



Accelerating Land Restoration, Drought Resilience And Desertification Progress: A Case For The Completion Of Dallaje Dam Irrigation Project Katsina State, Nigeria

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ABSTRACT

The World Environment Day 2024 is celebrated with the theme accelerating land restoration, drought resilience and desertification progress. The theme is aptly applied to make a case for the completion of the Dallaje dam project in Katsina State, Nigeria. Data for the research were collected through direct observational technique during field visit to Dallaje village and the dam site. Additional data were collected through the administration of questionnaire on the residents of the Dallaje and the surrounding villages that are beneficiaries of the project. The results have shown that the project is presently abandoned with the people expressing their unhappiness on the condition. The results further showed that the completion of the dam project will accelerate land restoration, drought resilience and progress in combating desertification in line with the theme of the World Environment Day. The people and other relevant stakeholders are making efforts to ensure the resumption of the work and the subsequent completion of the project. It is recommended that the State and Federal Government should join hands together to ensure the completion of the project in view of its importance to the socio-economic development of the people.

Keywords: Environment day, land restoration, drought resilience, desertification, dam project, Dallaje dam

INTRODUCTION

The World Environment Day June 5th 2024 is celebrated with the theme “Accelerating Land Restoration, Drought Resilience and Desertification Progress”. The main event is being hosted by Saudi Arabia at the capital, Riyadh where the United Nations Convention to Combat Desertification (UNCCD) will be held later in 2024 (UNEP, 2024a). The 2024 edition is under the slogan “Our Land, Our Future, We are #Generation Restoration” as the year marks the 30th anniversary of the UNCCD (UNCCD, 2024). Land restoration is a key pillar of the UN Decade of Ecosystem Restoration (2021-2030), a rallying call for the restoration and revival of ecosystems all around the world which is critical in achieving the Sustainable Development Goals (SDGs) (UNEP, 2024b).

Land restoration is the process of restoring degraded or damaged land to a healthy and productive state. It can include various activities such as biodiversity conservation, reforestation, soil improvement, soil erosion control, water management and climate change mitigation. Land restoration is important for many

reasons such as it can improve the livelihood and wellbeing of the people who depend on land for food, income and other services. Land restoration can reverse the creeping tide of land degradation, drought and desertification affecting many arid and semi-arid regions of the world (UNEP, 2024).

Drought is a prolonged and widespread deficit in available water supplies that creates multiple stressors across ecosystems and communities (USGS, 2024). Drought resilience on the other hand is a measure of a system's ability to absorb, respond and recover from drought risk, which is a product of the size of the risk, as well as the capacity of the system to adapt (DAFF, 2024).

Drought is a slow-onset disaster characterized by the lack of precipitation resulting in water shortage which can have serious impacts human health, agriculture, economies, energy and environment (WHO, 2024). According to the World Health Organization (WHO) (2024), an estimated 55 million people are affected by droughts globally every year and droughts are the most serious hazards to crops and livestock in nearly every part of the world. Also, according to UNCCD, the number and duration of droughts have increased by 29% since 2000 and without urgent action droughts may affect over three-quarters of the world's population by the year 2050 (UNEP, 2024b).

Desertification is the process by which vegetation in dry lands that is arid and semi-arid such as grasslands and shrub lands decreases and eventually disappears (Iberdrola, 2024). It is the persistent degradation of land ecosystems by human activities such as unsustainable farming activities, mining, overgrazing, cutting down forests and climate change. A third of the world's land surface is threatened with desertification with over 4 million square kilometers of land is being degraded every year (TWC, 2024). One hundred and twenty thousand square kilometers (120sq. kms.) are turned into actual deserts and by 2045; 135 million people could be displaced as a result of desertification (TWC, 2024).

One of the activities involved in land restoration is water management through irrigation especially in arid and semi-arid regions of the world. Construction of dams to store water for irrigation and water supply is one of the major ways of ensuring drought resilience. Progress in combating desertification is recorded through the application of water on dry lands to plant crops during the dry season when there is no rain. Based on the above it can be argued that construction of dams for irrigation is one of the major ways of accelerating land restoration, drought resilience and progress in combating desertification.

