposed to increased water stress due to climate change. Sub-Saharan Africa including Nigeria, are more vulnerable to increase in climate variability, with projected large losses in their national output (Thurlow et al., 2009) due to loss of yield arising from reduction in the quantity of water available for irrigation and loss of land through sea level rise and associated salinization. Climate change that reduces either the overall quantity of water or the timing of when water is available for use creates a void in the knowledge of water resources planners and managers which can have important effects on agriculture, industrial and urban development.

Integrated water resources management (IWRM) is an innovative approach to support decision-making under the present situations of climate change uncertainties. It is defined as a process which promotes the coordinated development and management of water, land and related resources in river basins in order to maximize the resultant economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems (WWF, 2008). Cap-Net (2005a) also defined

IWRM as the sustainable development, allocation and monitoring of water resource use in the context of social, economic and environmental objectives. It is cross-sectoral and therefore in complete contrast to the traditional sectoral approach that has been adopted by many countries. IWRM recognizes the various uses to which water resources can be put into and their interdependence. By this, IWRM can ensure regulated and sustainable use of water resources to prevent water wastage. Since sustainable availability of water resources is a requirement for sustainable agricultural productivity, it follows that with IWRM, the agricultural sector can cope better with climate change. It will ensure that water resources are well equitably distributed amongst the completing sectors of the economy and therefore making water available for domestic uses to further enhance good sanitary conditions at homes for healthy living. This is without prejudice to demands from the industrial sector while also catering for environmental demands.

According to WWF (2008), IWRM has been the accepted management paradigm for efficient, equitable and sustainable management of water resource since the early 1990s. It is based on the principles that (i) fresh water is exhaustible; (ii) water planning and management should involve participatory approach, (iii) provision, management and safeguarding of water requires women playing a key role; and (iv) water is economic good. To achieve all these, implications of water resources impacts on the economy are taken into account in the formulation of policies and priorities, not forgetting the two-way relationship between macro-economic policies and water development, management, and use. Also, policy developments are based on the integration of all sectors, while stakeholders are allowed to speak on water planning and management, with particular attention to securing the participation of women and the poor. There is proper coordination of all decision making organs of governments such that water-related decisions made at local and river basin levels do not conflict with or run contrary to the attainment of broader national objectives. Water planning and strategies are integrated into broader social, economic, and environmental goals.

Presently, there are indications that the afore-stated innovations have not been incorporated into water management in Nigeria; most water policies are not properly coordinated. The locals, states and federal governments are probably not on the same page in terms of policy formulation and implementation. Many water projects embarked upon by the federal government in Nigeria linger for many years without completion while those that have been completed are not optimally exploited. An example is seen in the case of Owena Multipurpose Dam in Ondo State which was commissioned in 2007, but yet to be utilized for any meaningful purpose. There is no proper monitoring of water availability; wetlands are not well managed and auditing of groundwater recharge has never been done. Adequate data required for planning and research is not available while many have seen water resources management as governments' business. On the overall, it might interest all to know that the executive bill which sought to establish the Nigerian Integrated Water

Resources Management Commission (NIWRMC) passed by the National Assembly in 2007 was not signed 4 years after (Musa, 2011). This is in spite of the fact that IMRM was adopted by the World Summit on Sustainable Development in 2002 as a strategy to achieving the MDGs (MUSA, 2011).

CONCLUSION

The year 2015 set for the attainment of the goals of the MDGs is less than two years from now and there are evidences that Nigeria is yet to meet 60% percent of the goals. As a result of high unemployment rate, poverty and hunger is increasing especially amongst the rural populace which constitute about 80% of the entire population. Agriculture which is a key contributor to the GDP and a ready source of employment opportunities for over 60% of the population is being hampered by climate change through extreme weather events which altogether have implications for water availability. This has negative impacts on sustainable agricultural productivity and as well capable of hampering the means of livelihoods in the rural areas and therefore leads to increasing poverty and hunger. Sustainable agricultural productivity is anchored on availability of water. To this end, we conclude that with integrated water resources management (IWRM) a new approach to water management, which has the capacity to ensure equitable water distribution amongst all sectors of the economy, sustainable agricultural productivity can be made possible to reduce poverty and hunger and therefore meet the MDGs.

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