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Kwa Iboe River: Its Physical Characteristics And Economic Potentials To Host Communities In Abia And Akwa Ibom States, Nigeria

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ABSTRACT: ***Kwa Iboe River had developed into a sizeable basin with distinctive characteristics and identity in the south-eastern region of Nigeria. However, this distinction and prominence in economic sustainability to host communities have not received accurate attention and popularized in academic literature. This paper aimed at conducting an investigation on the river in order to gain insights about its physical characteristics and economic potentials in the area. The study adopted qualitative methods, employing field measurements and observations, focus group discussion, and structured interviews to gather relevant information from the target population who constituted community stakeholders purposively sampled for study. The result revealed that Kwa Iboe River had no distinctive shape but with the length of about 158.183 kilometers, it traversed over 150 communities in 5 and 13 Local Government Areas in Abia and Akwa Ibom States respectively. Its prominence in economic sustainability of host communities included facilitation of agricultural production in the catchment area, fishing and catching of other marine delicacies, lumbering and timber production, means for water transportation, provision of sand and gravel for construction as well as facilitation of petroleum and oil production activities in the area. It was however envisaged that based on its length, expanse of coverage and economic potentials, issues relative to water pollution through industrial discharge, oil spillage or whatsoever that could be detrimental to human and aquatic life could be imminent. Therefore, to ensure sustainable management and use of the natural capital, effective management procedure with regular monitoring of the water quality of Kwa Iboe River have been recommended.***

Keywords: Kwa Iboe River, Host communities, Physical characteristics, economic sustainability, sustainable management

I. INTRODUCTION

The geo-strategic position of South-eastern region of Nigeria is quite spectacular in view of its vast natural resource base and potentials for economic sustainability in the region. The natural resource base of the region comprises land, forest, water

and mineral resources. Of these, water resources (stream, rivers and seas) remain very essential for economic development and human survival. However, there are three major rivers that are commonly in operation and very influential in the region. They include Imo River, the lower Cross River and Kwa Iboe River. Kwa Iboe River remains an outstanding geographic feature and very distinctive in its form, shape and identity. Beyond its physical characteristics, Kwa Iboe River has remarkable economic influences on its host communities.

What is becoming more worrisome is the fact that the physical characteristics of this remarkable geographic feature have not been explicitly studied and well represented on the network of academic exchange. However, knowledge of its potentials for economic sustainability within and outside the catchment areas from the source region to the point of entry into Atlantic Ocean is somewhat far from reach. Consequently, the continued scarcity or complete lack of relevant information on Kwa Iboe River which could be of ample importance in respect of ecological and water resource management practices is not only a problem but a total disregard for knowledge distribution in academic exchange network.

Although there are many studies on water bodies and rivers including Kwa Iboe River, they are hardly coordinated with the possibility of assessing the physical characteristics of the river and its adjoining environments. This development does not offer the possibilities of gaining an appreciable knowledge and understanding of the prospects of the great Kwa Iboe River in terms of its potentials for economic sustainability in the areas concerned. However, Barquin & Capel (2011) carried out an assessment of physical habitat characteristics in a river in an effort to ascertain the efficacy of the river ecology and management in Spain using physical habitat assessment method (PHAM). Based on the outcome of the study, improvements and adaptation of the method used for study was strongly recommended for other geographical areas. In a related development, Ekong, Jacob and Uyanga (2011) examined pollution level of coastal water resources and the socio-economic effects on the communities in Akwa Ibom State using water samples collected from 19 locations and the socio-economic data collected with the use social survey method. The input data from the laboratory were correlated with the socio-economic data using correlation and regression analyses. The study however revealed a relationship between the pollution level and poverty profile within the coastal communities in the area and therefore recommended measures that could improve the quality of coastal water resources and economic viability of the coastal communities in not only in Akwa Ibom State but in the entire Niger Delta region of Nigeria.

Similarly, Andem, Udofia, Okafor and George (2013) investigated the level of heavy metals and total hydrocarbon (THC) in the tissues of periwinkle using 300 samples of periwinkle collected at Mkpanak (control) and Itak Abasi (downstream) in the intertidal region of the Kwa Iboe River. The study used atomic absorption spectrophotometry (AAS) to determine the level of heavy metals and soxhlet extraction gravimetric method to determine total hydrocarbon. The result however did not show any significant difference, this was attributed to less industrial activities and close proximity of stations to major roads where emissions from automobiles were abundant. However, it was demonstrated that evidence of bioaccumulation of heavy metal and total hydrocarbon was below the recommended level from Federal Ministry of Environment in Nigeria, thus implying that periwinkles from Kwa Iboe River were safer for human consumption. The authors however recommended regular monitoring of the water bodies in order to forestall cumulative effects of pollution in the fresh water environments.

