Doma Dam and Challenges of Development in Doma Area, 1973-2023

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Abstract

Dam construction by the Federal Government of Nigeria was perceived as a remedy and an alternative means to curb the menace of rampant water shortage that have been responsible for decrease in food supply in Doma area over the years. Therefore, the main motives behind the construction of Doma Dam by the Federal Government of Nigeria was to engage farmers in both the raining and dry season in irrigation farming system, provision of fish, provision of food as well as to sustain clean drinking water and for other domestic use for Doma people. The study unveils the significance of dam in the transformation of agricultural production, alleviate poverty and create job opportunities, improve the peoples standard of living of the Doma people through adequate water supply for th ehost communities and food supply throughout the year. The study also finds out that despite the potential of Doma Dam to generate electricity power supply, it is yet to tap into this. The objective of this study includes; to assess the extent of water provision to Doma people through the dam, to investigate how Doma Dam aided agriculture and food production in Doma area and to examine how Doma Dam create employment. However, despite the laudable potentials of the dam and its contributions to the development of Doma area, the Dam is faced with several challenges, some of which are: lack of maintenance and sustainable government policies. The study concludes that Doma Dam has the potentials of eradicating the poverty level in Doma area and its environ if adequate attention is given to sustained funding, maintenance by government and patronages by other stakeholders as well as the host communities are ensured. The study adopts qualitative method with in-depth scrutiny of all sources so as to ascertain their authenticity before the analysis, interpretation and presentation of findings.

Keywords: Dam, Challenges, Development,Area.

Introduction

Dam construction or building started long time ago across the globe. The Sadd-el-kafara Dam, built in Egypt is believed to be the oldest dam in the world. It was built around 2700 B.C., located on the Nile River about 20 miles south of Cairo for the purpose of conservation of water for human usage and industrial development.[1] Also, by 1000 B.C. the Assyrians built dams across the Tigris River near Samaria and other places in Mesopotamia. The Romans also built many dams which is best known as the Cornaldo earth dam north of Merida in southern Spain.

In Nigeria, the effect of the Sahelian drought of 1972 – 1975 aggravated food shortage in the country prompting the various levels of government to embark on a rigorous policy to increase food production.[2] To achieve this, impoundment of river basins were seen as inevitable to provide sufficient water for year-round irrigation which led to the construction of over 246 dams. Their reasoning of Nigeria leaders was that in the midst of food crisis and poor power supply that bedevilled Nigeria, dams will serve multiple purposes of boosting agricultural production, improve economic opportunities and power supply.

Moreover, the idea of harnessing rivers and their basins for systematic and optimal utilisation of their resources for human benefit is of historical antiquity but no proper regard was given to harness the abundant potentials either by individuals, host

1. EtosaUyigue, *Dams are Unrenewable; A Discussion Paper,* CREDC, March (2006), 3
2. EtosaUyigue, *Dams are Unrenewable; ...*4

communities or the Nigeria government until the outbreak of food crisis that was widespread and rampant in the early 1970s.[3] In response to the above food crisis, Doma Dam was constructed to provide potable water, water for irrigation farming and also to provide fish for the people of Doma area. The major mandate which the River Basins Authorities were saddled with in Nigeria at the turn of 1970's was to ensure a comprehensive development of both surface and underground water resources.

It was in this perspective that the Federal Government of Nigeria (FGN) through the Lower Benue River Basin Development Authority (LBRBDA) established the Doma Dam in 1973 to serve three major purposes.[4] Firstly, provision of domestic water for Doma metropolis. Secondly, the Dam will promote food sufficiency through establishment of irrigation farming, and thirdly, the Dam will provide fish for Doma people and its environs. However, four decades after the construction of this Dam, no scholarly historical research has been carried out on this project; thus, little is known about this Dam. Coupled with this is the general comatose situation of the Dam despite the major financial investments made by the Federal and State government towards the realisation of the goals and objectives of this Dam.

This study therefore examines the establishment of Doma Dam by appraising how it affects the socio-economic development of the people of Doma area from 1973-2023. The study is divided into the

3. O.N. Njoku, *Economic History of Nigeria, 19th – 21st Centuries* (Second Edition, Revised and Extended), Nssuka-Nigeria: Great AP Express Publishers Ltd, (2014), 317-319.

4. H. Joseph, "How Doma Dam Project Raised Hope, but Frustrated Irrigation Farming" *Daily Trust*, Vol. 34 No. 99, June 19, (2014), 32

following sub headings: introduction, conceptual clarification, geographical description and historical overview, Doma Dam and socio-economic development of Doma area, challenges confronting Doma Dam, way forward and conclusion.

Conceptual Clarification

Dam

Dam means different thing to different scholars. According to Etiosa, Dams are barriers constructed across a stream or river to harness water for one of the following uses; to concentrate the natural fall of a river at a given site in order to generate electricity,[5] to direct water from rivers into water supply systems, to direct water into canals and irrigation systems, to increase depths for navigational purposes, to control flow during times of flood and droughts, and to create official lakes for fisheries and recreational uses. Thus, many Dams are multi-purpose and fulfil several of these functions.

