LINKED OPEN DATA AND VISUALIZATION TECHNIQUE ANDIT'S IMPORTANCE TO BAYELSA STATE FLOODING ISSUES

BY

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APPROVAL PAGE

This project work written by **WEST INIE WORIKUMA.** has been approved for the department of computer science and Science faculty of applied science, Bayelsa State Polytechnic Aliebiri

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I also certify that the project work is adequate in scope and quality in partial fulfillment for the award of National Diploma (ND) in Computer Science

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DEDICATION

This project work is dedicated to God for His love, guidance, inspiration and enablement of this project work

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ABSTRACT

Linked open data has been around since 2009 in the field of computer science. Various Government all over the world has decided to let data open. When these data have been released to the public, it comes in form of CSV (comma separated variables). In Nigeria almost all the 36 states have embraced the open government data policy. But worthy of note is the government of Edo state south -south Nigeria was the first to embrace the linked open data technique by having datasets of raw materials that can be found in Edo state (Edostate.gov.ng, 2014). Flooding in recent times has been a recurring natural disaster in several places in Nigeria with Bayelsa state not excluded. The aim of the study is to demonstrate the use of linked data and visualization technique with the implementation of an open linked data site that will help to mitigate the effects of floods in Bayelsa state. To demonstrate the study further, a web application was developed showing the names of towns and local government that is affected, not affected and partially affected by flooding in Bayelsa state. This application was implemented with HTML, CSS and JAVASCRIPT.

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CHAPTER 1

INTRODUCTION

Linked Open data has been around Since 2009 (Willie.e, 2014) Several government globally has embraced the links data strategy. When data is kept Open, it gives citizens opportunity to have a firsthand knowledge on activities as it relates finance, natural disaster, education and commerce etc. (mc Demoth 2010).

Flooding have been recorded as the most devastating natural disaster in the world (Tonbra Robert Odubo 2014).

Bayelsa state has been identified as one of the worst flood affected State in Nigeria (Imukwdo, 2022).

Bayelsa State with eight Local governments has recorded flood in some communities and their local government, some of these communities are shown below.

Names of communities and local government areas

1. Biseni, Tombia, Ekpetima, Akenfa, Akempi, Igbogene, Amarata, Yeneka etc Yenagoa local government areas.
2. Otuoke, Elebele , Otuogori, Otuobhi etc Ogbia local government areas
3. Sampon, Torofuni, Toru-orua, Adagbabiri, Agbere, Asamabiri, Angalabiri etc. Sagbama local government area.
4. Aleibiri, peretorugbene, Ayamasa etc. Ekeremor local government area.
5. Sabagrei, Igbedi etc. Kolokum/Opokuma local government area.
6. Amassoma, peremabiri, Oporoma etc. Southern Ijwa local government area.
7. Opu-Nembe etc. Nembe local government area (Ogbe Akpeyi 2012 eta Saviour Imukwdo 2022).

Link data strategy will help residents in these areas Identify places to go during the flood. Flood can be cause by human and natural factors (Adaku 2021 etal Njoku 2022).

Some natural factors that causes flooding are, excessive rain fall, topography and soil management strategies, rapid melting of snow and ice (Njoku etal 2022). One of the human causes of flooding is drainage system which is the major human causes of flooding (Adaku 2021).

Bayelsa state is located in the South of Nigeria(Okeowo Gabriel 2022). Bayelsa state was created in 1996 by the Sunny Abacha's Military Government, and was curved out from River State, making it one of the newest State in the federation (Nigeria media 2022).

The capital Yenagoa is susceptible to high risk of annual flooding (Oladimeji. O. E 2022) it shares a boundary with River State to the East and Delta State to the North. Bayelsa state has eight Local government namely

1. Brass
2. Ekeremor
3. Kolokuma/Opokuma
4. Nembe
5. Ogbia
6. Sagbama
7. Southern Ijaw
8. Yenagoa

A linked open data site is seen as a collection of triples that deals with certain studies areas (Oliveria 2011). For data to be left open, there are certain criteria that must be meet, among others include:

1. Completeness: when data is complete and not constrained to valid privacy, security and privileged limitations, then such data is termed open.
2. Primary: There is need for data to be original, data is said to be open when is collected from the right source of origin. By this way, it guarantees a high level of correctness.
3. Timely: When data is released timely the value of the data is maintained.
4. Accessibility: When data is made available for any purpose for as many as may want to have access to it, it also termed open.
5. Non Discriminatory: When data has no restrictions on who is supposed to use it, then it is open to all. The users need no requirement to use such data.
6. Non Property: Data is termed open when it appears in such format, that no person or organization has right over it.
7. License Fee: When data is open, it does not suggest users to pay fees or obtain copy right free license, patent or trademarks.
   (Rogens and Lindsey 2012)

Today the world cannot do without the use of useful and effective data. Data help new findings which lead to the development of new technologies, there “is no world without the word data”(Willie.e, 2023).

AIMAND OBJECTIVES

The analysis, design and implementation of a linked open data and visualization, technique, approach, aim to explain the necessity of linked open data in mitigating the

effects of flooding in flood dominated areas in Bayelsa State. For the task to be achieved, a simple web application with data sets created in form of comma separated variables (CSV) files was considered.

PROBLEM STATEMENT

Data sets are available but cannot be used without visualizing them in linked data format. Creating a linked data base that will be able to make these data sets visible. these data sets contain names of some communities and local government areas that's affected, not affected and partially affected by flood, so that people can migrate to during any possible flooding occurrence.

This paper is proposed the use of linked data techniques to publish the areas that is affected ,not affected and partially affected by flood, so that people can mitigate to places that best suits their interest.

SCOPE OF THE STUDY

This study covered the substitutive solution to the Bayelsa State Flooding issues. The scope of the project is confined to create a linked open data website that will display names of some communities and their local government areas, that is affected, not affected and partially affected by flooding, that people will mitigate to during any possible flooding occurrence, that is making Data open for the citizens and government of Bayelsa State.

LIMITATIONS OF THE STUDY

A lot of factors posed as problem to the development of this study.

1. **TIME:** Because the project must be completed within a specified data, the researcher do not have enough time to get all required.
2. **RESOURCES:** Lack of resources also contributed to the limitations of the project among others is funding to travel around the eight Local government areas and communities in Bayelsa State. To this end the scope was limited to some communities and LGAs.

DEFINITION OF TERMS

1. HTML: Hypertext Markup Language. The basic language of web pages, it's a standard markup language for creating web page, it is also known as the building block for any web site.

2. CSS: Cascading Style Sheet. It contains the formatting information for web pages. It is the language we use to style an HTML document. CSS describe how HTML elements should be displayed.
3. JS: JavaScript is a scripting or programming language that allows you to implement complex features on web pages. It is used to add functionality to any given website.
4. Comma separated values (CSV) is a term used to refer to a computer file containing tabular data that is presented in plain text. It's organized so the data can be imported into tables at a later date, e.g. in Excel.
5. Linked Open Data (LOD) that are authorized to see and may also add to any data without disturbing the original data source. This provides an open environment where data can be created and also collected.

CHAPTER 2

LITERATURE REVIEW

Linked open data has been around since 2009 (Willie.e 2014) . From a technical point of view , open data has been referred to as sets of data which can be reused with no restrictions by any method of license.(Robatson etal 2013). When data is left completely open , citizens will have the opportunity to have a first hand knowledge on activities as it relates to finance, natural disasters, education and commerce etc(Dermoth 2010) . Flooding have been recorded as the most devastating natural disaster in the world (Tonbra Robert Odubo 2014). flood can be caused by both human and natural factors. (Adaku 2021 etal Njoku 2022). Linked open data can be of help to Bayelsa state in mitigating of people from flood affected areas.

The several benefits of making Data open.

1. Enhancement of social values
2. Political values

3. Economical values
4. Reduced crimes and destruction of life and properties
5. Enhance academic and general productivity (Consense 2008). In September 2011, Brazil also embraced the open data policy becoming committed to public transparency (Karim et Al 2012).

FLOODING

Many definitions of flood have been presented over time. Bradshaw (2007) posits that a flood occurrenceis an overflow of water bodies such as rivers and lakes from its natural boundaries submerging the land. In their various submissions (Djimesah et al., 2018) &Henry (2006) explains flooding as an excess water flowing unto dry land. The European Union (EU) floods directive, defined flood as a large volume of water covering land. Flood is a natural occurrence that passes through its usual channels but it becomes a problem when humans occupy the space required by the floodwaters to move (Sarah, 2007).

The frequency of natural disasters has been on the rise for years resulting in loss of life, damage to properties and destruction of the environment. Flooding is one of the most devastating environmental disasters that threaten the world. It has claimed more lives than any other single natural disaster (Komolafe et al., 2015). Globally, over 70 million people are exposed to flooding and notable lives and properties are lost in flood prone areas (Peduzzi et al., 2009), resulting in great losses and disruption of social activities (James, 2000).

Poor people in developing countries reside in flood plains and steep hills with little access to resources making them more vulnerable to the flood (Grunfest, 1995). poverty index levels also affect flood recovery process.

In Nigeria, flood has been a common occurrence. The country has experienced three major flood incidences in 2012, 2018 and 2022 (Umar et al., 2022). The 2012 and 2022 floods occurrence in Nigeria were quite was devastating with a major effect to states like Bayelsa, Delta, Rivers and Anambra State. The heavy rains made water reservoirs and dams to overflow leading to loss of lives and property. Over 7.7 million people were affected by the floods, about 363 people were killed and 600,000 houses destroyed. In the south western part the floods causedresidents of Oke-Ayo and Eleyele of Ibadan to leave their homes. Some lives were lost and properties damaged at Olodo and Apete areas of Ibadan (Onifade et al., 2014). In Plateau State, 39 people were killed and about 200 houses were destroyed as a result of the flooding (Onifade et al., 2014). The federal government of Nigeria stated that about 603 people were killed and 2.5 million people displaced from their homes in the current 2022 flooding across the country. The Ministry of Humanitarian Affairs, Disaster Management and Social Development further revealed that about 82,053 houses were completely destroyed, and 332, 327 hectares of land

completely submerged. Other statistics show the number of injuries as 2,407, partially destroyed houses totaled 121,318, and farmland partially affected was 108,392.