It is worthy of note that in every research, the design and peculiar methods developed are necessary for ensuring the achievement of desired objectives. In the work of Ekong et al (2011) and Andem et al (2013) involving pollution levels of the coastal water and socio-economic effects on the communities as well as the bioaccumulation of heavy metal and total hydrocarbon in the tissues of periwinkle in the Kwa Iboe River respectively. Findings from these studies clearly synchronized

the health quality of water resource within Kwa Iboe River catchment region considering the time frame of the study. The recommendations so far made were quite necessary for ensuring effective management of the geographic feature and its immediate environment. This is the purpose for every successful research development. However, apart from specific objectives and the methods used in these local studies, it was observed that no attempt was made to describe the physical characteristics of Kwa Iboe River as well as its potentials for economic sustainability of the host communities. It is therefore at the instance of bridging this knowledge lag that this study was triggered.

Although Barquin and Capel (2011) carried out an assessment of the physical habitat characteristics in a river in Spain using the physical habitat assessment method (PHAM) as well, a replication of this method in the case of Kwa Iboe River in Nigeria should be readily commendable. This paper therefore strived to assess the physical characteristics of Kwa Iboe River as well as the potentials for economic sustainability of host rural communities in Abia and Akwa Ibom States. Attempts have also been made to assess the socio-cultural background of the inhabitants of the communities traversed by the great Kwa Iboe River. The paper however, used physical assessment method (PAM) employing field measurements and observations, focus group discussions, structured interviews so as to gain deep understanding of social and cultural heritage of the people as well as in-situ assessment of Kwa Iboe River.

The study however revealed that Kwa Iboe River has no distinctive shape; with the length of about 158.18 kilometers, it traversed over 150 communities in 5 and 13 Local Government Areas in Abia and Akwa Ibom States respectively. The catchment area covers the entire western and central parts of Abia State and a unification of elongated segment of Akwa Ibom State down the south. The relief pattern consists of low lying plain and riverine environments with no portion rising above 175 meters above sea level. The slope continues downward and eventually drops to about five meters above sea level at the Kwa Iboe Estuary where the river empties into the Atlantic Ocean in Ibeno LGA of Akwa Ibom State.

Its prominence in economic sustainability of host communities included facilitation of agricultural production in the catchment area, fishing and catching of other marine delicacies, lumbering and timber production, means for water transportation, provision of sand and gravel for construction as well as facilitation of petroleum and oil production activities in the area. It was however envisaged that based on its length, expanse of coverage and economic potentials, issues relative to water pollution through industrial discharge, oil spillage or whatsoever that could be detrimental to human and aquatic life could be imminent. Therefore, to ensure sustainable management and use of the natural capital, effective management procedure with regular monitoring of the water quality of Kwa Iboe River constitute the major recommendation in the study.

Significantly, it is considered that this paper ensures availability of information in the regard that the concerted efforts in development planning and effective management of Kwa Iboe River for economic growth and sustainability could easily be accessible and simplified in the near future. Consequent upon this however, an appreciable knowledge and understanding of the burning issues relative to the physical characteristics and economic potentials of Kwa Iboe River is believed to be harmonized.

II. MATERIALS AND METHOD

This study was designed to assess the physical characteristics and economic potentials of Kwa Iboe River - a distinctive geographic feature that drains most parts of Abia and Akwa Ibom. Maps and the Ikonos Satellite Imagery with spatial resolution of 0.6 by 0.6 metres of important parts of the Kwa Iboe River constitute the major materials used for the study. To better coordinate and illuminate important areas of interest for information gathering, it was however considered that such tools like focus group discussions, participant observations, field measurement and recordings of relevant information equally make up different instruments and materials employed in the course of this work. In addition, the possibilities offered in Geographic Information

Systems (GIS) were of utmost important in the aspect of mapping the geographic feature of interest and the catchment area for detailed study. In order to ensure accuracy in field data capturing, the use of digital and video cameras became very essential in an effort to take snapshots of important areas of interest.