Yusuf and Akashe on their own part see dam as one of the artificial methods through which man modifies river and other alluvial processes. It also represents one of man's methods of developing water resources and the best strategy for averting the effects of perennial drought in the dry lands of the world.[6] They further argue that dams have been constructed in order to prevent floods, supply drinking and domestic water to generate energy, also for irrigation

5. EtosaUyigue, "Dams and Livelihood: The Problems of Parasitic Diseases in Communities Hosting Dams in Nigeria" *Society for Water and Public Health protection.*

6. Y.O. Yusuf & A.A. Akashe, "The Doma Dam and its Socio-Economic Implication in Doma Local Government Area of Nasarawa State" *International Journal of Humanities, Arts, Medicine and Sciences* (BEST: IJHAMS), BEST Journals, Vol. 2, Issue 4, April (2014), 87-88

purposes since the old times. They have a great deal of positive and negative implications on the environment. The benefits of dams include controlling stream regimes, preventing floods, obtaining domestic and irrigation water from the stored water and generating energy.

From the various conceptions of dam by various scholars, the researcher is of the opinion that a dam can be seen as man-made and deliberate effort to conserve water into a particular place which can be used for various purposes with the aim of improving his living condition and having control of the world around him. Part of the reasons why dam is established includes: it serves as a source of electricity power generation, provides water for irrigation farming, provision of clean water for domestic usage, supply water for industrial usage, and the provision of fish. It can also serve as a tourist centre and provide avenue for recreational activities.

Development

Development on the other hand means many things to different people. It means to improve the living conditions of a people, partly by supplying them with a good and suitable infrastructure such as roads, funding, railway, well-equipped schools and medical facilities.[7] Development entails the supply of social amenities such as electricity and clean water, a healthy environment recreational facilities and it also means giving the people good education so that they can become enlightened and be able to appreciate the facilities provided for them. Development also means or connotes more employment opportunities for the

7. B. Barkindo, B. Omolewa and G. Babalola, *Africa & the Wider World 3: Africa Since the Scramble,* Ikeja: Longman Nigeria Plc, (1994), 243

people either in government, private sectors or through self-employment. A developed country has modern industries which offer employment to its citizens and provides them with the necessities of life. The citizens of a developed country feel that the state is powerful enough to protect them at all time.[8]

Rodney sees "development as multidimensional in nature".[9] At the individual level, it implies increased skill and capacity, greater freedom, creativity, self-discipline, responsibility, material well-being and relations of men in the society. At the level of social groups, development implies an increasing capacity to regulate both internal and external relationships, how men were able to organise themselves a group to exploit and harness their environment for their own benefits.[10] He further argues that society develops economically when societal members are able to effectively deal with and exploit their environment. Development is universal because the conditions leading to economic expansion are universal.

Nnoli conceptualized development as a dialectical phenomenon in which the individual and society interact with their physical, biological and inter-human environments in the process of transforming them for their own betterment and that of humanity at large and being transformed in the process.[11] To him, the lessons learnt need to pass from one generation to another and it has to involve changes in man's and creative energy. It is an unending

8. B. Barkindo, *Africa & the Wider World 3: ...* 243
9. W. Rodney, *How Europe Underdeveloped Africa*, Abuja: Panaf Publishing, Inc., 2005, 1-2
10. W. Rodney, *How Europe ...*1-2
11. O. Nnoli (ed), *Path to Nigeria Development* (London: Codestria Book Series Lawrence Hill Publisher, (1981), 36

improvement in the capacity of the individual and societies for their own benefit and that of humanity at large. Nnoli opines that development is a progressive process that probably has no end because no developed or underdeveloped or developing society have fully realized their potential creativity and probably will never achieve it because no nation has achieved a complete mastery of all the obstacles on its part to social bliss, and there may never be. As old challenges have been overcome, new and sometimes more intractable ones emerge.[12] Development connotes training in the art of using local resources and creative human energy in problem solving rather than a wholesale invitation to the path of good life, that is, man's progressive qualitative and continued self-improvement.

Dudley Seers posed the basic question about the meaning of development when he asserts some fundamental issues concerning development. To him, the questions to ask about a country's development are therefore what have been happening to poverty? What has been happening to unemployment? What has been happening to inequality? If all three questions above have declined, then a country is said to be on the path of development. If one or two of these central problems deteriorating, especially if all the three have been, it would be strange to call the result "development" even if per capita income doubled.[13]

Todaro on his own part sees development as the process of improving the quality of all human lives.[14] He outlines three important aspects of development, which are as follows; first,

12. O. Nnoli (ed), *Path to Nigeria Development* … 36
13. O. Nnoli (ed), *Path to Nigeria Development* ... 36-37
14. M.P Todaro, *Economic Development* (England: Addison Wesley Longman Limited, England, 1997), 685

raising people's living levels – their incomes and consumption levels of food, medical services, education among others through relevant economic growth processes; secondly, creating conditions conducive to the growth of people's self-esteem through the establishment of social, political, economic systems and institutions that promote human dignity and respect and thirdly, increasing people's freedom by enlarging the range of their choice variables by increasing varieties of consumer goods and services.

Hence, development can be summarised as all the processes that bring about improvement in human life, enhanced environment, healthy living, access to knowledge, availability of sufficient resources for decent living standards, and conducive democratic atmosphere necessary for peaceful co-existence and national stability.