Flooding in Nigeria occurs in three forms; coastal flooding, river flooding and urban flooding also called flash floods(Scott, 2007). Coastal flooding occurs in the low-lying belt of mangrove and fresh water swamps along the coast. River flooding occurs in the flood plains of the larger rivers while urban flooding is linked with rivers in the inland areas. It is often short-lived and the sudden heavy rains in the inland areas can change them into a destructive torrent (Scott, 2007). Many factors are responsible for flooding which include; dumping of refuse in water bodies (David, 2004), constructing buildings on flood plains and poor maintenance of drainage facilities (Ajayi, 2012). Removal of vegetation, increase in the size of water channel and increase in erosion also contribute to flooding. Flooding can also be caused by excess rainfall when the absorption capacity of the soil is exceeded (Tramblay et al., 2021). Other causes of flooding include; climate change, excessive precipitation, rise in sea level and increase in population (MacLeod et al., 2021).

BAYELSA STATE FLOODING ISSUES.

The perennial flooding affects many communities, while properties and human lives are destroyed in communities, especially in Ekeremor, Southern Ijaw, Sagbama, Kolokuma/ Opokuma local government areas of the state (Bassey Willie 2023), during the 2022 flooding, communities in Yenagoa, the state capital, such as Igbogene, Azikoro, Famgbe, Ogbogoro, Akenfa, Agudam, and Ogu anamongst others were heavily impacted, and .... My many people ascribed the perennial flooding to poor town planning by appropriate authorities.

Flooding has many extreme negative social, economic and environmental impacts (Span et Al 2010). Some of the negative impacts of flooding include, damage to properties, crops and livestock, loss of human lives, health problems, damage to roads, bridges and power plants. There's also disruption of economic activities as livelihood of victims (Ajayi 2012).

Despite these negative impacts of flooding, it still has some important role to play in the environment. It recharges ground wate system, fills wetlands, moves nutrients around the ecosystem, increases fishing activities, and triggers dispensal migration and bleeding (Jeffrey 2010, Iwena 2015).

The Impacts of the 2022 flooding in Bayelsa State, Nigeria was sever. Properties such as televisions, radios, chairs, tables, beds, refrigerators, and rugs were damaged. From the finding beds and rugs were the most affected, probably because they easily takes up and retain water. (Authors Field Survey 2022).

The drinking water sources of the residents were also affected. Those who depends on rivers, open wells, and boreholes felt it the most because these water sources were

unprotected and exposed. As such, the water was prone to contermination and infiltration by the flood carry a lot of dissolved and undissolved conterminat pathogens inclusive (Ten Veldhuis, et Al , 2010).

The buildings collapsed as a result of flooding. The damage of farm produce caused by the flooding also resulted to a serious link in food prices. (Douglas et Al 2005) aslo implicated flooding as a cause of undespread crop damage. The common health issues experience during flooding include, diarrhea, measles, cough and malaria. (Hakim et al 2014).

The most common health issues that affected a lot of people most was diarrhea, meaning the affected people must have consumed flood conterminated water or food. Hakim et al (2014) also implicated diarrhea as a common health challenge that occurs during flooding.

CAUSES OF EXCESSIVE FLOODING

Thus a flood can be caused both due to natural causes, as well as human causes.

Human causes of flood.

1. **INFRASTRUCTURE FAILURE:** Flood can be caused by a breaking or failure of infrastructure that can cause large quantities of water to flood a local area. Example, when dam breaks due to faulty construction or maintenance, or when they are overwhelmed due to heavy precipitation.
2. **DEVELOPMENT AND INFRASTRUCTURE ON FLOOD-PRONE AREAS:** The development and building of infrastructure in flood-prone areas such as along rivers, near occean shoreline or near river deltas, has led to aim increase in Vulnerability to flooding because the natural resilience of these ecosystems has been compromised.
3. **DEFORESTATION:** When deforestation occurs In a particular area, there are no more trees to help soak up precipitation and reduces water flow over the landscape. Without these natural protections, there's an increased risk of Flooding and erosion whenever it rains.
4. **IMPERMEABLE SURFACE:** In developed areas such as in urban areas, there is commonly large amount of impremeable surfaces like roads and other concrete structures that do not allow water to permeate back into soil when large amount of rainfalls on these impremeable surfaces, the water can accumulate and lead to flooding in low-lying areas, if it is not directed properly.
5. **BRIDGE CONSTRUCTION:** Sometimes bridges that have been built over rivers can show the discharge of water and reduce the rivers capacity to hold more water.
6. **FLOOD EMBARKMENTS:** Flood embarkments that intended to increase the water-holding capacity if the river cam potentially prevent flood water from draining back into the rivers during large precipitation events

7. **CLIMATE CHANGE:** Due to an increased level of human-produced greenhouse gases in the atmosphere, the worlds climate is changing and getting warmer. Among many other climate change impacts, some regions are now experiencing increased precipitation and flooding.

As melting of the world's glaciers occurs due to warmer global temperature, sea level rises is occurring around the world also leading to an increased risk of flooding in low-lying coastal regions and in heavily urbanized flood plans, such as the Nile, Mississippi and the ganges Brahmaputra.

These flooding risks are predicted to increase if greenhouse gas emissions continue uriabated .(Sara et al 2015). Emission of greenhouse gases . The burning of fossil fuels , the industrial influences, the pollution all is depleting the level of the ozone layer and increasing the level of greenhouse gases, becoming a major cause of man made flooding.

NATURAL CAUSES OF FLOODING.

1. **HEAVY RAINFALL.**Heavy rainfall can occur due to various weather conditions cyclones, which can transform into hurricanes and produce large amounts of rain that can cause flash floods and deaths . Heavy rain can result in water arriving too quickly to lrifiltrate the soil. This increases surface run off , leading water to reach the river channel quicker, resulting in a greater risk of Flooding.
2. **OVERFLOWING RIVER.** Areas near rivers have a higher flood risk during an overflow . If you live in such a place, you need to protect your property against a river flood.
3. **COLLAPSED DAMS.** Dams are designed to hold water upstream. If the dams begin to collapse,they will discharge more water downstream, resulting in flooding. That can cause more problems for people living in the Lower lying on areas around the dams. It may also result to deaths.
4. **SNOWMELT.** Much of the spring time streamflow or runoff in rivers is accountable for melting snow or ice in colder climates , when there's heavy precipitation, flooding will most likely occur during the subsequent warm seasons. Snowpack will begin to melt and release water(Aqua Barrier 2021)

HOW TO REDUCE THE RATE OF FLOODING .

1. INTRODUCE BETTER FLOOD WARNING SYSTEMS

The UK must "improve our flood warning systems", giving people more time to take action during flooding, potentially saving lives, the deputy chief executive of the Environment Agency, David Rooke, said. Advance warning and pre-planning can significantly reduce the impact from flooding.

2. MODIFY HOMES AND BUSINESSES TO HELP THEM WITHSTAND FLOODS

The focus should be on "flood resilience" rather than defence schemes, according to Laurence Waterhouse, director of civil engineering flood consultancy Pell Frischmann. He advised concreting floors and replacing materials such as MDF and plasterboard with more robust alternatives. "We are going to have to live with flooding. It's here to stay," Mr Waterhouse said. "We need to be prepared." His recommendations were echoed by Mr Rooke, who suggested waterproofing homes and businesses and moving electric sockets higher up the walls to increase resilience.

3. CONSTRUCT BUILDINGS ABOVE FLOOD LEVELS

People should construct all new buildings one metre from the ground to prevent flood damage, the former president of the Institution of Civil Engineers has suggested. Professor David Balmforth, who specializes in flood risk management, said conventional defences had to be supplemented with more innovative methods to lower the risk of future disasters.

4. TACKLE CLIMATE CHANGE

Climate change has contributed to a rise in extreme weather events, scientists believe. Earlier this month the leader of the Green Party, Natalie Bennett, welcomed the landmark Paris Agreement, whereby governments from 195 countries pledged to "pursue efforts" to limit the increase in global average temperatures to 1.5°C above pre-industrial levels. "It is now crucial that world leaders deliver on the promise of Paris," Ms Bennett said. "The pressure is now on the British government to reverse its disastrous environmental policy-making."

5. INCREASE SPENDING ON FLOOD DEFENCES

Figures produced by the House of Commons library suggest that real terms spending on flood defences has fallen by 20 percent since David Cameron came to power. Yesterday [MON] the Prime Minister rejected this allegation, insisting the amount being spent had risen. Mr Cameron promised to review spending on flood defences after chairing a conference call of the government's emergency Cobra committee at the weekend.

6. PROTECT WETLANDS AND INTRODUCE PLANT TREES STRATEGICALLY

The creation of more wetlands – which can act as sponges, soaking up moisture – and wooded areas can slow down waters when rivers overflow. These areas are often destroyed to make room for agriculture and development, the WWF said. Halting deforestation and wetland drainage, reforesting upstream areas and restoring damaged

wetlands could significantly reduce the impact of climate change on flooding, according to the conservation charity.

7. RESTORE RIVERS TO THEIR NATURAL COURSES

Many river channels have been historically straightened to improve navigability. Remeandering straightened rivers by introducing their bends once more increases their length and can delay the flood flow and reduce the impact of the flooding downstream.

8. INTRODUCE WATER STORAGE AREAS

Following the severe flooding of 2009 a £5.6 million flood alleviation scheme was established in Thacka Beck, on the outskirts of Penrith, Cumbria. More than 675 metres of culverts underneath the streets of Penrith were replaced and a 76,000m^3 flood storage reservoir – the equivalent of 30 Olympic sized swimming pools – was constructed upstream to hold back flood water. The risk of flooding from the beck was reduced from a 20 per cent chance in any given year to a one percent chance, according to Cumbria Wildlife Trust.