With reference to Figure 1, the Kwa Iboe River passes through 5 Local Government Areas (LGAs) in Abia State and 13 LGAs making a total of 18 Local Government Areas in all. Consequently, for simplification in spatial coverage and effective description and assessment of the Kwa Iboe River, 18 communities, one from each LGA was purposively selected for study and data collection. This sampling procedure was adopted in order to target those communities which have effectively utilized the presence of the river for economic purposes in the area.

The sampled communities were identified from the base map of Abia and Akwa Ibom States. It became very necessary and instrumental in a bid to identify and access the target communities as well as the geographic features/landmarks on the ground.

The communities identified eventually became the sample sites for field inspection, observation and measurement including in-situ assessment. Records and snapshots of desirable features of the Kwa Iboe River were purposively taken for study. This was accurately conducted with very little or no difficulties whatsoever. In the best option, each of the communities identified was necessarily visited by the research team. During this session, and at the village councils, several meetings with the stakeholders and elders of the communities with the research team became very indispensible; this provided the platform and possible use of different research materials including structured interviews and focus group discussions. However, relevant information ranging from different management, accessibility and uses of water resources from the Kwa Iboe River were obtained. Interestingly, information relative to the ancestral, cultural, religious and socio-economic issues of the rural landscapes owing to the influence of the river were extracted and equally recorded. Moreover, digital camera was used to take snapshots of flashing areas of interest. However, the length of the Kwa Iboe River was determined using the geographic information systems (GIS) while the digital mapping was done with the help of ArcGIS 9.2 software. In view of the fact that the data obtained during field survey were largely qualitative, and having been obtained from focus group discussions and interviews, analysis of the data set was better done qualitatively with reference to the varying degrees of the research interest.

III. RESULTS AND DISCUSSION

A. *The People of Abia State and their Cultural Heritage*

The people of Abia State most preferably the rural inhabitants of Amaise, Umuoabiala, Umuoasua, Umuogwugwo, Umuokogbuo and Usaka communities where stream networks and waterfalls were traced to be the major sources of Kwa Iboe River are made up of Igbo ancestral stock identified with a common language and cultural diversities. Historically, it is firmly understood that the people were descendants from the Benin Kingdom who migrated and settled in the present Abia State. This, according to the people is evident in their behavioral patterns, artifacts and cultural inclinations. They came for trading on agricultural produce and slaves during the colonial era and however found the place comfortable for final settlement.

The main stream in Umuokogbuo Autonomous Community is called “Nneochie” which means, “Old Woman”. There is a shrine located on the “Nneochie” water which is mostly worshiped by the women cult group known as “Uzoiyi” in the community (Please See Plate 1). Traditionally, Nneochie water is believed to be sacred and as such fetching, fishing, farming within and around the Nneochie water body and hunting of wildlife on the surrounding forests are strictly prohibited.

Plate 1: The Neochie Stream believed to be the abode of ancient goddess of the land.

The traditional institution is well organized with "Eze" as the number one citizen. The Eze rules with the help of the council of elders that make up his cabinet. The family heads, village heads and development unions also help in the day to day administration of the communities. The popular "Ahia Egwu" festival is celebrated annually in the months of August. During these celebrations, there are growing opportunities for young girls of the communities who are dressed in their best traditional attire to be given in marriage to men who come from within and sometimes outside the host community to witness the celebration. Moreover, there exist other cultural practices in the area; notably are the "Ekpe", "Nzu", "Edera", "Okombo" as well as "Uzuiyi" festivals. The "Ekpe" and "Nzu" festivals are mostly celebrated in the months of April and September of every year respectively.

On youth development, the youths are usually integration to join the elders on certain occasions to observe what the elders do especially during festivals in order to help sustain their culture and traditional practices even though Christianity is pushing most of their traditions to extinction. On maintenance of peace and order within the communities, any member of the community that steals or commits any such related offence(s) is always paraded naked round the community. If any man, by any means impregnates a young girl, such a man is subjected to sacrifice a life dog to the elders in line with laid down cultural principles in order to appease the gods of the land. This is the prestigious "Ikoro"- a native means of communication which only sounds when there are emergencies like tribal wars especially during farming seasons or on notice of any suspected attacks by armed robbers etc. Various age groups exist within the communities who help in the development of the area especially during the months of April, August and December when they come together and contribute money to provide some of the lacking infrastructures within the area. This was the situation before the advent of Christianity in the nineteenth century. The earliest Christian missions in the area were the Catholic and Methodist Missions. Methodist church was first Christian denomination to establish her presence in the area while the Roman Catholic later arrived with developments including western education.