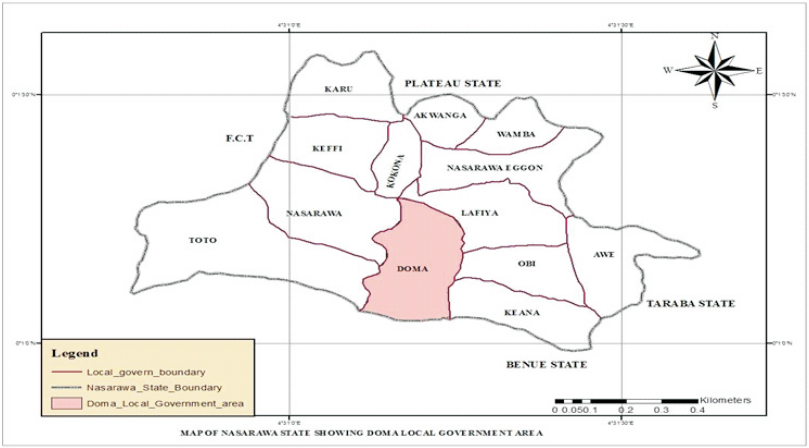
Geographical Description and Historical Overview of Doma Area

Doma is the headquarters of Doma Local Government Area in Nasarawa State, Nigeria. It is located between latitude 70501 and 80301 north of the equator and longitude 80 and 80241 east of the Greenwich meridian.[15] Doma Local Government shares a common boundary with Lafia Local Government in the North, and Awe Local Government Area in the North-East, Kokona Local Government Area in the North-West, Nasarawa Local Government Area in the West, in Nasarawa State as well as Makurdi and Gwer Local Government Areas of Benue State in the South.[16] Doma is 24km away from Lafia the Capital of Nasarawa

15. Y.O. Yusuf & A.A. Akashe, "The Doma Dam and its Socio-Economic … 89
16. Programme for the Formal Restoration of Third Class Chieftaincy … 17

State. It is an area of about 2714kilometres square (2006 population census) with an estimated population of 137,220.[17]

Map of Nasarawa State showing the different Local Government Areas



Source: Y.O. Yusuf & A.A. Akashe, "The Doma Dam and its Socio-Economic Implication in Doma Local Government Area of Nasarawa State" *International Journal of Humanities, Arts, Medicine and Sciences* (BEST: IJHAMS), BEST Journals, Vol. 2, Issue 4, April 2014, 89.

Doma Dam is located at about latitude $8^{0}20^{1}$ N and longitude $8^{0}20^{1}$ on the Ohina River.[18] The road from Lafia to Doma is a laterite road and provides reasonable access at all times of the year. The road from Doma town to the dam site needs to be improved and extended by the Lower Benue River Development Authority. The area lies between 500m -1000m above average sea level. The two broad geological terrains of Doma town are the basement complex

17. Programme for the Formal Restoration of Third Class Chieftaincy … 17
18. *Programme for the Formal Restoration of Third Class Chieftaincy* ... 17

terrain in the north and the sedimentary terrain in the south.[19] The Doma formation is brownish and often laterite at the top getting less and less ferrogenised and more whitish with depth, while the sand at the top of Doma Dam area forms the aquifer of the Doma sub-basin. It is blackish to grey, sometimes carbonaceous or calcareous.

The location of the study area falls within the zone of cretaceous sediments (sedimentary basin) and it is deposited during the marine transgression about 130 million years ago.[20] The commonest sediments found in the area are silica sand, galena, limestone clay, chloride sepheterite, sodium and bartyle.[21] The relief of a particular environment influences its drainage pattern. This means that; there is a correlation between the relief forms which greatly influence the drainage pattern of the study area which is characterised by streams and rivers. These rivers and streams dry off their water during the dry season while in the wet seasons they swell off their water volume. This in turn has a negative impact on the economic base of the people in the study area such as farming and fishing.

Annual rainfall in the region ranges from 1500 to 2000mm.[22]The duration of rains here is rather lengthy, spanning between 7 and 8

19. Report on Lower Benue River Basin Development Authority Makurdi, Nigeria, *Mada River Project, Doma Scheme, The Design, Manufacture, Delivery C.I.F. to Site and the Supervision of Installation of above Ground Sprinkler Irrigation Systems,* 3
20. Nasarawa State Ministry of Land and Survey …
21. Nasarawa State Ministry of Land and Survey …
22. Y.O. Yusuf & A.A. Akashe, "The Doma Dam and its Socio-Economic Implication in Doma Local Government Area of Nasarawa State" *International Journal of Humanities, Arts, Medicine and Sciences* (BEST: IJHAMS), BEST Journals, Vol. 2, Issue 4, Apr 2014, 87

months in a year (April-November). This zone covers the lowland areas; it is characterised with deep fertile alluvial soils which are enriched with abundant forest biomass.[23] The forest savannah zone covers Toto, Nasarawa, Doma, Keana, and Awe local government areas.

The climate of Doma Local Government is the hot humid tropical type. The temperature of Doma not too harsh/high as compared with that of the Far Northern Nigeria;the mean monthly temperature in Doma is 26.80C.[24] On the other hand; relative humidity is less than that of the southern part of Nigeria. The temperature variation of humidity in Nasarawa State indicates less than 40% around January but it will continue to rise to a maximum of about 88% in July, while steady rains commences in April when relative humidity will be at about 75%. By August when the Inter-Tropical Discontinuity (ITD) is at its northern most position, the entire state will be under the influence of the tropical marine wind (MT). This high relative humidity will continue till December, though with a noticeable slight decline from October to December.[25]

Doma is an ancient town with traditional structures and has natural features like hills (onyibi), forest and few rivers (Ohina, river Mada, Okpayanku, Otiya, Ruttu) that flow directly into river Benue. The dry season in the area which is from November to March is characterised by high temperature that ranges from 66^0C to 87^0C and this often affects dry season farming or irrigation

23. Y.O. Yusuf & A.A. Akashe, "The Doma Dam and its Socio-Economic Implication in Doma … 87
24. www.LBRBDA.net.Information on Doma Irrigation Scheme, 3
25. www.LBRBDA.net.Information on Doma Irrigation Scheme, 3

farming in the area as streams and small rivers in the area usually dry up.[26] Doma soil consists of brown sandy soil with loams overlying brown which is good for the cultivation of cereals and grains such rice, maize, groundnut and the few swampy areas usually dry up due to sandy nature of most parts. This is because the soil cannot retain water for a long period of time. Farming alongside handcraft such as weaving, pot making are the major economic activities of the Alago people who are the majority ethnic group in Doma with other ethnic groups such as Tiv, Eggon, Migili, Bassa people cohabiting since the pre-colonial period. The Alago people live in basic family units just like the Idoma (ole) which consists of a man, his wife, children and dependants.