In Nigeria, the States affected by drought and desertification are located in the northern region. Thirty eight percent (38%) of the total land mass of Nigeria is facing the threat of drought and desertification (Ayuba, 2005). This percentage corresponds with the frontline States of Bauchi, Borno, Jigawa, Kano, Katsina, Kebbi, Sokoto, Yobe and Zamfara (Ayuba, 2005). This paper is focusing on one of the States listed above which is Katsina State. The State is found within the zone of drought and desertification as about two-third of the land mass is under the threats (Alo *et al.*, 1998 in Ladan, 2004a). Since the creation of the State on September 27th 1987, several measures have been adopted by successive administrations to ensure land restoration, drought resilience and progress in combating desertification.

The aim of the paper is to examine how accelerating land restoration, drought resilience and progress in combating desertification can be achieved with the completion of Dallaje dam irrigation project in Bindawa LGA of Katsina State. The aim will be achieved through the following objectives which are to trace the history of the dam irrigation project, to ascertain the present condition of the irrigation project, to explain how the completion of the irrigation project could lead to land restoration, drought resilience and desertification progress and to recommend measures that could lead to the completion of the project.

Description of the Study Area

Dallaje is the name of a village settlement in Doro district of Bindawa LGA of Katsina State. The dam is located close to the village hence the name of the dam as Dallaje dam. Bindawa LGA is one of the thirty four LGAs of Katsina State created on September 21st with headquarter at Bindawa town by the military regime of General (Rtd) Ibrahim Babangida.

The LGA is located on latitudes 12 ° 31' 30'' and 12 ° 49' 30'' North and longitudes 7° 43' 30'' and 8° 01' 30'' East in the northern part of Katsina State (See figure 1). The LGA shares boundary to the north with Mani LGA, to the North West with Rimi LGA, to the west with Charanchi LGA, to the south with Kankia and Kusada LGAs and to the east with Ingawa LGA (See figure 1). The LGA consist of two Districts of Bindawa and Doro covering an aerial extent of 398kms. The LGA has a population of

151,002 as at the 2006 census final results released by the National Population Commission (Bawa, 2013). The major occupations of the people are farming, cattle rearing and trading activities in daily and weekly markets within and outside the State.

In terms of physical setting, the relief is part of the High Plains of Hausa land of Northern Nigeria. The drainage consists of small and large streams that drain on the land of the LGA, one of the large streams is dammed to create the Dallaje dam. The climate is also part of the Tropical Continental climate of northern Nigeria that is characterized by long dry season and short wet season. The vegetation is Sudan savannah type characterized by short scattered trees, shrubs and grasses dominating the landscape particularly during the rainy season. The figure below shows the study area, Bindawa LGA.