B. *The People of Akwa Ibom State and their Cultural Heritage*

Akwa Ibom State is made up of a homogenous group of people believed to have originated from a single ancestral stock (Johnson, 2013). It is important to acknowledge that in-migrations into the present Akwa Ibom land occurred in badges but the earliest migrant groups were the first to settle in the region and eventually become true owners of the land including the littorals waters. However, the major ethnic groups that make up Akwa Ibom State are Ibibio, Annang, and Oron. This notwithstanding, tracing down the southern pole of the state, there are other ethnic minorities of Eket, Ibeno and Andoni which to a greater extent, have been integrated into Ibibio ethnic stock. Before the creation of Ibibio State Union in 1928, the entire people of Akwa Ibom State were known as Ibibio, apart from Oron and Ibeno who occupied the coastal region of the state. Apparently, the ethnic homogeneity of the people became disrupted in 1951 when party politics brought about diverse interests and disputes. Thereafter, some groups hive off to create a situation which that engendered different ethnic identities, namely Ibibio, Annang, Oron, Ibeno and Andoni.

The Ibibio language belongs to the Benue - Congo language family, which forms part of the Niger -

Congo group of languages. The local languages spoken in Ibibio and Annang lands are mostly identical with a few dialectical differences. Eket and Ibeno languages are more closely related other than the other two, and are only partially understandable by Ibibio and Annang. The favourable climatic condition in Akwa Ibom State has been responsible for human habitation. The size of the population of each group as satisfactorily computed from the 2006 census data however showed that about 28.13 percent of the people occupy the eight Local Government Areas of Annang extraction, 10.17 percent occupy the four Local Government Areas in Oro nation, 1.54 percent of the people constitute the Andoni ethnic group while the Ibibio proper constitute about 60 percent of the entire population (Johnson, 2013).

On account of the prolonged human occupation and natural resource exploitation, the forest cover has largely been removed, modified, and converted in line with the needs, aspiration, and socio-economic realities of the people (Ituen, 2010). However, access to water resources (streams, seas, and rivers) for personal hygiene, domestic or commercial and any other uses is strictly managed and controlled by the local authorities. The issue of internal or external influence or whatsoever in access, ownership and control of the rural water resources is completely out of reach in the local communities.

C. Physical Characteristics of Kwa Iboe River

Kwa Iboe River has developed into a sizeable basin; its catchment area occupies the entire western and central parts of Abia State and a unification of elongated segment of Akwa Ibom State down the south. The relief pattern consists of low lying plain and riverine environments with no portion rising above 175 meters above sea level (Usoro, 2010). It is important to acknowledge that the Abia State segment of Kwa Iboe River covers four LGAs of Isuikwuato, Umuahia North, Umuahia South and Ikwuano while the Akwa Ibom State segment covers up to 13 LGAs including Obot Akara, Ikot Ekpene, Essien Udim,Etim Ekpo, Ukanafun, Oruk Anam, Etinan, Nsit Ubium, Nsit Ibom, Onna, Eket and Ibeno LGAs as indicated in Figure 1. From the point at Amaise, the river cascades through a height of over 130 meters and at the point of entrance into Akwa Ibom State at Usaka, the elevation is slightly above 63 meters. The slope continues downward and eventually drops to about five meters above sea level at the Kwa Iboe Estuary where the river empties into the Atlantic Ocean in Ibeno LGA in Akwa Ibom State.