In the period before the establishment of Doma Dam, the people of Doma area exploit the streams and water bodies around them basically for domestic or household usage.[27] They made use of water from the wells, streams and rivers for drinking, bathing and embark on skeletal hand watering irrigation farming system at the bank of the streams and river. Basically, crops grown include tomatoes, pepper, spinach, okro and maize in small quantities. They equally engage in fishing activities from streams and the Ohina River not as their major occupation but as vocational and occasional activity to provide diet for their family. Shedding light on the peoples exploits, Emmanuel Adagbo says that the basic method used by people in catching fish before the advent of

26. For details, see M.A Akwe "A Critique of Alago Traditions of Migration, Settlement and Inter-Group Relations" in Jonathan M. Ayuba (ed) *Book of Readings,* Makurdi: Aboki Publishers, 2010, pp. 82-84. Also see U.I Oboshi "A Survey of Socio-Economic Development of DomaAlago During Pre-Colonial Epoch" Project submitted to Department of History, College of Education Akwanga, Nasarawa State, 1992, 11-13

27. *Interview;* Muhammad Ari, Male, 78years, Farmer, Sabon-Gari in Doma, 22-10-2015.

modern instruments such as net and hooks were traps and the blockage of water and draining of small streams.[28]

Doma Dam and Socio-Economic Development of Doma Area

Doma Dam and reservoir was constructed to effectively utilise surface water throughout the year for irrigation farming, domestic and municipal water supply and fishing.[29] The Kenting Earth Science Limited and Shawmont Limited are the two Canadian firms that were awarded the contract to conduct design and construct Doma Dam in August 1973.[30] The project was sponsored and financed by the Federal Ministry of Agriculture and Natural Resources and supervised by the Ministry of Natural Resources and Cooperative, Benue Plateau State. The Doma Dam is constructed across River Ohina in Doma after the feasibility study was carried out by a Canadian consulting firm and the site was found suitable for the construction of a Dam.It has a foundation of at least 105m above sea level and at the crest its height is 132m above sea level. To be precise, the Dam is 28m high and 520m long. The width at the foundation is 160m and at the crest it is 18m. The dam links the following communities; Alagye, Kogon Lemu, Ruwan Baka, Dogon Kurmi (Iwashi) and Ruttu in the present day Doma Local Government and Amaku in the present day Nasarawa Local Government areas of Nasarawa State respectively.[31] The dam runs 16 kilometres in length with over 35 million cubic metres

28. *Interview;* Emmanuel Adagbo, Male, 66years, Farmer, Burum-Burum Road-Doma, 23-02-2016
29. M. Ukuedojor, "Declining Fortunes of River Basins" in *Daily Trust,* (Vol. 26 No. 87, 10-05-2011),22
30. Report on *Mada River Feasibility Study and Design, Federal Ministry of Agriculture and Natural Resources. Executed by Ministry of Agriculture, Government of Benue Plateau State*, 1-2
31. Y.O Yusuf & A.A Akashie, "The Doma Dam and its Socio-Economic Implication"... 87-88

of water. It provides a natural habitat for various sea life including fishes of many species. The Doma Dam is at an elevation of 130 metres above mean sea level. It is bounded approximately by Latitude 8^0 20' N and Longitude 8^0 20'E. The construction of the Doma Dam was completed in 1986 and was commissioned in 1988 by the then President and Commander-in-Chief of the Armed Forces, General Ibrahim Badamasi Babangida.[32] The construction of Doma Dam in Doma area has impacted positively on the lives of the people. The establishment of the dam brought high hopes and expectations to the people of the area because it goes a long way in transforming the well-being of the people especially in the aspect of water provision and utilising the dam water for agricultural and other purposes.

Job Creation and Revenue Generation

Dam construction in Doma area has resulted in the employment of several people during the construction and management of the dam.[33] Furthermore, labour needs during the dam's construction led to an increase in population and the expansion of market where exchange of agricultural products and fish took place. Fishing, recreation and tourism have been enhanced by the dam's construction thereby generating employment and increase income of fishermen. Furthermore, fish provides communities with animal protein in their diets. The fishing industry rates as one of the most significant benefits of the dam to the economy of Doma and its inhabitants. Fishing and aquaculture also provide food and livelihoods for thousands of resource-poor people in the area, and have become even more important to regional food security as the

32. J. Hir, "How Doma Dam Project Raised Hope, but Frustrated Irrigation Farming" *Daily Trust (*Tuesday June 19, 2014, Vol. 34 No.99),32

33. *Interview* Ezekiel Sule, Male, 33+years, Fishing/Student, Doma Dam Treatment Site Community, 19-02-2015.

climate changes and other sources of food increasingly become less reliable.