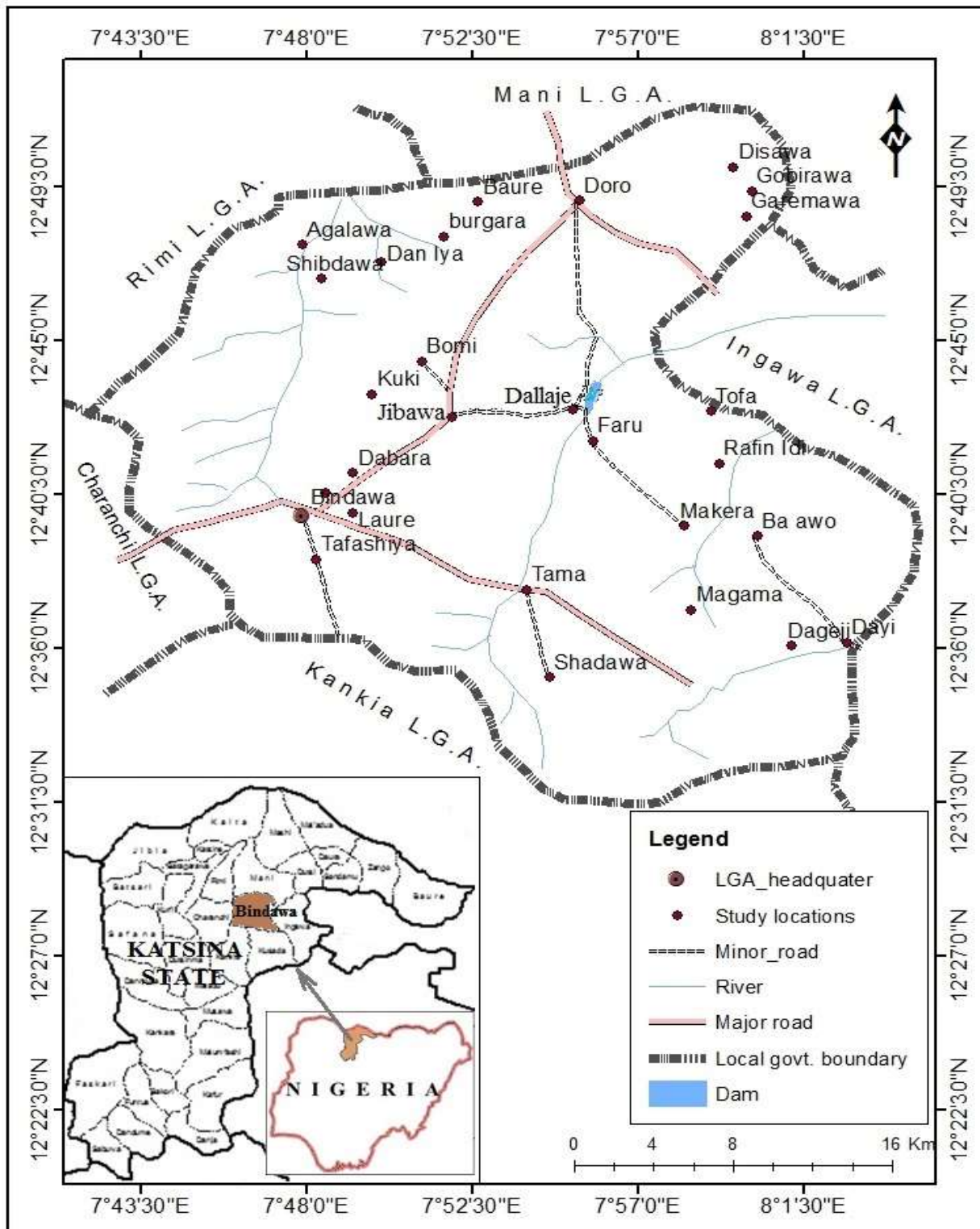


Figure 1: Map of Bindawa Local Govt. Area as the study Area.

MATERIALS AND METHODS

One of the materials used in the study is the map of the study area Bindawa LGA. The map was drawn at the Cartography Unit of the Department of Geography Umaru Musa Yar'adua University Katsina, Katsina State. Another material used is an Infinix Hot 8 cell phone to snap the dam site which is included in the study. The picture shows the present condition of the dam project and the level of the contract work done at that level.

Field visit was conducted to the Dallaje village and dam site to observe the condition of the dam project on May 25th 2024. Other observations were made on the land area under cultivation, the crops cultivated and the physical setting of the area. The field visit was carried out with the assistance and guidance of two Research Assistants who are the son of the Village Head and a native of the village who is concerned about the status of the project.

A structured questionnaire was distributed to fifty (50) residents of the village who are aware of the project and its status. Those who completed the questionnaires are therefore purposively sampled based on their knowledge of the dam project and its present status. Some of them are farmers who are using the little water contained in the dam for irrigation purposes at present. The questionnaire consisted of two sections designed to collect data on the demographic characteristics of the respondents. Section B consisted of the main research questions that formed the main focus of the research. The research questions are: What is the history of the Dallaje dam project ?, What is the present condition of the dam project and how can it be described ?, How can the completion of the dam project accelerate land restoration, drought resilience and progress in combating desertification ? What measures would be recommended towards the completion of the dam project ?

Additional data were collected through Key Informants Interview (KII) involving a former staff of the project and an indigene of Ingawa town in Ingawa LGA, which is the source of one of the two large streams that were dammed to create the Dallaje dam downstream. Questions asked are on the history of the project and its present condition.