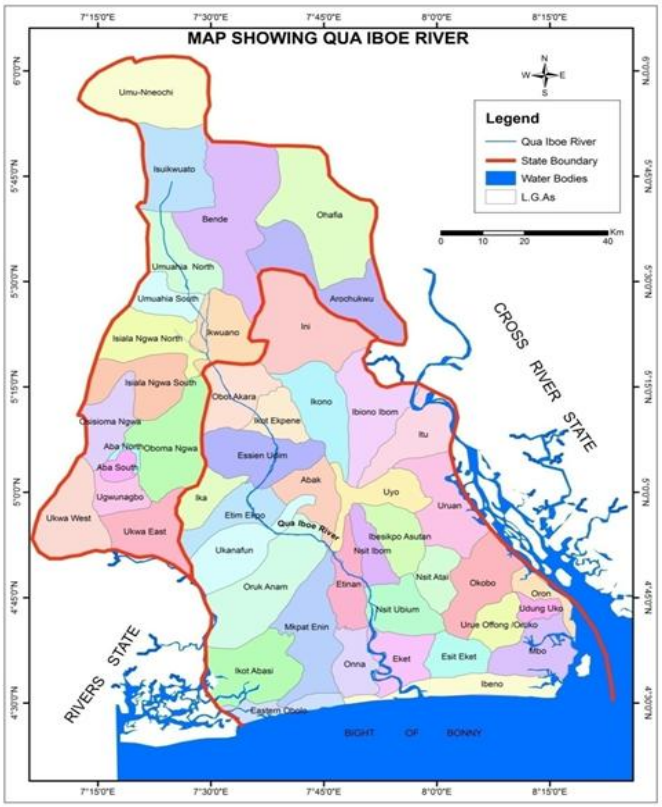

Figure 1: Kwa Iboe River traversing through Abia and Akwa Ibom States

Generally, Kwa Iboe River has no definite shape. From the upper course –the stream network flowing from the rocky landscape of Amaise autonomous community in Isuikwuato LGA, The River appears very slender and shallow. But as the flow continues down the slope, the water channel begins to expand in size and shape. The depth gradually becomes deeper and deeper. Between the middle and the lower course, the great Kwa Iboe River meanders into differing loops and at the point of entry into Atlantic Ocean; it becomes broader and broader occupying an expansive area in the watershed.

Ordinarily, the great Kwa Iboe River originates from the rocky landscape of Amaise autonomous community in Isuikwuato LGA of Abia State and eventually developed into a waterfall at Osowuruwurum community. The Osowuruwurum waterfall is located between the two contiguous communities of Umuobiala and Umuasua both in Isuikwuato LGA of Abia State and is located on latitude 05^0 $43^{'}$ $02.9^{''}$ north and longitude 007^0 $29^{'}$ $08.0^{''}$ east. The highest point on the hill is about 203m above mean sea level (Please see Plate 2).

Plate 2: The Osowuruwuru waterfall – main source of Kwa Iboe River

In addition to this main source of the river, there are two closely linked water sources that empty into the river. One is close to Umuokogbuo community located on latitude 05^0 $44^{'}$ $14.3^{''}$ north and longitude 007^0 $28^{'}$ $57.0^{''}$ east. Umuokogbuo community is situated on a height of about 183meters above mean sea level. On the other perspective, the other source of the water channel is located on a height of about 130meters above mean sea level. Upon these two closely related sources however, the Osowuruwuru waterfall is the major source of most rivers within other states around the neighbourhood. The water naturally flows from an ancient rock of great ages as shown in Plate 3.

Plate 3: The point at which "Okpuala Water" flows under the rock

Kwa Iboe River flows in the south eastern direction towards the Atlantic Ocean and traverses over 100 communities covering four (5) and thirteen (13) LGAs of Abia and Akwa Ibom States respectively. The water flows through Umuahia North and Umuahia South Local Government Areas and dissects the landscape as it cascades through Ikwuano LGA and enters into Akwa Ibom State at Usaka community in Obot Akara LGA. Usaka community is located on latitude $05^0 17^{'} 31.4^{''}$ and longitude $007^0 33^{'} 08.3^{''}$ and on an elevation of about 65 meters above mean sea level. From here, the River splits into two channels resulting from excessive outcrop of rocks along the river channel. The two channels continue to flow covering about 150 meters before joining again at a point within the Usaka community. This process however facilitated the development of a unique geographic feature - an island which is locally known as "Usaka Island". The island is identified with beautiful scenery which sometimes serves as tourist's attraction. An example of which was the hosting of the 2011 African Beauty Peargent and the 2012 Gulder Ultimate Search – a popular Nigerian Celebrity on the Usaka Island.

Plate 4: Usaka Island located on Kwa Iboe River

At the Ibeno segment of this study, there is a strip of land of parallel and sub-parallel ridges of recently deposited marine sands. A look at the scenario in Upenekang - a rural settlement located on the bank of Kwa Iboe River, the ridge extends to about 400 meters in width. Agriculture is extremely restricted on the sandy ridges. However, the oil palm plantation sited near Ibeno is to a greater extent thriving very well. The region is also characterized by mangrove swamp and river floodplains mostly found around the Kwa Iboe Estuary and the floodplains at Eket. It is however worthy to note that from the source region of the great Kwa Iboe River to the mouth - the point of entry into Atlantic Ocean, the great Kwa Iboe River is measured in length to be **158.18 Kilometers** approximately.