Income is also a reflection of the standard of living.[34] It is socio-economic characteristics of the amount of money received by an individual for work done, goods and services or a reward for capital over a period of time.

Provision of Potable Water

The importance of water to humans and animals cannot be over emphasised. The above assertion is further buttressed in the World Book Encyclopaedia that water is the most common substance on earth.[35] It fills the oceans, rivers, lakes, in the ground, in the air we breathe, thus, water is everywhere.

The utility of water to humans is enormous and without it's there will be no life because we need it in our homes for cleaning, cooking, washing, bathing and carrying away wastes. We use water to irrigate dry farmlands so we can grow more food. Our factories use water more than any other material. Water is used to produce electricity. As such these have created more and more pressure on the significance and demand for water every day.[36] As the human population keeps increasing in Doma area, so is the need for more water. We live in the world of water yet there is widespread shortage of clean and good water.

It is a well-known fact that water is not only an essential element for the existence of any form of life but it also brings about

34. *Interview* Ibrahim Obiya, Male, 45yrs, Watchman, Doma Dam, 19-02-2015
35. *The World Book Encyclopaedia,* 1996, 116
36. J. Ehusani "Why You Should Drink More Water" *Nigeria Pilot Newspaper,* Vol.3No. 999, Saturday September 6, 2014, 22

economic and social growth. The survival and well-being of humans are primarily related to their access to clean and good water resources, both in meeting their biological needs and also as a major drive for their socio-economic development.[37] In all sectors of human endeavour and in every human settlement (be it farmstead, village, town, city, metropolitan area or whatever), water is greatly important and it predates the settlement of early man.[38] Man is only found in places where he could get little quantity of water for drinking. However, the history of growth and development of any settlement all over the world cannot be complete without water around which the early settlers settled. With the advent of civilization, various forms of water preservations and storage emerged.

The forms and types of water preservation and storage used depend largely on the technological advancement, needs, and the environment. So many communities depend on rain water, streams, pond and lake waters; ocean (saline water) is distilled for use among some communities. Big rivers are commonly dammed for large supplies and wider coverage and usage. Wells and bore holes are dug to reach groundwater at various depths among some communities.[39] Doma Dam is about 9 000 m^3/d which is about 69% of its installed capacity and with about 8 hours pumping time. The limited operational hours are attributable to lack of electricity power supply or funds to purchase diesel for the pumping of

37. *The World Book Encyclopaedia,* 1996, 116
38. H.O Nwankwoala, "Groundwater Management Systems in Nigeria: Implications for Economic Growth" *International Journal of Environmental Issues*, Volume 7 Number 1 June 2010, 25
39. H.O Nwankwoala, "Groundwater Management Systems ... 51-52

water.[40] The main source of power supply at Doma dam is through the use of two power generating sets, one of which is out of service thereby reducing the capacity to generate electric power.

Additionally, roofs of buildings at the plant site are periodically ripped off due to wind storms. By 2013, the LBRBDA provided the Nasarawa State Water Board with 9 million cubic of water for treatment from Doma Dam but only 2880 million cubic is usually pumped to its reservoir behind St. John Bosco Secondary School along Alwaza road in Doma. This is done two to three times in a week for onward distribution to Doma community.[41] Below are the two reservoirs built in order to preserve the water pumped from Doma Dam for onward distribution to the people of Domatown.

Doma Dam reservoirs located along St. John Bosco Secondary School and Alwaza road meant for Water Supply to Doma people.



40. K.A Aderogba, "Groundwater Development in Nigeria: A Study of Abeokuta-Ewekoro-Ifo-Ota-Agbara Axis in Ogun State, Nigeria" *International Journal of Environmental Issues,* Volume 3 Number 1 June 2005, 52

41. Project Completion Report of Plateau State Water Supply Project sponsor by African Development Bank African Development Fund Nigeria, 12



Source: Field Work by Author on 08-08-2014

The above pictures show the concrete building and aluminium made Doma Dam reservoir along Alwaza road behind St. John Bosco Secondary School Doma with a water reservation capacity of over 9000 million tons. The reservoir tanks are used for storage of water that is usually pumped on daily or weekly basis as the case may be from the main Dam along Alagye road for onward distribution to the people of Doma area. The provision of the above reservoirs has gone a long way in reducing the stress and difficulties that confront the people of Doma area, most especially the women and children during the dry season. It also provided for the first time, clean drinking water for majority of Doma people and also improved their health status.

Water is an important national resource, in fact, one of the most important natural resources. Yet, government officials do not attach much importance to it. The role of the Federal Government of Nigeria in water supply to her citizenry is not visible enough when compared to electricity, transportation, communication, among others. Indeed, water supply until recently was essentially the responsibility of state governments. Many of the states had

their water boards/public utility boards charged with the responsibility of making available potable water especially in urban areas. Despite all these roles or significance of water to human existence, little attention is paid to it.[42] The provision of safe and sufficient water and water resources to meet the cultural, social and economic needs of all Nigerians in a way that will enhance public health, food security, poverty eradication while maintaining the integrity of freshwater ecosystems of the nation is a major objective and the goal of water resource management in Nigeria.[43]

The Lower Benue River Basin Development Authority does not restrict the Water Board from using dam water for treatment and supply to Doma area. The Water Board was established to supply treated water to the populace of Doma local government area. Although the water supplied by the Board is still not enough, this effort has tremendously reduced the problem of domestic water supply in the study area. The provision of potable water supply has improved the social condition of the people in Doma area and signs of social change in this regard can be observed. The improved water supply is insufficient but has substantially raised the standard of living of the population by reducing the time spent on obtaining unsuitable water from distant sources especially by women and children. The time saved is being utilised for the pursuit of other socio-economic activities.[44] In acknowledging the importance and usefulness of the dam, Zainab Audu says that;