9. IMPROVE SOIL CONDITIONS

Inappropriate soil management, machinery and animal hooves can cause soil to become compacted so that instead of absorbing moisture, holding it and slowly letting it go, water runs off it immediately. Well drained soil can absorb huge quantities of rainwater, preventing it from running into rivers.

10. PUT UP MORE FLOOD BARRIERS

The Environment Agency uses a range of temporary or "demountable" defences in at-risk areas. These can be removed completely when waters recede. Temporary barriers can also be added to permanent flood defences, such as raised embankments, increasing the level of protection. "As the threat and frequency of flood risk increases, the use of passive flood defence has to be the only realistic long term solution," Frank Kelly, CEO of UK Flood Barriers claimed earlier this month in Infrastructure Intelligence, a magazine for the infrastructure sector. Mr Kelly's company was responsible for designing a self-activating flood barrier he said had proved to be "invaluable" in protecting properties close to the River Cocker.(Katie Grant 2015).

2.2.4. CANALIZATION

Canalisation involves regulating or diverting the flow of water from a water source, such as a river. This can include directing river water into specific channels, utilising mini dams

for regulation, establishing interconnections between canal systems and rivers, and fortifying earthen embankments in times of need. as a river.

2.3 CLOUD COMPUTING.

Cloud computing is a set of resources and services offered through the internet. They are delivered from data centres located through the world. A paramount example of cloud computing is the API . It enables users to access a service via the browser and deploys on million of machines. Cloud computing offers greater flexibility, reduces capital cost , provides required services along with many other characteristics (Shaikh and Haider, 2011) . Cloud computing supplies a shared pool of configurable IT resources such as network , software and database (EKen, 2013). Cloud computing is as a pay-use or change -per- use access to applications, software development and deployment environments , and computing infrastructure. It provides optimized and efficient computing through enhanced collaboration, agility, scalability, and availability. In a recent survey of 1,000 Americans conducted by Wakefield Research for Citrix found that 51% of respondents believe that when the weather becomes Stormy it can affect the cloud and interfere with cloud computing, 29% think that the cloud is the actual cloud. Only a little amount of 16% percent knew what cloud computing actually was (Bojanova et al , 2014).

According to IEEE computer society, cloud computing is a paradigm in which information is permanently stored in servers on the internet and cached temporarily on clients that include desktops, entertainment centres , tablets, computers, notebook, wall computers , handhelds etc. Cloud computing is a collection of scalable , virtualized resources, which is capable of hosting application and providing required services to the users and can charged as per the uses like utility (Wyld, 2010 in Tripathi and parihar, 2011). Cloud computing is associated with three levels they are.

1. Infrastructure as a service (iaaS)
2. Platform as a service(Pass)
3. Software as a service (Salas) (Tripathi and parihar,2011).

2.3.1 SECURITY THREATS IN CLOUD COMPUTING.

Security threats in cloud computing are important issue for cloud service providers and cloud service customers. Threats usually are related information security because of data and applications. Cloud computing has a wide variety of threats because of being a combination of several technologies (EKen, 2013). Cloud computing threats include the following.

1. Information security
2. Physical security
3. Data location

4. Data investigation
5. Data segregation
6. Data recovery
7. Secure data transfer
8. User access control (EKen 2013).

2.3.2. CLOUD COMPUTING SECURITY GUIDELINE

The cloud computing security guideline intends to promote a common level of understand between the consumers and providers of cloud computing regarding the necessary security requirements and attestation of assurance (Kao et.al , 2012).

2.4. LINK DATA

Bizer et.al(2012) in their report: Linked Data the story so far , summarized linked data as simply a way of using the web to create typed links between data from different sources. Linked Data is a set of techniques for expressing, exposing, and publishing data a set of best practices for publishing and connecting structured data on the Web, and using Web technologies to connect data that is related but stored in different locations. (Tim Berners-Lee,bMay 2001,) . These may be as diverse as database maintained by two organizations in different geographical location or simply heterogeneous from a technical point of view.

Linked data is also referred to as data published on the web in such a way that it is machine readable, that is its meaning is explicitly defined , this is possible because it is linked to other data sets (Bizer et.al 2010).

A dataset is a collection of triples , that deal with a certain topic that originate from a certain source or process , which are hosted on a certain server or aggregated by a certain custodian (Machado and de Oliveira, 2011). Data sets when created can also be published. A person that publishes a dataset is the data set publisher(Machado and de Oliveira,2011). The dataset publisher does so in a More accessible format. Data sets are primarily found through catalogue sites.

Linked data can be explored using browses that support the display of RDF data and the navigation of interlinks, Linked Data can be searched using semantic web search engines (Marian 2008).(No et al .2013) described linked data as a set of best practices for publishing, sharing and connecting structured data by applying URIS and RDF in semantic web. Like the linked data publisher, there is also a linked data consumer . A linked data customer might be machine or a query engine or as well as humans (Machado and de . Oliveria,2011) linked data is published for ease of discovery , ease of consumption , reduced redundancy and added value. Linked Data also refers to a set of best practices for

publishing and interlinking structured data for access by both humans and machines via the use of RDF (Resource Description Frame work) family of standards for data interchanged. Linked Data achieves the several objectives of open government transparency initiative through the use of international web standards for. Publication , dissemination and reuse of the structured data(w3schools.org, 2014).

2.4.1. LINKED DATA VISUALIZATION

Linked Data visualization can be a reasonable way to visually present the internal structure in the data .

Data visualization is the practice of translating information into a visual context, such as a map or graph, to make data easier for the human brain to understand and pull insights from. The main goal of data visualization is to make it easier to identify patterns, trends and outliers in large data sets. The term is often used interchangeably with others, including information graphics, information visualization and statistical graphics. Data visualization provides a quick and effective way to communicate information in a universal manner using visual information. The practice can also help businesses identify which factors affect customer behavior; pinpoint areas that need to be improved or need more attention; make data more memorable for stakeholders; understand when and where to place specific products; and predict sales volumes.

Other benefits of data visualization include the following:

The ability to absorb information quickly, improve insights and make faster decisions;

An increased understanding of the next steps that must be taken to improve the organization;

An improved ability to maintain the audience's interest with information they can understand;

An easy distribution of information that increases the opportunity to share insights with everyone involved;

Eliminate the need for data scientists since data is more accessible and understandable; and an increased ability to act on findings quickly and , therefore, achieve success with greater speed and less mistake.(Kate Brush ,Ed Burns 2023).

Visualization interface allows a user to identify any unreasonable, incorrect or duplicate data and links in the linked data(Ni et al .2013).

2.4.2. LINKED DATA PROVIDENCE

Providence describe where data is originated from, who created it, who was responsible for it's implementation and how it came into existence, what quality of data storage method involved (Marijit, Sarkar and Biswas,2012) . The entire brain behind providence of web data is for it to assist a service requester to determine who can use the web contents or resources and what are the permissions not ignoring the level of trustworthiness.

2.4.3. LINKED DATA TECHNOLOGY STACK

Linked Data relies on two technologies that are fundamental to the web. They are uniform resources identifiers (URIS). (Berners-lee. et.al 2005 in Bizer , Berners-lee,2009) and also Hypertext transfer protocol (HTTP), (Fieiding et al , 1999 in Bizer, Health and Berners-lee 2009). More recently uniform resource locators(URLS) have become familiar as addresses for documents and other entities that can be located on the web, uniform resource identifier provide a more generic means to identify any entity that exists in the world (Bizer, Heath and Berners-lee, 2009).

Like every other scientific invention linked data has its own principles with provide a basic recipe for publishing and connecting data. Berners-lee,(2006) outlined a set of rules for publishing data on the web , which also serve as rules for linked data they are

1. Use URIS are names for things
2. Use HTTP URLs so that people can look up those names.
3. When someone looks up a URL provide useful information, using the standards (RDF, SPARQL)
4. Include links to other URIS, so they can discover more things . The four steps above are seen as attributes, disobeying them does not destroy anything but brings about a miss opportunity to make data interconnected which in turn will go a long way to limit it's reuse in future (Berners-lee 2006).

2.4.4. URL

URL is an acronym that stands for uniform resource locator , it is a string of characters used to identify a name of web resources. Such identification gives room for interaction which represents the web resources over a network (w3school.org, 2014). Associated with the URL also is the URL set. URL reference , URL schemes. The research will briefly consider the URL resolutions and it's uses. The use of uniform Resource identifer has as name of physical and abstract concepts and mechanism for linking these entities constitute a fundamental tenet of linked data [Bizer et.al 2009 in (Abbas and ojo, 2014)] To support the design of persistent URls in publishing Linked Data, several guideline

and best practices have been developed since the first guideline provided by Tim Berners-lee. [Berners-lee 1998 in (Abbas and Ojo, 2014).

2.4.4.1. URL DESIGN PATTERN.

URl design rules are associated with different URltypes (Abbas and Ojo, 2014) in their report: Applying Design patterns in URl Strategies did an analysis of existing rules which produce six different but related set of URl types . Each of these types is stated below

1. Thing: thing here represent any real-world entities or physical objects like people and cars that cannot be found on the web, except information about it or them(Dodds and Davis, 2011) , Sauermann , Cyganiak and Volkel(2011) in Abbas and Ojo,2014).
2. Concept: concept represents abstract ideas and non physical entities in the world (Sauermann , Cyganiak and Volkel,2011in Abbas and Ojo 2014).
3. Resource: resource represents a document on the web providing information about real-world things including objects and concept (Dodds and Davis ,2011in Abbas and Ojo,2014).
4. Representation: represents one format of the resource. Each available resource format may be separately named by a Representation URl (Dodds and Davis 2011 in (Abbas and Ojo 2014).
5. Hierarchical: represents a natural hierarchy exists between a set of resources (Dodds and I.Davis ,2011 in (Abbas and Ojo,2014).
6. Onto: represents a resource providing the meaning of things , concept and relationships (Sauermann, Cyganiak and Volkel,2011 in Abbas and Ojo 2014).

2.4.4.2. URL SET.

A URL set will contain:

1. A URL to name the set and describe its quality characteristics.
2. Each of the identifer URls for the real-world 'Things' in a single concept.
3. Optionally , ontology URl to define the scheme's concept and relationships.
4. Optionally, list URl to list the identifer URld contained in the set (GOV.UK, 2010).