1) Landforms and Topography of Kwa Iboe River Catchment Area: As Akwa Ibom State lies on the coastal plains of Southern Nigeria, it is noticed that there is no part of the state that constitutes an area of appreciable high relief. However, the relief pattern consists of low lying plain and riverine environments with no portion rising above 175 meters above sea level (Usoro, 2010). The relief pattern belongs to the relatively youngest and lowest erosion surfaces in Nigeria and the African Continent. Kwa Iboe River therefore flows across substantial areas in the state from the upper course to the estuary, measured to covers an approximate length of 158.18 kilometers and inundates about 7,000 hectares of fresh water floodplains ones a year. It drains more than 50 percent of the 8,412 Square Kilometers of land area and provides all year round moisture within its catchment area. This geographic influence has somewhat effect on the topography of the affected area. However, major landforms and relief pattern common in the area comprise low-lying undulating peneplain sandy terrain, shallow depressions and numerous dry valleys. Such depressions are usually inundated during the rainy seasons and many a times create seasonal lakes which serve as major sources of water in the rural communities.

Around the Kwa Iboe River Estuary, the relief is characterized by the Atlantic Ocean shoreline and surf beach. This exhibits a beautiful and smooth sandy beach. The surf beach slopes gently between 5^0 and 10^0 into the open ocean thus, creating the beautiful scenery for tourist activities. Some of these tourist centers include the ExxonMobil Terminal Golf course and other relaxation facilities at the Ibeno beach as shown in Plate 5

Plate 5: Wide stretch of sandy beach near the Estuary

The vegetation class found around the Kwa Iboe River is a subset of the forest vegetation as presented in Figure 2. Others are cultivated land and very little of mangrove vegetation found around the river estuary. First, the fresh water

swamp forest as shwon in Figure 2 serves remarkable economic purpose as the forest is subjected to lumbering activities producing timber for different purposes including building of houses, civil engineering works like road construction and furniture. However, the persistent cutting down of trees seem to hinder navigation as most of the felled trees fall into the river channel. The Kwa Iboe River catchment area is dominated by cultivated lands particularly at the upper segment (Please see Figure 2).

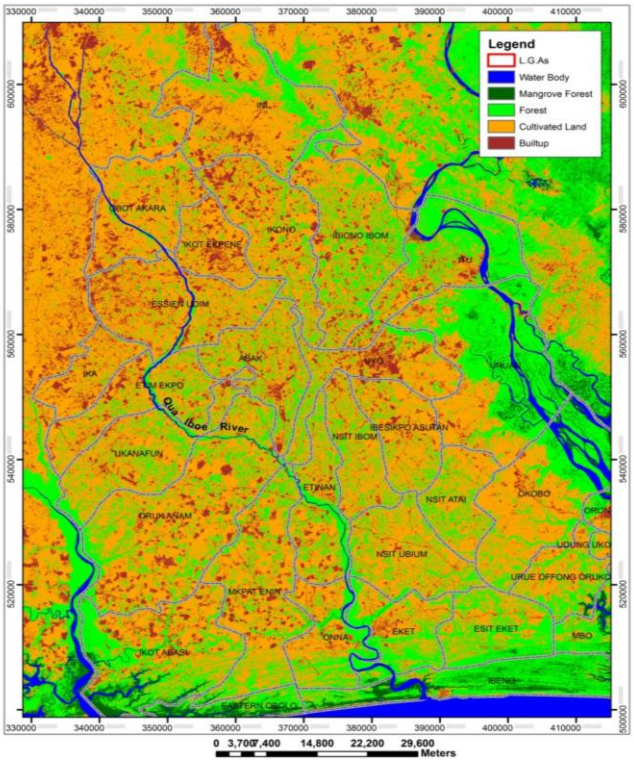

Figure 2: Vegetation and land use in Kwa Iboe River catchment area

This is an indication that the much needed moisture to facilitate all year round farming is guaranteed within the catchment area. In many of these communities, farmers cultivate garden crops including water leaves, fluted pumpkin, pepper, garden egg, cocoa yam, and many others all of which contribute immensely to the growth of the state's economy. But then, it is acknowledged here that the potential for dry season cultivation in particular has grossly been under-exploited as large expanse of wetlands drained by the river continue to be perpetually in wasted.