42. *Interview;* Ibrahim OmadefuIdris, Male, 35+years, Civil Servant, Doma, 08-08-2014
43. *Interview;*OkpedeAbubakar M., Male, 34+years, Civil Servant, Doma, 08-08-2014
44. *Interview;*ZainabAudu, Female, 60years, Business Woman, AgwanMadauci-Doma, 23-02-2016

before the opening of the Doma Dam, women and children trekked for over two hours to get water for domestic use from seasonal streams. However, this has stopped with the opening of the dam thereby ensuring that women and children have reduced if not eracdicate the time they spend searching for water.

Establishment of Irrigation Farming

The study area is characterised by streams and rivers. These streams and rivers usually dry up during the dry season and the water volume do swell up or increase during the wet or rainy season.[45] The area usually experience rainfall from the month of March/April and ends by October/November. This often has negative effect on the economic base of the people as farm produce, especially food items, could not meet the needs of the inhabitants all year round due to shortage of rainfall. Even during the rainy season, there are incidences of low farm yield. It was against this backdrop that irrigation was seen as a suitable alternative by Doma people following the establishment of Doma Dam to ameliorate their food problems. It is important to know that irrigation will not be necessary if the distribution of rainfall were ideal for the growing of crops throughout the year. In Nigeria, the variations between the north and south are quite significant in terms of agro-climatic conditions and respective agricultural practices.[46]

45. M.K Yahaya, "Development and Challenges of Bakolori Irrigation Project in Sokoto State" *Nordic Journal of African Studies* 11(3), 2002, 412

46. S.A. Rahman "The Status of Agricultural Production in Nasarawa State" in O. Akinwumi*et al* (eds), *Studies in the History and Culture of the Peoples of Nasarawa State* (Zaria: Ahmadu Bello University Press, 2010), 257. see also W.M Adams, "Large Scale Irrigation in Northern Nigeria, Performance and Ideology" *Transaction of the Institute of British Geographers,* NS 16, 2003, 287-300

Although irrigation farming is practiced among various communities in Doma area even before the establishment of Doma Dam as rivers and streams were among the water resources in the state and Doma area in particular, it provided a great potential for dry season agriculture due to the tropical climatic condition of the area but the practice was not large hectares of land.[47] The farmers practice irrigation during the dry season to provide food crops and fresh vegetables by using hand watering system. Doma Dam is under the management of the Lower Benue Development Authority and was designed for over-head sprinkle system purpose. The crops being grown under the irrigation schemes include okro, tomato, pepper, jute, sugar-cane, egg-plant, rice, maize and onion.

Potential and developed land areas for irrigation in Nasarawa state show in the table below;

Location/Scheme	Potential land areas hectares)	Developed land areas (hectares)	LGA
Doma irrigation scheme	20000	1500	Doma
Ruttu surface irrigation scheme	750	250	Doma
Rukubi surface irrigation scheme	1500	500	Doma
Keffin-Wambai irrigation scheme	500	200	Lafia
Dep-SabonGidaBakinKogi	2750	150	Lafia
Tedde-Rize-Ungwar Zaria	1000	500	Akwanga
UngwarJarmai Keffi (Tiv point)	700	100	Keffi
Gwalada Panda	1000	750	Keffi

Source: Nasarawa Agricultural Development Programme (NADP), Lafia, 2002

Above table shows that 8 areas are identified and suitable for irrigation farming across Nasarawa State but Doma has the highest potential land of about 20,000 hectares and 1500 hectares were developed for irrigation purposes.

47. www.net.Information on Doma Dam Irrigation Scheme

Irrigation farming is a major agricultural activity during the dry season along flood plains, river courses and dam environment.[32] Irrigation farming increased rapidly due to the pressure of survival and need for additional food supplies to the ever increasing population.

General Idris Garba (Rtd), the former Military Governor of Benue State, carried out irrigation farming using equipment provided at the dam on a land of between 10 to 15 hectares along Doma-Alagye road, off the Ohina River in the early 1990s.[48] The retired military Governor cultivated maize and other cereals on that fertile land for about three years, using irrigation facilities at the dam, including newly installed sprinklers in what marked the test run on the Federal Government initiated irrigation farming technology on the edge of Doma Dam.

In 1988, the UTC contractors were awarded contract for the rehabilitation and installation of the machinery needed at the engine house to pump water to farms: The contract includes the maintenance of water pumps, panels and generator for power supply.[49] Pipes were laid from the dam up to Ruttu some 15-20km away from the area that was projected for irrigation scheme. In all, 20,000 hectares of land around Doma was projected for gravity irrigation but the government saw to the laying of only 1500 pipes, covering 1600 hectares to make up for a part of phase 1. UTC engineers test run the irrigation system using the gravity system that was installed.

48. J. Hir, "How Doma Dam Project Raised Hope, but Frustrated Irrigation Farming" ... 32
49. Mada River Feasibility Studies ...