Secondary sources of data were collected through desk research from textbooks, journal articles, conference papers, environmental reports and internet sourced materials. The data collected from both the primary and secondary sources were analyzed through descriptive statistics in forms of percentages, tabulation, averages, means etc.

RESULTS AND DISCUSSION

Demographic Characteristics of the Respondents

The table below shows the demographic characteristics of the respondents.

Table 1 : Demographic characteristics of the respondents

S/No.	Characteristic	Frequency	Percentage
1.	Gender		
	Males	50	100%
	Females	00	00%
2.	Age range		
	20-29 years	04	08.00%
	30-39 years	12	24.00%
	40-49 years	12	24.00%
	50-59 years	16	32.00%
	60-69 years	06	12.00%
3.	Marital status		
	Single	00	00.00%
	Married	50	100%
4.	Number of wife/wives		
	One	20	40.00%
	Two	20	40.00%
	Three	10	20.00%
5.	Number of children		
	1-4	16	32.00%
	5-9	16	32.00%
	10-14	18	32.00%
6.	Educational qualification		
	Qur'anic education	24	48.00
	Primary school	14	28.00
	Secondary school	12	24.00
7.	Occupational status		
	Farming	24	48.00%
	Trading	14	28.00%
	Cattle rearing	08	16.00%
	Fishing	04	08.00%
8.	Place of residence		
	Dallaje	16	32.00%
	Faru	10	20.00%
	Wali	08	16.00%
	Yar' Kuki	06	12.00%
	Tokarchi Maishudiya	06	12.00%
	Makera	04	08.00%

Source: Data analysis (2024).

The demographic characteristics of the respondents show that all (100%) are males and this is because they are the heads of households who engage in various activities and occupations associated with the dam. The age range of the respondents indicated that majority (32.00%) are within the ages of 50-59 years. This age range is more knowledgeable about the dam project right from the time of its conception to the present time. The marital status of the respondents indicated that all (100%) are married with those married to one or two wives being the majority (40.00% each). The number of children is what differs between them with the majority (36.00%) having 10-14 children. This number of children has made them

to be more concerned about the completion of the dam project which would provide employment opportunities to the children.

In terms of educational status, majority of the respondents (48.00%) have Qur'anic education. The occupational status of the respondents shows that majority (52.00%) are engaged in rainy season and irrigation farming even though the number of the respondents practicing irrigation farming is declining due to the present condition of the project. The residency status of the respondents shows that majority (32.00%) reside at Dallaje village where the dam is located. Other villages are located at the other side of the dam like Faru or along the stream emanating from the spillway of the dam downstream.

History of the Dallaje Dam Project

On the research question of what is the history of the Dallaje dam, the responses vary. The respondents within the age range of 60-69 years who constituted 12.00% stated that the dam project was conceived in 1979 during the administration of Late Alhaji Balarabe Musa, the Governor of the defunct Kaduna State. The dam was to be constructed as an Earth dam at the end of a lowland where rain water flows during the rainy season. The site was adjudged to be unsuitable due to its proximity to the houses at the Dallaje village.

Respondents within the age range of 30-39 years of age who constituted 40.00% stated that the dam project was inaugurated in November 2009. The project was awarded at the cost of N4.3 billion with a completion time of two (2) years (Katsina Post, 2020). Dignitaries present at the inauguration ceremony included the then Senator Katsina Central Senatorial district Late Alhaji Kanti Bello, the former secretary to Katsina State Government Late Alhaji Bala Kuki and the District heads of Bindawa, Dutsi, Ingawa and Mani. The District Heads of Dutsi and Mani were present as the dam project was meant to supply portable water to their district headquarters.

One of the streams that supply water to the dam flows around Ingawa town hence the name Ingawa-Dallaje dam. Another large stream, the Dagau stream, flowing from Kankia town joins the Ingawa stream flowing out of Masibil dam to also supply water to the Dallaje dam. The dam is a Federal Government of Nigeria project brought to Bindawa and Ingawa LGAs by the Late Senator. The Federal Ministry of Agriculture and Water Resources is the client Ministry in charge of the dam project under the supervision of Sokoto Rima River Basin Development Authority (SRRBDA) Gusau road, Sokoto, Sokoto State. The dam project contractor is Hassuni Engineering Services Nigeria Limited located at Plot 1077 behind Zone D National Assembly Quarters Apo, Garki Abuja. The consultant is Poseidon Technologies/ Bayi-Sada & Associates located at 15A Danmarna road, Kaduna.