Rainfall pattern within the catchment region is usually very high with annual average ranging from 2000mm to 3000mm (Uniuyo Meteorological Station). Rainfall lasts for about 9-11 months on yearly basis. The maximum possible insolation ranges from 800 – 900 ly day^{-1} (AKS, 1989), while the maximum possible sunshine hours varies between 11 and 12 hours. The values of insolation and sunshine hours are considerably reduced due to thick cloud cover. The mean minimum temperature is 24^0c, while the mean maximum is about 30^0c.

The highest temperature value in the area occur in February and March, just before the onset of the rainy season while the lowest temperature for the area are recorded in July, August and September when heavy rains and clouds cover tend to reduce the amount of insolation received from the atmosphere. Relative humidity in the catchment area varies between 70% and 80% (AKS, 1989 and University of Uyo Weather Station). While July has the highest value, January records the lowest. The condition of relative humidity is influenced by the Inter-Tropical Discontinuity (ITD) and the consequence prevalence of either the Maritime Airmass (MT) or the Dry Continental Airmass (CT) – the Harmattan, which is locally known as "Ekarika". While the area is under the influence of the former between April and October, it comes under the influence of the latter between December and January.

Air quality over the area has a close linkage with the seasons. During the short dry season, the air becomes dry and dusty especially since most roads in this study area are not tarred. Also, during this period, slash and burn mode of land preparation for agriculture contributes significantly to releasing carbon into the atmosphere thus polluting the air. Conversely, during the rainy season, the air becomes less dusty as the problem of slash and burn activity is absent hence, leading to an improvement in the air quality.

B. Kwa Iboe River: Its Potentials for Economic Sustainability

Kwa Iboe River plays significant role to sustain the local and state economies with its vast natural

resource base. Experience and close observations of the local and state economic activities in the area simply revealed that crop production, fishing and catching of other marine delicacies, lumbering and timber production, pottering, means of transportation, sand and gravel mining as well as petroleum and oil production constitute the major economic activities within and around Kwa Iboe River catchment area. However, it is important to discuss the basic economic activities common in the area in the following sub-headings

1) ***Crop Production****:* The soils fertility is known for its outstanding ability in support of agricultural production. This has been the main stay of the local and state economies over the years. Major crops produced in the area are seasonal while other agricultural harvests are produced all year round mainly for family consumption and income generation. Women are actively involved in the production of majority of crops as shown in Table 2.

Table 2: Category of crops and list of major agricultural products

S/No	Category of Crops	Crop Varieties Produced in the area
1.	Vegetables	Fluted Pumpkin, Okra, Waterleafs, Beater leaf, Scent leafs, Tomato etc.
2.	Fruits	Pineapple, banana, plantain, Guava, Apple, Pears, Orange, Garden Egg, Pawpaw, Cucumber, Coconut etc
3.	Roots/Tuber	Cassava, yam, potato, sweet yam
4.	Cash crops	Palm fruits, palm
5.	Cereal Crops	Corn, Rice

The Kwa Iboe River surrounding is naturally dorminated by oil palm bushes. Oil palm trees appear very luxuriant, giant, and healthy in this environment as shown in the picture in Plate 6. It is a major economic tree in the entire State.

Plate 6**:** Oil Palm Bush in Etinan Catchment Area of Kwa Iboe River

2) ***Fishing and Catching of other Seafood:*** Naturally, Kwa Iboe River is reckoned with its fresh water content. The water quality supports the growth and spread of different variety of fishes and other marine lives or seafood including crabs, periwinkle, prawns and oyster among others. There are ample opportunities for fishing as they are necessary and economically relevant for food provision and income generation in the area. Fishing is intensely carried out in places like **Mkpanak** area of Ibeno on the mouth of Kwa Iboe River and its tributaries notably, the **Stubbs** and **Douglas Creeks**. The surrounding rural communities are actively involved in artisanal fishing. Apart from fishing on the natural water source; the natural environment can also provide opportunities for fish farming. However, many individuals are already engaging in this kind of business activity. Some of the local species of fish commonly bred in the area include: Catfish, barracuda, and tilapia among others.