Doma Dam pump-house and storage reservoir is to provide the following services which include the Doma sprinkler irrigation development and servicing 1800 hectares of land using water supply from the proposed Doma reservoir. The water for irrigation will be supplied by a pumping station located near the dam, having a pumping capacity of 1800 l/s at a delivery pressure of 470 kpa.[50] The water will be delivered through a buried pipe network to hydrants on each farm unit. The above ground moveable sprinkler system is attached to the farm hydrant irrigation of the individual blocks. Doma Dam and the country as a whole witnessed a slow pace in development of large projects in the decades that followed 1980 to 1990, with renewed and increased interest in small-scale irrigation. The investments in irrigation development have been enormous and have produced many types of technologies in irrigation. The final results are far-reaching, while some painful and bitter lessons have been learnt. Gains in crop yields are lost due to lack of proper processing and storage facilities of farm produce.

Challenges Confronting Doma Dam

The desire and expectations of Doma people following the establishment of the dam were cut short due to the failure of the dam to provide the expected water for irrigation farming, provision of enough drinking water and water for other domestic usages and the continuous presence of hyacinths as well as the illegal spreading of chemicals have short lived the dream of making Doma Dam a fish providing dam for Doma people. The major challenges that confronted and that are still confronting Doma Dam are lack of proper maintenance as well as the lack of sustainable government policies.

50. J. Hir, "How Doma Dam Project Raised Hope, but Frustrated Irrigation Farming" ... 32

Lack of Proper Maintenance

River Basin Development Authorities are not properly monitored and supervised. There is no real measure in place to monitor and oversee how appropriated funds are utilised. This therefore explains why funds are often channelled on purposes that are unconnected to the original mandate.[51] The implication of the interplay of some of these factors is that the river basins have failed to deliver. Other problems facing the Authority include, lack of functional machinery and equipment for routine maintenance, grossly inadequate technical and extension staff, lack of skill improvement training for project staff, and inadequate inputs, credit and other support services. According to Hajiya Lami,[52] pipes and equipments meant for installation across the farms that are designated for irrigation and pumping of water to Doma town were left scattered all over the dam site and have been overtaken by grasses, rusted pipes and legumes. Some of the projects are already suffering dilapidation and seriously damaged and some are beyond repairs. Below are some of the pictures of abandoned pipes and collapsed buildings at the dam site.

Below are rings pipes for abandoned Overhead/underground Irrigation Doma Dam Site.



51. Project Completion Report of Plateau State Water Supply Project sponsor by African Development Bank African Development Fund Nigeria, 26.
52. *Interview*HajiyaLami, Ex-Project Manager, Lower Benue River Basin Development Authority, Doma, Female, 60+ on 08-08-2014



Source: Field Work by Author on 08-08-2014

The above pictures are large pipes that litter the farmlands of Doma some kilometres away at the Dam site and across farmlands due to lack of proper maintenance. The pipe dreams are supposed to take pressured water from the Dam to sprinkle crops even far off. The Pipes are rusty from the three decades of rain and sun while some of them are half covered by the fertile soil of Doma area. They lie in length, choked by shrubs and the roots of trees that have grown over them in the last three decades and some of these pipes were even stolen. Doma Dam just like any other dam is not built without a significant cost. In addition to substantial adverse impacts on the physical environment, there are disruption of lives

and properties of people living in the reservoir area.[53] Even when thorough surveys of people adversely affected by dams are conducted, which is not always the case; it is not easy to recognize all the adverse impacts of dam construction on the affected people. Impacts that are not fully identified are difficult to fully mitigate. Poorly planned and implemented dams can devastate local socio-economic systems without replacing them with a comparable and acceptable alternative system.

The adverse impact of dam construction is compounded when the affected people belong to indigenous groups with a close relationship to the lands on which they live. The land likely to be submerged behind a dam could be supporting a distinct culture, with a language, and customs and traditions that are unique to the location. Resettlement of people from such locations is a much more difficult process, and can be successful only if the affected people themselves determine that acceptable alternatives exist, and those alternatives are actually offered to them. The sustainability of the project's operating conditions is unlikely. It would be very difficult for the Water Board in their present operating environment to internally generate enough funds in the short to medium term to cover operational and maintenance costs, let alone provide for depreciation based on re-valued assets and contribute to system expansion. According to Anzaku,[54] the water is hardly up to two feet deep due to increasing growth of weeds and water hyacinth which reduce the quantity and quality of Doma Dam water as they keep on encroaching deep right inside the water. The illicit and unguided practices of fishermen and the illegal

53. Okereocha, "Why the River Basins Are Failing" *TELL Magazine*, Tue, 05/11/2013

54. *Interview*Anzaku Benjamin, Male, 52yrs, Tractor Operator-LBRBDA, Doma, 20-02-2015

activities of unknown persons who often use dangerous chemicals and drag nets to catch fish have reduced the fishes in the dam to mere fingerlings.[55] This was made possible due to lack of proper monitoring and maintenance of the Dam water by the authorities concerned.

Lack of Sustainable Government Policies

Unstable government policies, obsolete equipment, insecurity, inadequate hydrological, processing and storage facilities, lack of adequate and qualified staff are the major challenges confronting Doma Dam. Besides,[56] the RBDAs are not properly monitored and supervised.