The dam is a medium-size project based on the size of the dam which is 7-8 km in length and 2-3 km in width, its water holding capacity and the proposed land underutilization. The project included construction of dam and irrigation outlets, water treatment plant, road construction and electrification that would benefit a number of communities when completed (Katsina Post, 2020). Table 2 below shows the historical timeline of the project.

Table 2 : Historical Timeline of the Dallaje Dam Project

S/No.	Year	Authority/company of concerned group	Activity, Pronouncement and or expectations
1.	1979	Defunct Kaduna State Government	Conceiving the idea of establishing the project close to the Dallaje village
2.	2009	Federal Government of Nigeria	Inauguration of the dam project at a suitable site outside the village. Construction work started earnestly at the site in all the components of the project.
3.	2010	Managing Director SRRBDA	Construction of the dam would be completed in two (2) years.
4.	2011	Federal Government of Nigeria.	Project work stopped at the dam site.
5.	2014	Federal Fiscal Responsibility Commission (FRC) Abuja	Declaration that the contractor had abandoned the project while on tour of the project.. The project has attained 50% completion rate based on the field verification rate.
6.	2015	Dallaje Community and Surrounding Villages	High expectations of resumption of the project work following the election of former President Buhari into office.
7.	2016	Federal Government of Nigeria	Resumption of work at the dam site.
8.	2020	Academic Research on Natural Resources in Katsina State	Dam projected included among uncompleted projects in Katsina State.
9.	2021	The Contraction Company Hassuini Engineering Services	Stoppage of project work that started in 2016 due to funding issues and challenges of inflation.
10.	2022	Federal Ministry of Water Resources Abuja	Federal Minister declared project as 70% completed and an ongoing priority project.
11.	2023	Federal Government and the Contracting Company	The dam project was declared as abandoned following many months of inactivity.
12.	2024	Dallaje Community and Surrounding Villages	Complains about the incomplete and abandoned nature of the project to the media.

Sources: Mohammed (2010), Muhammad (2014), Mutawalli (2020) and Ladan & Tukur (2024).

From table 2 above, it can be observed that the dam project was conceived in 1979 but inaugurated in 2009 with a completion period of two years. In 2011, work stopped at the time the project should have been completed. In 2014, the contractor was declared to have abandoned the project after collecting 50% of the contract money (Muhammad, 2014). But during physical verification exercise of the project by the Fiscal Responsibility Commission, the Chairman of the Commission identified non-release of funds as the main reason hindering the completion of the project (Ogwu, 2014). From 2015 to date (2024), changes in governments and its priority, inflationary trends and no budgetary allocation affected the project leading to the present status as an abandoned project despite the huge sums of money already spent.

The Present Status of the Dam Project

On the research question what is the present status of the dam project, all the respondents (100%) indicated that the project is abandoned. This is because the last time work resumed at the dam site, it was in 2011, three years ago at present (2024). Also, the contractor has withdrawn equipment from the site including the field staff. At present, the only staffers left on the project site are eight security guards to prevent theft of some of the projects assets. During field visit to the dam site on May 25th 2024 none of the security guards was seen on duty.

Observations on the component parts of the dam reveal that the internal reservoir is not completed as it is visibly not deep enough to store water. The intake tower is under construction with the link way to the tower under construction with three supporting pillars still standing. The dam embankment is still under construction as it is not high enough to block the flow of water out of the dam. The construction of the auxiliary spillway is complete but heap of laterite is found in front of the spillway. The irrigation outlets could not be seen as they may likely be constructed once the components of the dam are completed. Works have started on the other components of the project such as water treatment plant; road construction and rural electrification but are at 40% completion rates. The figure below shows the dam project site.



Figure 2 : Dallaje dam site showing the uncompleted nature of the dam.