3) ***Lumbering and Timber Production:*** The surrounding vegetation is naturally rich in content and quality of forest resources. Forest resource in Southern part of Nigeria is known for its outstanding and invaluable economic relevance. The situation is not different in Kwa Iboe River

region as availability of different varieties of trees has provided opportunities for the production of hard and soft woods whose demand in the market is very effective. Lumbering and timber production have been very outstanding and common in the area as the demand for roofing materials continue to be very high. The business is very lucrative and provides opportunities for the people within and outside the state to buy and sell the products even with high interests. Apart from exploiting the forest resource base for building and construction purposes, it is worthy of note that forest resources have been very useful in medicinal values. Consequently, the local herbs have been continually exploited in this regard as they are known for their ability to cure local ailments. Right from time, forest resources have been providing lasting opportunities as a source of domestic power in the rural environments. The situation is not also different in this area.

4) ***Pottering:*** Clay is the major raw material required for pottering. Clay deposits in Usaka community, Obot Akara Local Government Area of Akwa Ibom State is in great commercial quantityand economic value. Although this has not yet been fully developed and exploited for the same purpose.

5) ***Means of Transportation:*** Kwa Iboe River has different kind of uses. One of such uses is for transportation.According to the Paramount Rural of Obot Akara His Royal Majesty Okuku Uwa Umoh Adiaka the third, the River serves as a major means of transportation between them and faraway areas with articles of trade like locally manufactured pots, fishes, logs and timber products.

6) ***Sand and Gravel Mining:*** The great Kwa Iboe River bed provides enabling opportunity for sand and gravelmining. Observations indicate that sand and gravel mining have become major economic activities in almost all the communities located on the riverbank. There are sand mining sites in all the communities visited duringfield survey. In most communities where the water channel is shallow, the rural inhabitants use this opportunity to mine sand and gravel deposited along the channel as shown in the picture on Plates 7 and 8.

Plate 7: Sand Mining Sites at Abak, Abak L.G. Area

Plate 8**:** Gravel Mining Site at Abak, Abak L.G. Area

However, in other places where the water channel is deep enough and does not encourage the use of hand for the production, the people resort to using locally canoes built for sand production. It is worthy to note that the depth of the river around

the mining site at Usaka is about 11 feet deep. Sand produced in this area is known to be of high quality for building and road construction.

At Ikot Osurua mining site in Ikot Ekpene L. G. Area, where sand mining is highly commercialized, this segment of the River is locally known as "Inyang Udo Anwankwo", the depth is over 16 feet deep. However, there are other mining sites located between Afaha Ikot Ebak and Ukana in Essien Udim LGA. The intensity of sand mining activities in these areas has gradually initiated gullies which have to be regulated before the situation gets out of hand.

7) ***Petroleum and Oil Production****:* One of the outstanding activities and potentials for economic sustainability in Akwa Ibom State is the petroleum and crude oil production. Although there are other oil operation activities going on the area, Ibeno – a location on the Kwa Iboe River Estuary as shown in Figure 4 has become the operational headquarters of ExxonMobil. ExxonMobil is one of the giant oil producing companies in Nigeria with its operational base at Kwa Iboe River Estuary. The presence of this oil producing activity is not only beneficial to the surrounding communities, the state, in terms of employment opportunities and social responsibilities, but the entire country of Nigeria and neighbourhood.

IV. CONCLUSION

From what has been discussed so far, it is common that Kwa Iboe River is indeed a great river. With a total length of about 158.18 Kilometers, traversing roughly over 100 communities across Abia and Akwa Ibom States and providing water for domestic and industrial uses. The river also provides moisture even in the dry season for farming activities. Within the catchment region, the topography and other environmental condition have made it possible for the growth of economic activities notably are crop production, fishing and other seafood catching, pottering, lumbering and timber production, sand/gravel mining and crude oil exploration , production among others.

However, if this great natural resource is to be fully utilized for optimal benefits to the people, some forms of legislation and regulation would be of immense assistance in this regard. Based on the fact that Kwa Iboe River traverses over 150 communities across Abia and Akwa Ibom States, its usefulness and potentials for economic development of the region is highly expected. In view of the fact that, there are numerous economic activities going on the area, issues relative to water pollution either by industrial discharge, oil spillage or whatsoever that could be detrimental to human or aquatic life could be imminent any time. Based on this assumption however and for sustainable management and use of the natural capital, effective management procedure and regular monitoring of the river have been recommended.

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