2.4.4.3. THINGS TO CONSIDER WHEN PUBLISHING FOR A URL SET.

It is important to publish data on the web, because there is a common knowledge that there will be need for it. A publisher may not necessary have knowledge of who will use the data. A valid and vivid example is tweeter , people follow other people's tweets without their knowledge.

The following should be considered as meta data when publishing a URl set

1. Concept and definition: concept and definition can be considered in terms of an ontology URl that resolves to a machine-readable definition and as human-readable metadata.
2. Relationship to other URlsets: to highlight other URl sets.
3. Providence: to describe the source and purpose of the reference data.
4. Official status: to describe the range of statuses of the identifers that are contained in the set.
5. Accuracy: to describe the closeness to the truth that the set attempt to achieve.
6. Completeness: to describe the degree to which the identifer URls are a complete set against the definition of the concept.
7. Timelines: to describe the time-lag between a change to a real-world 'Thing' being applied to the URls in the scheme
8. License Terms: to describe the terms of the URl set
9. Intended audience: to describe who may confidently use the set. This provides a means of making the set as being promoted for re-use
10. Intended longevity: to provide a guarantee of persistence of the set.
11. Representation available: to describe the range of the file formats of representation URls in the set.

2.4.5. BEST PRACTICES FOR PUBLISHING LINKED DATA

There is also the best practice policy in attempting to publish linked data. These best practices are grouped into 10, and they are

1. Prepare Stakeholders
2. Select a Data set
3. Model the data
4. Specify an appropriate license
5. The role of good URls for linked data
6. Standard vocabularies
7. Convert data to linked data
8. Provide machine access to data
9. Announce to the public
10. Social contract of a linked data publisher (W3school.org,2014).

2.4.5.1. PREPARE STAKEHOLDERS

In every segment of information management, preparation is key to achieve maximum productivity. When data is shared with stakeholders it ensures success. In the case of linked data, the concept of data modeling will be familiar to information management, while the specifics of linked open may be new to people who are used to the traditional approach of information management, they are well documented in w3c recommendations (Bernadette Hyland and Hyland 2011). Hyland (2011).

2.4.5.2. SELECT A DATA SET

When publishing a data set, it is very important to select the dataset that is uniquely collected; ideally this information when combined with other data provides greater value. Since there is effort and cost associated with modeling, publishing and maintaining any data set as a public service, selection of high value data sets may be guided re-use potential and popularity among other factors. Most common open linked data is open educational data www. Fmebasic.intelli.sys.xyz.

2.4.6. EXISTING LINKED DATA APPLICATIONS

In recent times loads of applications have been built with the help and practice of the linked data technology, they range mobile applications to web based applications. The table below provide some popular linked data applications.

Popular linked data applications

1: App name : linked GeoData
Link:http//www linkedgeodata.org/About
Description: linked GeoData uses the information collection by the open street map project and makes it available as an RDF knowledge base according to the linked data principles.

2: App name : BIO2RDF
Link:http://www.bio2rdf.org
Description: BIO2RDF service as a biological database using the semantic web technologies to provide interlinked life science Data

3: App name: Chem2Bio2RDF
Link:http://www.biomedcentra.com
Description: Chem2Bio2RDF serves as a semantic framework for linking and data mining chemogenomic and system chemical biological Data.

4: App name: Swiss public transport Api
Link: http://www.transport.opendata.ch
Description: The transport API allows interested developers to build their own applications using public timetable data, whether they are on the web , desktop or mobile devices. The API main purpose is to cove public transport within Switzerland.

5: App name :Global Building Performance Network (GBPN)
Link: blog.semantic-web.at/tag/linked-open-data/
Description:Global Buildings (Holst and Hofig,2013) performance network aims to stimulate collective research and analysis from experts worldwide to promote better decision-making and help the building sector effectively to reduce the impact of climate change.

6: App name: Traffic injury map
Link: http//www.road-injuries.info/map.html
Description: Traffic injury map is a free online mapping service to anyone who is interested in finding out the road traffic injury locations in their neighborhood and other areas.

7: App name: Vehicle crime and road map
Link:http//www.data.gov/apps/vehicle-crime-and-road-accident-map
Description: The application explores the safety of the roads in your area by examining this map of UK vehicle crimes and road accidents from data provided by the national police API and department for transports latest statistics for accidents and the injuries occuring on the roads of the UK.

8: App name: your Neighbourhood
Link:http://www.http://www.yourarea.net
Description: Allows users to search their post code and it will display relevant information related to the post code such as number of properties and numbers of people in that area.

9: App name: Integrated transport network
Link:http://www data.giv.uk/datasets/os-map-integrated-transport-network-layer

Description: The ITN layer provides a detailed overview of great Britain Transport infrastructure. It gives details or vehicle height and vehicle restrictions, traffic calming , one way roads and other information along any given route.

10: App name :Open Education Data
Link: http://www.fmebasic.intelli.sys.xyz
Description: is use to display names of students in a particular state .
App name : linked GeoData
Link:http//www linkedgeodata.org/About

CHAPTER 3

3.0. RESEARCH METHODOLOGY.

The waterfall model is introduced for the purpose of this research work. The waterfall model was introduced by Royce in 1970 (Ragunath et al, 2010) . Waterfall model is a sequential software development process in which progress is seen as flowing steadily downwords (like a waterfall) . Waterfall model is a project management approach that emphasizes a linear progression from beginning to end of a project. The model often used by engineers , is front loaded to rely on careful plan sequential development process that flows like a waterfall through all phases of a project (analysis, design development and testing for example) which each phases completely wrapping up before the next phase begins . Waterfall model follows a chronological process and works based on fixed dates , requirements and outcomes. The design process for this linked data site is broken down into

1. Requirement Analysis.

2. System Design
3. Implementation
4. Testing
5. Deployment
6. Maintenance.

Design of linked open data website that will display names of communities and their local governments that is affected, not affected and partially affected by flooding in Bayelsa State involves useful acquisition of data. The research involved data acquisition which led to the design of linked data website for this project work. In the process of data acquisition two choices were adopted for the acquisition of data which includes.

1. Primary data: primary data was collected with the use of personal interviews to acquire information . In a way to access tangible data, the research considered a visit to some near by communities and their local government areas in Bayelsa State, that is affected, not affected and partially affected by flooding.
2. Secondary data: considered the limited time and budget available and the resources required to access all Eight local government areas of the state and communities under it, the trip was restricted and aborted in some communities and their local government areas, telephone interview were used as an alternative.

Advantage of primary data.

1. Primary data is more accurate and reliable because it comes from a direct source
2. It's faster and easier to collect primary data then secondary data, which can take weeks or even months to collect.
3. Primary data can be collected in real time, which makes it ideal for tracking events or monitoring processes.
4. Primary data is less likely to be contaminated with errors or inaccuracies.

Disadvantages of primary data.

1. Primary research is expensive
2. Lack of experience
3. Time consumption of primary research
4. Accessibility of the primary research.

Advantages of secondary data.

1. Ease of access.
2. Low cost of data acquisition
3. Easy clarification of data.

Disadvantages of secondary data.

1. In some cases, the data may not be current
2. May not satisfy researchers need.
3. Most likely to be contaminated with errors or inaccuracies.

CHAPTER 4.

4.0. SYSTEM ANALYSIS AND DESIGN

In the course of this project , a lot of research and development was conducted in RDF (Resource Description Framework . Is a general frame work for representing interconnected data on the web. It is a standard model for data interchange on the web .) and SPQRL(pronounced 'sparkle, is the standard query language and protocol for linked open data on the web , able to retrieve and manipulate data stored in resource description frame work. SPAROL-pronouced Sparkle a recurve acronym for SPARQL protocol and RDF Query language that is a semantic query language for database able to retrieve and manipulate data stored in Resource Description Framework.) and a host of several other linked data technologies, as the research grew further , the use of JS ,css and html became necessary. In the process of analysing and designing the best website or application, the research looked at several models to be adopted. The waterfall fall model became very important , because it follows through the process of analysis down to the process of documentation. The waterfall model is a classical model of software engineering, one of the oldest models and is widely used in government projects today to ensure design flows before the project are developed (Mohammed et al 2010).

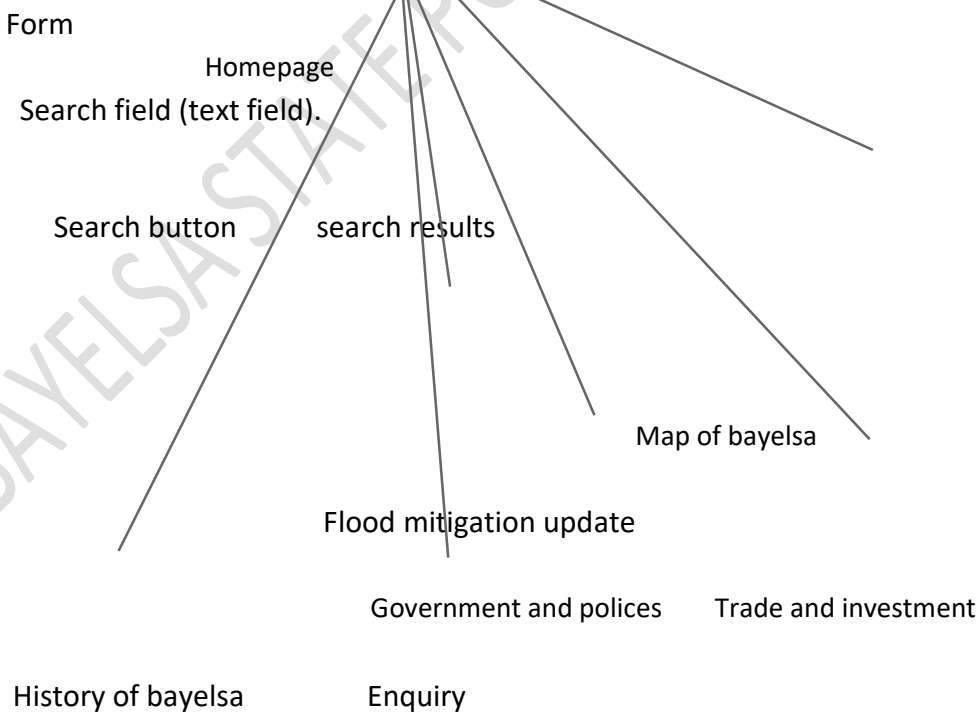
4.1.REQUIREMENT ANALYSIS

Requirement Analysis: involves all possible requirements for this system. It entails the process of investigation and comparing various linked open data applications. The waterfall model depends on the belief that all project requirements can be gathered and understood upfront . Requirement Analysis is broken down to hardware and software

requirements. A 32bit computer system is needed for the design for the purpose of the research. The software requirements involve creating data sets in in CSV format. These data sets contains the names and various local government areas that is affected, not affected and partially affected by flooding. The next step was to consider the choice of technology to adopt . Technologies include xampp software , which houses the apprache server, that serves as local host xampp also doubles as JS server where most of the backend codes are written. The system in focus is expected to be able to display names of communities and their various local government areas that is affected, not affected and partially affected by flooding when inputted for bayelsa state locations only south south Nigeria. It also expected to show names of communities and their local government to the user .