Description of the Present Condition of the Project

On the research question of how would the respondents describe the present condition of the project, the responses vary with 45.00% describing it as “sad and unhappy”. This is due to the fact that under normal circumstances the project could have been completed many years ago. The people of Dallaje and the surrounding villages could have been the beneficiaries of the projects producing crops by irrigation farming, providing employment to the youths and generating income to sustain their livelihoods. According to one of the former staff of the project, up to 300 people could be found working in different sections of the project when work was ongoing. Therefore, the stoppage of work had led to loss of jobs and source of income to the people of Dallaje and surrounding villages.

Majority of the respondents (55.00%) described the present condition of the dam project as “frightening”. This group of respondents comprised mostly the middle-aged and the elderly who are concerned about the present and future generations who could have been gainfully employed in irrigation farming. This would prevent them from seasonal migration to Southern Nigeria during the dry season to do menial jobs

referred to as *chi rani* in Hausa. Also the chances of picking up some bad habits while in the South would be reduced. It is also frightening that at the time the price of farm produce has surged in Katsina State, their farmlands are lying idle and unproductive. If the dam project had been completed, the people could have been producing vegetables and some food crops earning income and contributing to food production at a time the country is facing food crisis.

How the Completion of the Dam Project Could Lead to Accelerating Land Restoration, Drought Resilience and Progress in Combating Desertification:

On the research question of how can the completion of the dam project accelerate land restoration, drought resilience and achieve progress in combating desertification, the respondents have put forward the explanation below:

1. Accelerating land Restoration-

Land degradation is a common occurrence in Northern Nigeria as a result of human factors such as deforestation, bush burning, overgrazing and natural factors such as lack of adequate rainfall and persistent aridity in some areas. This despite the abundance of land available to the region for agricultural production of food and cash crops (Ladan, 2004b). This makes land restoration a necessity and a priority in several parts of the region in order to restore agricultural lands back to productivity.

The completion of the dam could lead to the availability of water in the dam throughout the year. The water will be released slowly into the farmlands through the irrigation outlets. Therefore lands that have become dry and unproductive due to the ceasing of rainfall will become productive again. The farmlands at Dallaje are suitable for the production of vegetables, rice and maize through irrigation. A major crop produced in large quantities after the ceasing of the rainfall is water melon which is transported for sale in markets in Katsina, Kano and Daura. But during its planting season in 2023 there was shortage of water at the dam which led to poor harvest of the crop. At present (May 2024) only two farmlands are productive, other farmlands are not due to shortage of water at the dam as can be seen on figure 3 below/



Figure 3: A farmland lying idle and unproductive close to the Dallaje dam site.

2. Drought Resilience- Construction of dams for irrigation purpose is a viable way of ensuring resilience to periodic drought in Northern Nigeria, a region characterized by seasonal rainfall. In fact, the construction of small, medium and large scale dams began earnestly following the impacts of the Sahelian droughts of 1972-1975 when aggravated food shortage prompted the various levels of government to embark on a rigorous policy to increase food production (Oyigwe, 2006).

The completion of the Dallaje dam project could have ensured drought resilience in Bindawa LGA characterized by long dry season and short wet season. During the long dry season, the dam water could have supported plants, animals and even water for human consumption thereby mitigating the impacts of the dry season. Indeed the completion of the dam is needed in view of the unfavorable weather conditions including the shortage of rain that has significant impacts on crop production and livelihoods of both humans and animals especially in rural areas like those of Bindawa LGA (ABC News, 2023). . The figure below shows evidence of prevalence of drought inside the dam as little water is available and the soil has cracked.



Figure 4 : Limited water and parched soil as evidences of drought condition inside the Dallaje dam.

3. Desertification Progress –Most dams have the growth of different plant species at their edges due to the availability of water. Along streams and rivers that are dammed, a gallery forest can grow. The growth of plant communities and the availability of water reduce the incidence of desertification. Also where there is a dam, the underground water table is close to the surface and trees can tap the water through their roots. For example a plantation comprising different species of trees has grown opposite the dam along Katsina to Charanchi road.