The military coup of December 31, 1983 that terminated the administration of AlhajiShehuShagari and many ongoing projects were stalled. Doma Dam was one of such projects as the regime of General Muhammadu Buhari / Tunde Idiagbon had no time to look the way of Doma Dam. The Babangida administration also did not pay attention to Doma Dam and this made NCC company to pull out its engineers, sacked the local workforce (labourers), abandoned many equipment at the sites, including the pipes meant to sprinkle water on crops at the farmlands.[57] A visit to the Dam site confirm the abandonment of equipments such as pipes, residential and office buildings lying waste and many worn out by the nearly three decades of abandonment. According to Hir Joseph, the dam project generally and Doma Dam in particular is aimed at boosting irrigation, flood control, navigation and pollution control, agricultural services and rural electrification, thus, it impacted

55. J. Hir, "How Doma Dam Project Raised Hope, but Frustrated Irrigation Farming" *Daily Trust Newspaper,* Vol. 34 No 99, June 19, 2014, 32
56. Okereocha, Chikodi, "Why the River Basins Are … 05/11/2013
57. J. Hir, "How Doma Dam Project ... 32

positively on the lives of Nigerians. However, the fortunes of the authorities declined as the institutions suffered policy reversal, non-maintenance and virtual neglect of their facilities, as well as projects abandonment.

Over the past decades of the existence of Doma Dam, series of dangerous fishing practices had been witnessed through entering of the dam with drag nets and clearing of the fishes. Presently, the illicit unguided practices have depleted the habitat that was once in Doma Dam. This is as a result of the lack of proper utilization of Doma Dam as only skeletal irrigation farming and local fishing took place throughout the period of its existence. The abandoned large pipes that litter the farmlands of Doma, some few kilometres away from the dam, are the physical aspects of pipedream to take pressured water from the dam to sprinkle crops that are far off. Also, out of the over 20,000 hectares of land around projected for gravity irrigation, only 1,500 pipes, covering 1,600 hectares were put into use which makes up the Phase 1. The main pumps to supply water to the irrigation farms were not put into proper use.

According to Joseph Gosa, another major challenge to the effective and efficient functioning of Doma Dam in Doma LGA of Nasarawa State is the inadequate funding of the irrigation project by the government. This has hampered the realization of sustaining the irrigation farming scheme.[58]

Way Forward

The Presidential monitoring team that visited the dam sometimes in 2012 has to some extent drawn the attention of the government,

58. *Interview* Joseph Gonsa, Male, 50yrs, Irrigation Assistant-LBRBDA, Doma, 20-02-2015.

private organisations and general public to the abandoned visionary project put in place by the Nigerian government since 1970s. The clamour by both the State and Federal governments to encourage individuals, private and non-governmental organizations to embark on irrigation farming will probably go a long way in the event of the revitalisation of the Doma Dam.

The presence of Islands across Doma dam can be used in building tourist centres, recreational centres and hotels for relaxation and other social activities that can take place especially during holidays, festive periods and serve also as a good source of eco-tourism for the community. Eco-tourism is a more sustainable development strategy that protects the ecosystem and at the same time serve as an income and also employment provider for the local community. This entails travelling to natural areas that conserve the environment, contributing at the same time to the welfare of the local society by creating employment and income generation but unfortunately in the case of Doma Dam, the benefits of ecotourism were yet to be tapped despite the availability of Islands across the dam. If illicit and unguided practices that depleted habitats and fish in Doma Dam over the years such as the use of chemicals and drag nets in catching fish are curtailed and proper maintenance of the dam water which has been overtaken by water hyacinths that have encroach deep into the body of the water is discourage and prevented by the LBRBDA and Water Board staff, it will increase the volume of the water and serve as home for aquatic animals and other aquatic habitats. Government attempt to enforce and punish any offender according to the laid down rules and regulations governing water body in the country will restore private and individual investors' confidence to harness the opportunities available in Doma Dam.

The ongoing construction of roads and bridges which hitherto discourage many people and investors to have interest in the dam will attract not just local investors but foreign investors that want to invest in Nigeria's agriculture and tourism industries. Above all, there is no doubt that the governments both at the State and Federal levels are interested in resuscitating Doma Dam and the inclusion of LBRBDA into Nigeria's annual budgets is not enough as there is no proper implementation of the budget for the purpose it is meant for. The readiness of Nasarawa State government to revitalise and boost economic activities in Doma area using Doma Dam have begun to yield fruit with the arrival of Olam Nigeria Limited, a Singapore company presently in Rukubi-Agbashi under Doma Local Government Area.

The Over 20,000 hectares of fertile of land acquired by LBRBDA since 1973 using Doma Dam for irrigation purpose will serve as a major boost. The land is still under the custody of LBRBDA and can only be leased out upon the payment of some token. Government needs to engage in mass mobilization and sensitization of indigenous people by assuring them of the holistic desire to improve on the present effort to resuscitate the dam.

Conclusion

The establishment of theDoma dam has created both skilled and unskilled labour for the people, opened up the area to outsiders and have also diversified the socio-economic activities of the area. Farmers engage in an all year round farming activities as against the rain-fed farming that was hitherto practised prior to the establishment of the dam.The construction of the Dam in the area have boosted irrigation farming, provide potable drinking water for other domestic usage and also provide fish to the inhabitants of

the area. Food security and the improvement of health condition are the bedrock or pre-requisite for any meaningful development to take place as this goes a long way in curbing the menace of extreme hunger, poverty, reducescases of typhoid and other water-borne diseases such as, schistomiasis, create job opportunities for large numbers of people especially farming activities, trading, part-time and full-time fishing during the dry and wet season respectively. However, the objective of the dam establishment was short lived due inconsistency in government policies, corruption, bad leadership, lack of funding. Above all, if appropriate measures such as adequate funding, proper maintenance, completion of ongoing road construction to dam site as well as the boosting of other infrastructural facilities, increase of manpowerare taken into consideration, it will help toimprove the living standardof the people and also the socio-economic activities of Doma people and its environs.

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