4.1.1 SYSTEM DESIGN

The design of the linked data set is simply adopted every requirement provided by the requirement analysis and adopted useful technologies available for the work. The design include a form. The form is broken down into homepage. The homepage contains a drop down box where we have the history of Bayelsa state, flood mitigation update showing some names of towns and local government areas that is affected, not affected and partially affected by flooding, enquiry, government and polices, trade and investment and Bayelsa map. The design is also required to provide a section where results will be search. The design format followed a simple procedure stated below.



Design model of proposed site.

4.1.2 IMPLEMENTATION

The implementation was implemented with the use of the following technology

1. HTML.
2. INLINE CSS, INTERNAL and EXTERNAL CSS.
3. JAVASCRIPT.

HTML is an acronym for HyperText Markup Language , it is a coding language , which uses a method called markup(or tags) to create hyper-text. HTML started from version 1.0 and later 2.0 now we have the HTML 5. Before the takeover of HTML by the world wide consortium technologies like Netscape, Spyglass was used as browsers. For the purpose of this research HTML allows the user to navigate anywhere on page (Ahuka 2014). The HTML is seen as the building block of website.

CSS .is an acronym for cascading style sheet; it's basic job is to separate the appearance and style of the html document, and also the formatting of the entire website, from the content.

The CSS style adopted for this work is inline and external CSS. The internal method is simply done by placing the CSS code within the <head><\head>, inline placing the CSS code back of what you with to style .while the external your are coming it from out side , linking the HTML document and the CSS.(Zeldman 2003). Example

Internal CSS

<Head>

<title><\title>

<style type =text/css>

Css content goes here

<\style>

<\head>

Inline Css

<marquee>what you went to style goes here </marquee>

External CSS .

<head>

<title>lga</title>

<link rel="stylesheet" href="LGA.css">

</head>

CSS is used to present the following parts of a webpage

1. Background
2. Borders
3. Colors
4. Fonts
5. Formatting of text
6. Linked Effects (CSSbasics .com2014).
   JAVASCRIPT.JS: JavaScript is a scripting or programming language that allows you to implement complex features on web pages. It is used to add functionality to any given website.
   Example simple JavaScript code for greeting.

```
const greeting = name => console.log(`Hello, ${name}!`);
```

4.1.3 TESTING

The application was tested, and then deployed on several platforms. See figures I appendices A. The application was tested on both windows and Android devices. Testing involves the functioning of any application on several platforms, including iPhone, widows and Android.

4.1.4 LINKED DATA SITE AND FUNCTION.

The job of the site is to display names of communities and local government areas that is affected, not affected and partially affected by flooding in Bayelsa state.

Website app tested as a local page using internet explorer

CHAPTER 5

5.0 DISCUSSION OF RESULTS

The Researcher was able to come up with names of towns and local government areas , that is affected , not affected and partially affected by flooding through the help of face to face and telephone interviews with few citizens of bayelsa state and visiting of some near by towns and local government in the state. It was also observed that linked open data will give citizens a firsthand knowledge on activities as it relates to natural disaster , finance, education and commerce etc. It will also create awareness to foregin visitors who may be interested in investing certain part of the state. In the process of testing the website application, it is observed that , the site have passed all process of testing . The web application was able to meet all it's requirements, but meet the overall aim of the project which is tested at developing a web application which has the ability to operate with the linked open data principles.

5.1 CONCLUSION AND RECOMMENDATIONS

Linked open data has been around since 2009 in the field of computer science. When data have been released to the public , it comes in form of CSV. This piece of work was aimed at encouraging Bayelsa State government and citizens and every other state in Nigeria that is yet to embrace the linked data policy to do so and make data readily available to citizens and licensed organizations. Countries like the united States and the united kingdom as stood as front liners for the open data policy, open linked data have simply means a sets of data which can be reused, with no restrictions by any method of lincese(Robatson etal 2013). This open data policy will help the citizens of Bayelsa State to mitigate to any local government or community the is not affected or partially affected by flooding, during any possible flooding occurrence in the state. When linked open data is fully accepted and recognized in Nigeria and Bayelsa State our Case study it stands to benefit and help the Nigeria government to Eradicate or reduce to the barest minimum the following proposed issues.

1. Corruption
2. Climate challenges

3. Oil spillage
4. Data theft
5. Terrorism
6. Election manipulation
7. Kidnapping
8. Examination and Result issues.

Of the eight issues raised above , kidnapping and election rigging has been a repetitive issue for several government across African. With an effective data system , that is linked to all sectors of Government , lives and properties will be secured and there will be trust amongst citizens and governments. Linked Data should not only be practiced by government alone, but cooperate organizations, schools should also adopt it for better productivity. The work strongly recommend governments and citizens to adopt the linked open data policy , this will help to put Nigeria in the front in terms of trust in governance and investment opportunities that is because visitors to the country can adequately access what is obtainable before embarking on a journey to the country.

5.2 GAP IN KNOWLEDGE.

The government of Edo state considered uploading data sets for raw materials found in Edo state while this research paper covered the gap of flood mitigation with the use of linked open data and visualization techniques.

5.3 FURTHER WORK

The research further suggests the following as possible improvement to this work

1. live map of Bayelsa State
2. search engine to display data in dynamic form

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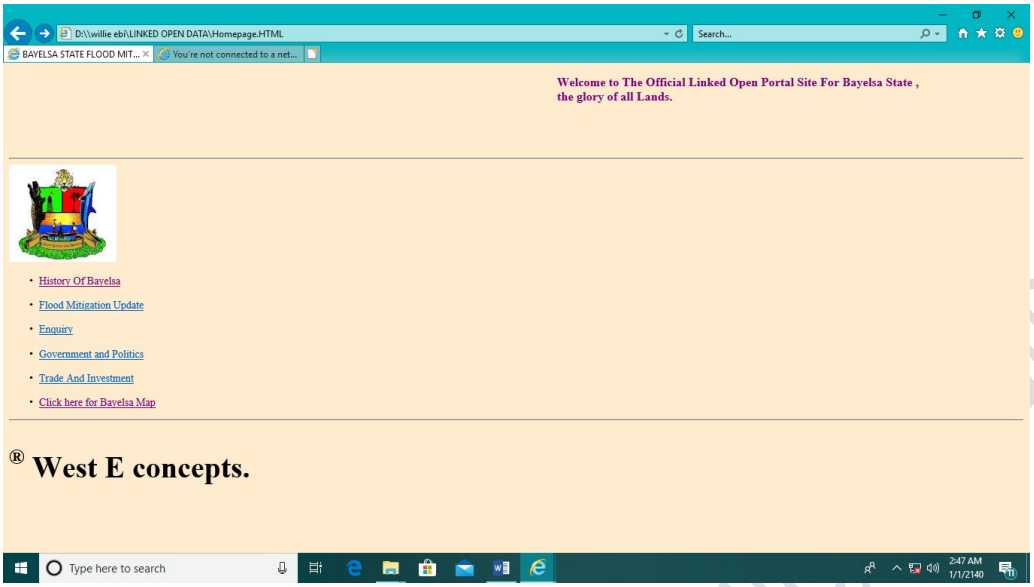
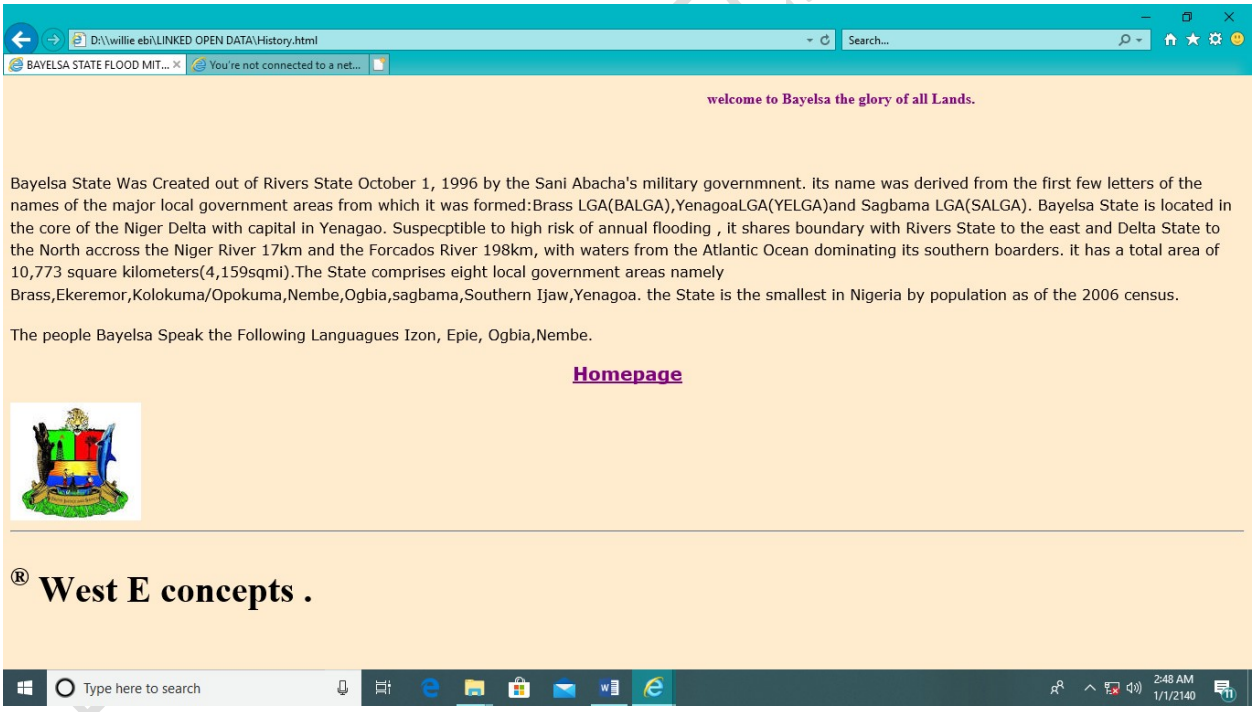
Appendix (A)