At the Dallaje dam site, the availability of little water in the incomplete dam has revived a plantation of mango trees. With the presence of water in the dam and plants growing in a community, migratory birds are attracted to go to the area. One of such large migratory birds was at the Dallaje dam site to breed for one week with locals visiting the dam site for bird watching. Therefore, the completion of the dam project can be a progress in combating desertification in the area while also encouraging recreational activities. The Managing Director of the newly established Katsina State Irrigation Development Authority (KSIDA) has recently stated that plans are underway to use irrigation as a tool for afforestation which is one of the most common measures of combating desertification in Katsina State (ABC News, 2024).

Recent Efforts Towards Ensuring the Completion of the Dallaje dam Project

There are some recent efforts made recently by relevant stakeholders to ensure the resumption of work at the dam site and the subsequent completion of the long overdue project.

(i)The people of Dallaje have been discussing at gatherings on how they can take actions that would lead to the resumption of work at the dam site. They have been patient in seeking the way out of the present situation while also assisting to prevent theft and vandalization of the project equipment.

(ii)The people of the villages located at the downstream of the dam such as those from Tokarchi Maishudiya are discussing how they can organize themselves and pay a courtesy visit to the Honorable Commissioner of Water resources Katsina State. During the visit they will seek for his assistance to take up the case of the uncompleted dam project to the Federal Ministry of Water Resources at Abuja.

(iii)Bindawa Local Government Council Chairman has recently visited the project site with a team of engineers to assess the level of work done and the remaining work to complete the project. The assessment tour is meant to forward the case of the uncompleted dam project to the Federal Ministry of Water Resources for further necessary action.

(iv)The people of Bindawa LGA especially those who are Friends of the Media have been calling during live radio programs on Alfijir and Vision FM radio stations to demand that they need the completion of the dam project as their own dividends of democracy from the State and Federal Governments.

(v)Some academic researchers from Hassan Usman Katsina Polytechnic, Katsina have decided to undertake research on the Dallaje dam project. The research is aimed at examining how the completion of the Dallaje dam project could boost regional development in Bindawa, Charanchi, Mani and Ingawa LGAs. This Institutional Based Research (IBR) will be sponsored by the Tertiary Education Trust Fund (Tetfund) Abuja. A copy of the research completion report will be submitted to the Katsina State Irrigation Authority for necessary action.

RECOMMENDATIONS

The following recommendations are offered towards ensuring the resumption of work and the subsequent completion of the dam project.

(i)The Chairman of Bindawa Local Government Council should continue the efforts towards the resumption of work at the dam site even if the work is skeletal and sponsored by the local government which will keep hope alive that the project will be completed one day.

(ii)Katsina State Government should undertake an assessment of the project work and then approach the Federal Government with a proposal on how to resume work and complete the project for the benefit of the LGAs and the State in general.

(iii)Katsina State Irrigation Development Authority should sink tube wells in areas where they are needed such as areas located at the downstream of the dam in order to provide water for irrigation purposes pending when the dam project will be completed.

(iv)The officials of the Federal Ministry of Water Resources including the Honorable Minister should undertake an assessment tour of the Dallaje dam site to see the level of work done and undone with a view to resuscitating the project.

(v)The Federal Government of Nigeria should approach the United Nations agencies such as the Food and Agricultural Organization (FAO) and the World Bank with a view for them to intervene in funding the completion of the project in view of its importance to the socio-economic development of Katsina State.

This recommendation is based on the present economic challenges facing the country as evident by the low standard of living of the population.

CONCLUSION

The World Environment Day June 5th of every year is a date set aside by the United Nations to examine and discuss particular environmental issues and challenges facing humanity with a view to creating positive change. The theme of the 2024 edition is accelerating land restoration, drought resilience and desertification progress. The theme is aptly applied to make a case for the completion of the Dallaje dam irrigation project located in Katsina State, Northern Nigeria. Findings from the study show that the completion of the project could have made many farmlands productive during the dry season thereby accelerating land restoration. The completion of the dam will further ensure drought resilience as water is made available for humans, animals and plants especially during the long dry season in the area. Progress in combating desertification will be achieved with the availability of dam water which will support plant and animal communities. This study is therefore making a strong case for the completion of the dam project. The revival and completion of the irrigation project will boost food production at a time the country is facing food crisis, contribute towards achieving food security and halt rural-urban migration including seasonal migration to southern Nigeria.

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