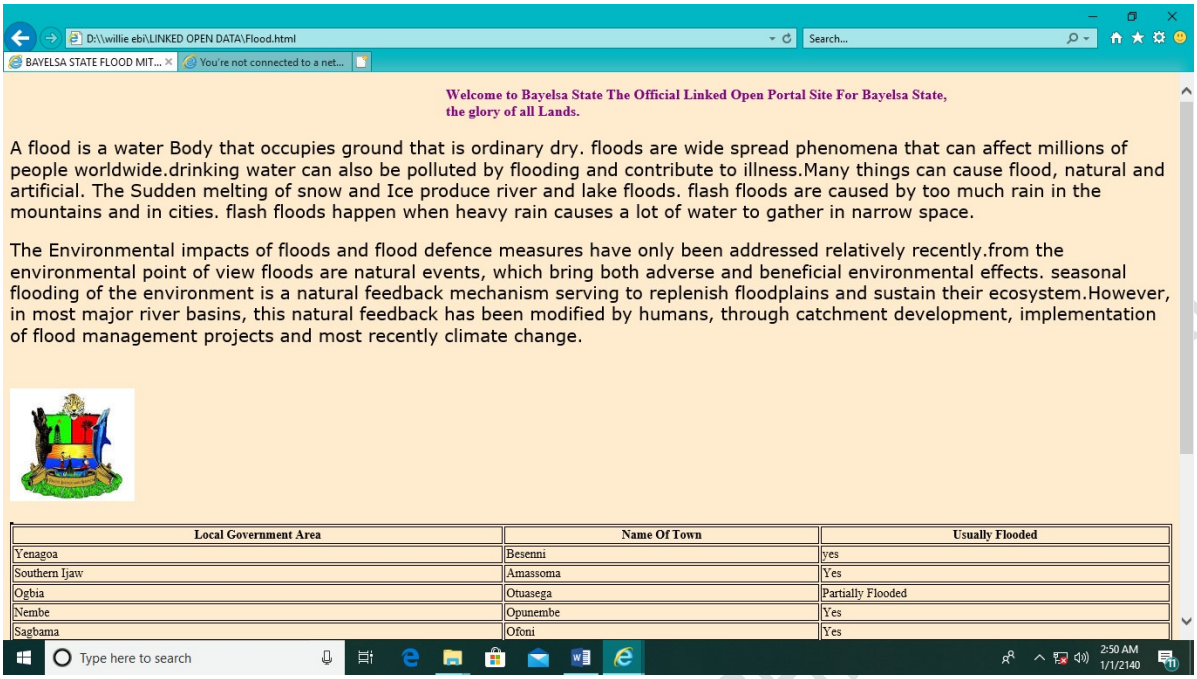
Home page interface.



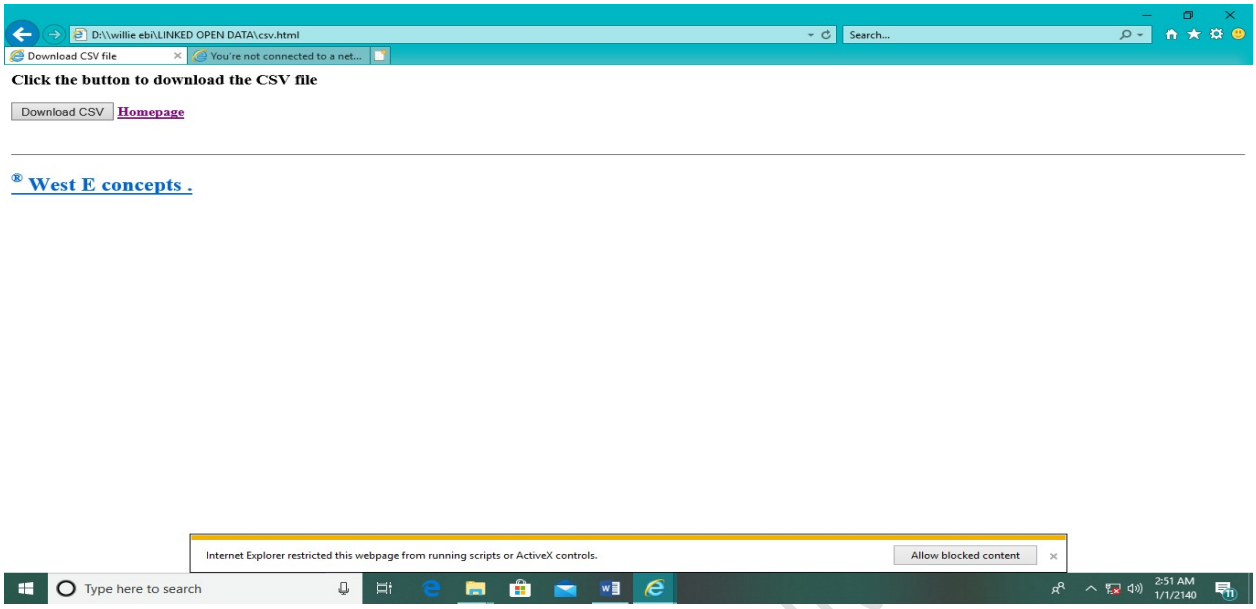
Interface for History of Bayelsa



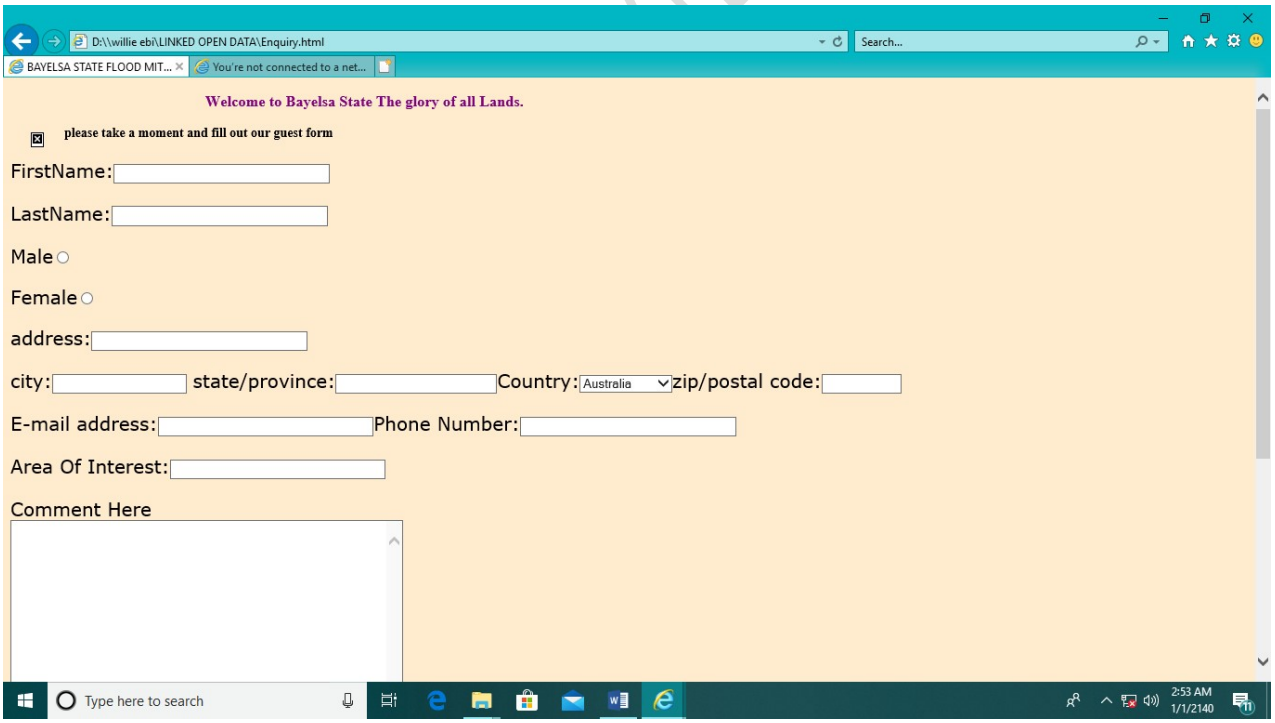
Interface for LGA Flood information with Select Communities



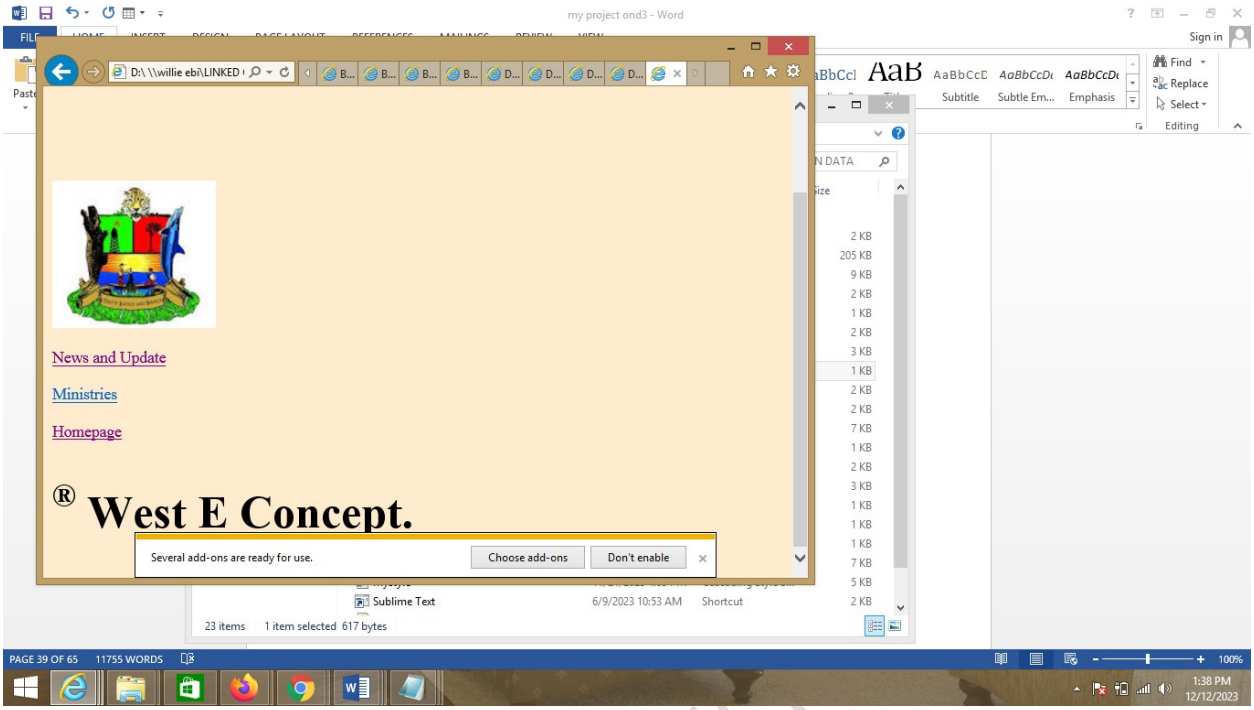
Interface Link for CSV Files on Floods In Bayelsa LGA



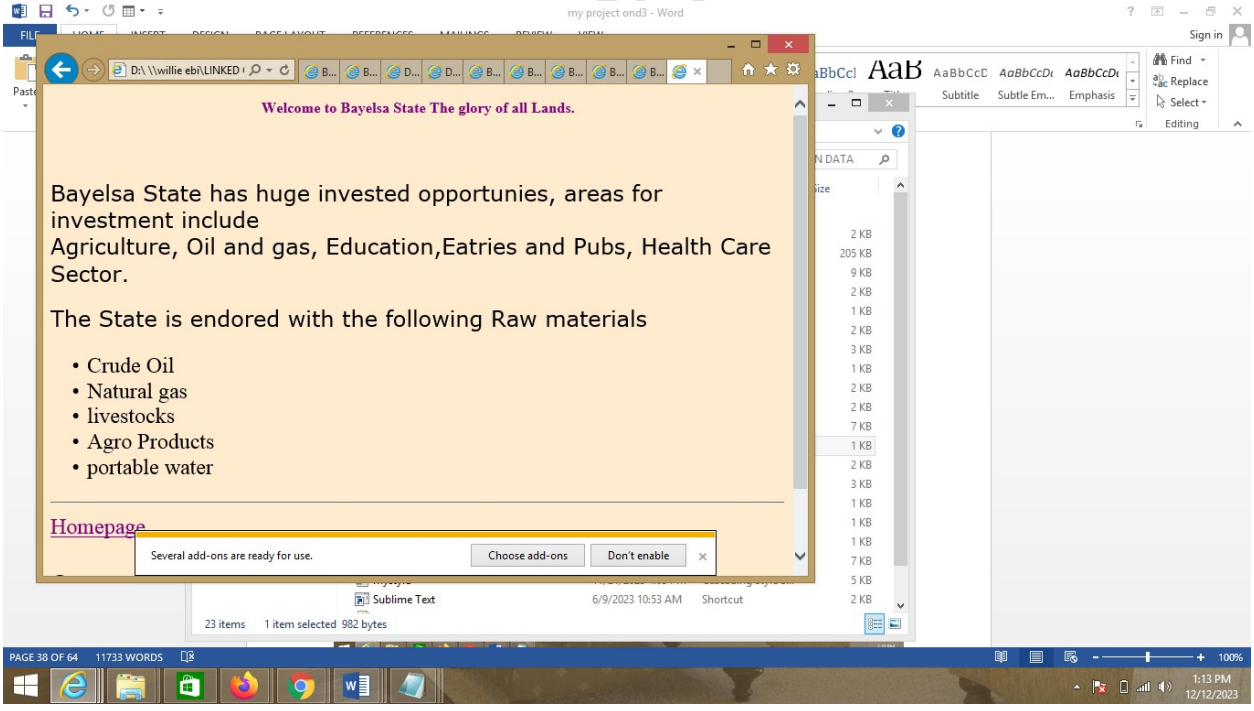
Form Interface for new visitors n



Interface for government and policies



Interface for trade and investment



Apendix B interview transcript

Interviev 1

Name of researcher :west inie worikuma

Name of respondent mrs amikpo blessing

Phone numbr:09053118089

LGA: Ogbia

Question

1. Do you linked open data can be of help to bayelsa state flooding issuses?
   Respodent : yes , because it makes data open, where by showing names of communities and local government area that is affected, not affected and partially affected by flooding
2. Do you all the 36 state in nigeria should practice the linked opend data policy?
   Respondent:yes because it will make government accountable.
3. Do you think if Bayelsa open data to its citiizens ,it will be of economic importance
   Respodent:yes
4. Do you think with the help of open linked data, more life and properties will be saved during any possible floooding occurance in bayelsa state?
   Repodent : yes
5. Do you think enough awareness is being created about linked open data?
   Respondent:yes

Interviev 2

Name of researcher :west inie worikuma

Name of respondent :MrJames God day

Phone numbr: 08158133720

LGA:Ogbia

Question

1. Do you linked open data can be of help to bayelsa state flooding issuses?

Respodent : yes , because it makes data open, where by showing names of communities and local government area that is affected, not affected and partially affected by flooding

2. Do you all the 36 state in nigeria should practice the linked opend data policy?
   Respondent:yes because it will make government accountable.
3. Do you think if Bayelsa open data to its citiizens ,it will be of economic importance
   Respodent: yes
4. Do you think with the help of open linked data, more life and properties will be saved during any possible floooding occurance in bayelsa state?
   Repodent : yes
5. Do you think enough awareness is being created about linked open data?
   Respondent: yes

Interviev 3

Name of researcher :west inie worikuma

Name of respondent : MR WEST WORIKUMA

Phone numbr:08150618083

LGA: BRASS

Question

1. Do you linked open data can be of help to bayelsa state flooding issuses?
   Respodent : yes , because it makes data open, where by showing names of communities and local government area that is affected, not affected and partially affected by flooding
2. Do you all the 36 state in nigeria should practice the linked opend data policy?
   Respondent:yes because it will make government accountable.
3. Do you think if Bayelsa open data to its citiizens ,it will be of economic importance
   Respodent: yes
4. Do you think with the help of open linked data, more life and properties will be saved during any possible floooding occurance in bayelsa state?
   Repodent : yes
5. Do you think enough awareness is being created about linked open data?
   Respondent: yes

Interviev 4

Name of researcher :west inie worikuma

Name of respondent : Mr Emmanuel Opkara

Phone numbr: 09016943214

LGA: Ogbia

Question

1. Do you think linked open data can be of help to bayelsa state flooding issuses?
   Respodent : yes , because it makes data open, where by showing names of communities and local government area that is affected, not affected and partially affected by flooding
2. Do you think all the 36 state in Nigeria should practice the linked opend data policy?
   Respondent:yes because it will make government accountable.
3. Do you think if Bayelsa open data to its citiizens ,it will be of economic importance
   Respodent: yes
4. Do you think with the help of open linked data, more life and properties will be saved during any possible floooding occurance in bayelsa state?
   Repodent : yes
5. Do you think enough awareness is being created about linked open data?
   Respondent: yes

Interviev 5

Name of researcher :west inie worikuma

Name of respondent :Mr DANIEL

Phone numbr: 07067297292

LGA: Brass

Question

1. Do you linked open data can be of help to bayelsa state flooding issuses?
   Respodent : yes , because it makes data open, where by showing names of communities and local government area that is affected, not affected and partially affected by flooding

2. Do you all the 36 state in nigeria should practice the linked opend data policy?
   Respondent:yes because it will make government accountable.
3. Do you think if Bayelsa open data to its citiizens ,it will be of economic importance
   Respodent: yes
4. Do you think with the help of open linked data, more life and properties will be saved during any possible floooding occurance in bayelsa state?
   Repodent : yes
5. Do you think enough awareness is being created about linked open data?
   Respondent: yes

Appendix c Data-tables

Local government area	Name of town	Usually floodied
Yenagoa	Besenni	YeS
Southern ijaw	Amassoma	Yes
Ogbia	otuasega	partially
Nembe	Opu-nembe	Yes
Sagbama	ofoni	Yes
Brass	Town Brass	Litile or not flood
Ekeremor	Pere toron	Yes

HTML Code For Implementation.

Homepage code

```
<!DOCTYPE html>

<html lang="en">

<head>

<title>

 BAYELSA STATE  FLOOD MITIGATION LINKED DATA SITE
```

```
</title>

<link rel="stylesheet" type="text/css" href="mystyle.css">

<h3><marquee behavior= "alternate" direction= "right"size="1000">Welcome to The Official Linked Open Portal Site For Bayelsa State ,<br> the  glory of all Lands.</marquee></h3>

</head><body><br><br>

<main>

<span id="datetime"></span>


<script>

    // create a function to update the date and time

    function updateDateTime() {

      // create a new `Date` object

      const now = new Date();


      // get the current date and time as a string

      const currentDateTime = now.toLocaleString();


      // update the `textContent` property of the `span` element with the `id` of `datetime`

      document.querySelector('#datetime').textContent = currentDateTime;

    }


    // call the `updateDateTime` function every second

    setInterval(updateDateTime, 1000);

</script><br>
```

```
<hr>


<img src="myimage.jpeg.jfif"><br>
<nav>
<ul>
<li><a href="History.HTML">History Of Bayelsa</a></li><br>
<li><a href="Flood.html">Flood Mitigation Update<br></a></li><br>
<li><a href="Enquiry.HTML">Enquiry</a></li><br>
<li><a href= "Government.html">Government and Politics</a></li><br>
<li><a href ="investment.html">Trade And Investment </a></li><br>
<li><a href="map.html">Click here for Bayelsa Map</a></li>


</ul>
</nav>
<hr>
<h2 align="bottom" size= 5><sup>&reg;</sup> West E concepts.</h2>
</main>
</body>
</html>
```

History of baylsa code

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>
```

BAYELSA STATE FLOOD MITIGATION LINKED DATA SITE

</title>

<link rel="stylesheet" type="text/css" href="mystyle.css">

<h3><marquee behavior= "Alternate" direction = "left" SIZE="500">welcome to Bayelsa the glory of all Lands.</marquee></h3>

</head>

<body>

  Bayelsa State Was Created out of Rivers State October 1, 1996 by the Sani Abacha's military governmnent. its name was derived from the first few letters of the names of the major local government areas from which it was formed:Brass LGA(BALGA),YenagoaLGA(YELGA)and Sagbama LGA(SALGA). Bayelsa State is located in the core of the Niger Delta with capital in Yenagao. Suspecptible to high risk of annual flooding , it shares boundary with Rivers State to the east and Delta State to the North accross the Niger River 17km and the Forcados River 198km, with waters from the Atlantic Ocean dominating its southern boarders. it has a total area of 10,773 square kilometers(4,159sqmi).The State comprises eight local government areas namely Brass,Ekeremor,Kolokuma/Opokuma,Nembe,Ogbia,sagbama,Southern Ijaw,Yenagoa. the State is the smallest in Nigeria by population as of the 2006 census.

The people Bayelsa Speak the Following Languagues Izon, Epie, Ogbia,Nembe.

Homepage

<img src="myimage.jpeg.jfif">

<hr>

<h2 align="bottom" SIZE = 50>® West E concepts .</h2>

</body>

</html>

Flood mitigation update

```
<!DOCTYPE html>

<html lang="en">

<head>

<title>

 BAYELSA STATE  FLOOD MITIGATION LINKED DATA SITE

</title>

<link rel="stylesheet" type="text/css" href="mystyle.css">

<h3><marquee behavior= "alternate" direction= "right"size="1000">Welcome to Bayelsa State The Official Linked Open Portal Site For Bayelsa State,<br> the  glory of all Lands.</marquee></h3>

</head>


<p> A flood is a water Body that occupies ground that is ordinary dry. floods are wide spread phenomena that can affect millions of people worldwide.drinking water can also be polluted by flooding and contribute to illness.Many things can cause flood, natural and artificial. The Sudden melting of snow and Ice produce river and lake floods. flash floods are caused by too much rain in the mountains and in cities. flash floods happen when heavy rain causes a lot of water to gather in narrow space.</p><p>The Environmental impacts of floods and flood defence measures have only been addressed relatively recently.from the environmental point of view floods are natural events, which bring both adverse and beneficial environmental effects. seasonal flooding of the environment is a natural feedback mechanism serving to replenish floodplains and sustain their ecosystem.However, in most major river basins, this natural feedback has been modified by humans, through catchment development, implementation of flood management projects and most recently climate change.<br><br><br>


<img src="myimage.jpeg.jfif"><br>

<table>

<style>
```

```
    table, th, td {
      border:1px solid black;
    }
</style>
<table style="width:100%">

<thead>
<tr>
<th>
        Local Government Area
</th>
<th>Name Of Town
</th>
<th>Usually Flooded</th>
</tr>
</thead>
<td>
Yenagoa
</td>
<td>Besenni</td>
<td>yes</td>
<tr>
<td>Southern Ijaw</td>
<td>Amassoma</td>
```

<td>Yes</td>

<tr>

<td>Ogbia</td>

<td>Otuasega</td>

<td>Partially Flooded</td>

</tr>

<tr>

<td>Nembe</td>

<td>Opunembe</td>

<td>Yes</td>

</tr>

<tr>

<td>Sagbama</td>

<td>Ofoni</td>

<td>Yes</td>

<tr>

<td>Brass</td>

<td>Town Brass</td>

<td>Little or No Flood</td>

<tr>

<td>Ekeremor</td>

<td>PereToru</td>

<td>yes</td>

<tr>

<td>KoloKuma Opukuma</td>

<td>Sampou</td>

<td>Yes</td>

</tr>

</tr>

</tr>

</tr>

</tr>

</tr>

</table>

Homepage <hr>

Click Here For Flood Update

<h2 align="bottom" size= 5>® West E concepts.</h2>

</body>

</html>

Enquery code visitors

<!DOCTYPE html>

<html lang="en">

<head>

<title>

BAYELSA STATE FLOOD MITIGATION LINKED DATA SITE

</title>

```
<link rel="stylesheet" type="text/css" href="mystyle.css">

<h3><marquee behavior= "alternate" direction = "right"size="100">Welcome to Bayelsa State The glory of all Lands.</marquee></h3>

</head>

<body>

<img src="nil.gif"align= "left" hspace="15"alt = ""><strong>please take a moment and fill out our guest form</strong>

<p><form method="post"action="mailto:ebiwillie@gmail.com"name:<input type="text"name = "visitor_name"size= "35">

<p>FirstName:<input type="text" name="visitor_FirstName"size="35">

<p>LastName:<input type="text" name="visitor_LastName"size="35">

<p>Male<input type="radio"Name="Sex" value="Male">

<p>Female<input type= "radio"Name="Sex" value="Female">


<p>address:<input type="text" name="visitor_address"size="35"><br>

<p>city:<input type="text"name="visitor_city"size="20">

        state/province:<input type= "text" name= "visitor_state"size="25"

<p>Country:<select name="visitor_country" size="1"<option selected>United States <option>Australia<option>Canada<option>England<option>France<option> Netherlands<option>NewZealand<option>SouthAfrica<option>Zambia<option>China<option>Russia<option>Norway<option>Sweden<option>Niger<option>Senegal<option>Cameroon<option>Nigeria<option>Niger<option>Garbon<option>Libya<option>Russia</Select >zip/postal code:<input type="text"name="visior_code"size="10"><p>E-mail address:<input type="text"name="visitor_email"size="35"<p>Phone Number:<input type="number" name="visitor_Phone Number"size=35>

<p>Area Of Interest:<input type="text"name="visitor_Area of Interest"size="35"><br>

<p>Comment Here<br><TEXTAREA NAME="COMMENT"ROWS="20"COLS="50"></TEXTAREA>
```

<input type="Submit"VALUE="submit"size="35"></form>

<h2 align="bottom" size= 5>® Ebipamobonumugha.</h2>

Government and policies code

<!DOCTYPE html>

<html lang="en">

<head>

<title>

BAYELSA STATE FLOOD MITIGATION LINKED DATA SITE

</title>

<link rel="stylesheet" type="text/css" href="mystyle.css">

<body>

<img src="myimage.jpeg.jfif">

<nav>

News and Update


```
<li>
<a href="ministries.html">Ministries</a><br><br>
</li>
<li>
<a href="Homepage.HTML">Homepage</a><br>
</li>
</nav>

<h2 align="bottom" size= 5><sup>&reg;</sup> West E Concept.</h2>
</body>
</html>
```

Trade and investment code

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>
 BAYELSA STATE  FLOOD MITIGATION LINKED DATA SITE
</title>
<link rel="stylesheet" type="text/css" href="mystyle.css">
<h3><marquee behavior= "alternate" direction= "right"size="500">Welcome to Bayelsa State The glory of all Lands.</marquee></h3>
</head>
<body>
<br><br>
```

Bayelsa State has huge invested opportunies, areas for investment include
Agriculture, Oil and gas, Education,Eatries and Pubs, Health Care Sector.

 The State is endored with the following Raw materials

<nav>

Crude Oil

Natural gas

livestocks

Agro Products

portable water

</nav>

<hr>

Homepage

<h2 align="bottom" size= 5>® West E concepts .</h2>

</body>

</html>

Bayelsa map code

<iframe width="100%" height="100%" id="gmap_canvas"
src="https://maps.google.com/maps?q=yenagoa&t=k&z=10&ie=UTF8&iwloc=&output=e

mbed" frameborder="0" scrolling="no" marginheight="0" marginwidth="0"></iframe>2yu
<style>.mapouter{position:relative;text-align:right;height:100%;width:100%;}</style>html embed google map<style>.gmap_canvas {overflow:hidden;background:none!important;height:100%;width:100%;}</style>

Homepage

<h2 align="bottom" size= 5>® west E Concept.</h2>

CSS CODE IMPLEMENTATION

body{

background-color: blanchedalmond;

font-size: 14px;

}

h1{

color: black;

text-align: TOP;

}

h2{

color:black;

font-size: 40px;

}

h4{

text-align: revert-layer;

```
}
p{
                                                    font-family: verdana;
                                                    font-size: 20px;
                                                    color:black;
}

marquee{
                                                    font-display: fallback;
                                                    font-size: 10;
                                                    behavior:Alternate;
                                                    color: purple;
                                                    direction: down;
img{
                                                    width:200px;
                                                    height: 100px;
}
html {
 background: #100a1c;
 background-image:
  radial-gradient(50% 30% ellipse at center top, #201e40 0%, rgba(0,0,0,0) 100%),
  radial-gradient(60% 50% ellipse at center bottom, #261226 0%, #100a1c 100%);
 background-attachment: fixed;
 color: #6cacc5;
```

```
}
```