

NEWSLE

5th Edition | December 2021

THE PREMIUM GEOSPATIAL BULLETIN

W: www.sambusgeospatial.com E: info@sambusgeospatial.com

... QUARTERLY NEWS BULLETIN ON GIS

P.10 Celebrating GIS Day 2021: Creating Awareness about GIS

P.14 Sambus GIS Articles: Combating Crime in Nigeria

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Sambus Geospatial Limited is a reputable geospatial intelligence firm with over 33 years of industry expertise. We are the official distributor for Esri and L3Harris geospatial, and authorized dealer for Trimble and Wingtra drone in Ghana, Nigeria, Liberia, Gambia, Gabon, Sierra Leone, and Equatorial Guinea. Our vision is to be the preferred geospatial innovator in West Africa, and our purpose is to be the distinguished organization in West Africa for the use and development of geospatial knowledge and technology for efficient planning, management, and improved decision making. In addition, our home office in Ghana and our country office in Nigeria, are supported by reputable international and local partners across our region. Our services include the provision of tailor-made geospatial solutions, capacity building, sales & after sales services, as well as consultancy services. Over the years of our operation, many organizations in the region have benefited from our expertise including the Nigerian National Petroleum Corporation, Nigerian Communications Commission, Nigerian Center for Disease Control, Ghana Health Service, Electricity Distribution Company - Sierra Leone, Ghana Highways Authority, Ghana Civil Aviation Authority, Gambia Telecommunications Company Limited Petroleum Commission Ghana, and among others.

Learn more at sambusgeospatial.com

Publishe

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Showcase Your Map

or more information on placing your map in the next edition of he Sambus Geospatial Newsletter, contact us via the email below. nfo@sambusgeospatial.com | sambusgis@gmail.com

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EDITOR'S REMARKS

This is the fifth issue of the Sambus Geospatial Newsletter since its inception in November 2020. Sambus Geospatial Newsletters are published on a regular basis to reveal the most recent Geographic Information System (GIS) updates, such as analytical and visualization tools, data collectors, and aerial and imagery data processing technologies available through our global alliance portfolios.

This edition, uniquely designed with graphical content, sets out to convey our message of promoting the Geospatial Agenda to all industries and how GIS professionals can leverage mapping tools to support sustainable actions in the local community. Thus, elaborating the essence of location intelligence in economic affairs by evaluating a variety of programs such as planning approaches in a holisitic manner to create a spatial perspective of any circumstance.

This issue also captures recent Geo-events and activities and our experiences gathered over the years. We express special gratitude to all who contributed to the success of these events and our quest to explore new opportunities to push the relevance of GIS everywhere. Sambus Geospatial pledges to make publications available to the public at no cost, thus assuring guaranteed access to the materials at any time.

We will continue to count on your consistency and your contributions to the utilization of Location-Based Systems.

Samuel Joe

Samuel Zoe **Business Development Lead** Sambus Geospatial







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SAMBUS GEOSPATIAL CELEBRATES WORLD GIS DAY 2021

Creating Awareness about Geographic Information Systems.

GIS Day is a global event celebrated annually to raise awareness on the importance of geographic information systems and how to use GIS technologies to solve real-world problems and make a difference in our society. The day allows GIS users all over the world to share their achievements and inspire others to embrace spatial sciences.

Sambus Geospatial celebrated **GIS Day** by organizing a GIS awareness week in Ghana and Nigeria. The activities planned for the week included a series of collaborative **Geoevents** in selected educational institutions. These joint efforts took the form of sponsorships and synergic planning of **Geohackathon** competitions, fundamental **GIS workshops** and **GeoTalks** that engaged and enlightened the attendees in a fun approach. Sambus Geospatial also provided resource persons to address challenges related to Emerging Technological Trends in the GIS field.

Another successful and major event held during the awareness week was the **Africa GIS Day** - An international conference organized by Esri Eastern Africa in collaboration with **Sambus Geospatial**, featuring three Nigerian panelists and recorded over 600 registrations.

Institutions that collaborated during the event celebration included the Geo-informatics Society of Nigeria, Samaila Secondary School-Kano State, Dry Land Agriculture-Kano State, Community Secondary School-Asokoro, University of Ghana-Legon, University of Mines and Technology-Tarkwa. Other institutions that collaborated include Tema Methodist Day Senior High School, St John's Grammar Senior High School, Bawku Senior High School, Presbyterian Boys' Senior High School and Holy Trinity Cathedral Senior High School.

BY PRECIOUS C. ANIEKWENA Marketing & Communications Officer





















WOMEN'S CHOICE AWARDS AFRICA

Sambus Geospatial Emerges as the Technology Company of the year

Great achievements are nurtured with the cooperation of many minds with a common vision working toward a common goal. Sambus Geospatial has exhibited this trait over the years, as the leading geospatial innovator in West Africa. Recognizing the effort of the Managing Director Akua Aboabea Aboah and her team, Sambus Geospatial was nominated for the Category "Technology Company of the year". On Saturday November 19th, 2021, at the Labadi Beach Hotel - Accra, Sambus Geospatial emerged as the winner for the category.

See Event Highlights 📂









Akua Aboabea Aboah

Managing Director, Sambus Geospatial WCAA Category - Technology Company of the Year









COMBATING CRIME IN NIGERIA USING GIS

Authored by

Mberede Benedict Obinna Technical Sales | Sambus Geospatial - Nigeria

> he #ENDSARS protest in Nigeria began as a demand for Justice but escalated into a nationwide if not a global concern. The youth claimed that officers responsible for some unlawful killings haven't been brought to justice.

Adequate data collection and analysis tools, in matters like this, are similar to the oil poured into troubled waters. As the Nigerian Police force continues to make changes to both strengthen and reform their organization, much attention should be paid to the intelligence department in creating a means of monitoring the activities of the police force.

For instance, with the aid of body cameras and communication devices to the various unit during daily operations and activities, these devices can be integrated with field data collection tools to support easy and swift data collection process and visualization with the aid of Web/Organization dashboards.

With adequate utilization of tools and facilities issues like this can be handled. As the world keeps advancing in technology, there's a need for every sector in the nation to follow suit.

Also, GIS does not replace a law enforcement agency's process of collecting and storing information in a database. Rather, it enhances the agency's ability to use the data, spatially visualize and spatially analyze the data for decision making, investigation process and spatially monitoring offenders, et-cetera.

Crime Dimensions

There are four dimensions to a crime: A legal crime which deals laws being broken, the Victimized crime which targets an individual or a group of people, the crime that has only one offender responsible and the spatial crime which references a specific place and time.

With an adequate geographic information system platform, data can be integrated with ease. That's why it is necessary that Law enforcement in Nigeria collaborate with different agencies holding different citizen's data. Data from agencies like the National Population Commission (NPC), National Bureau of Statistics (NBS), National Identification and Management Commission (NIMC), National Communication Commission (NCC) can be integrated into the law enforcement database to make operations easier, especially in times where cyber crimes are common. If need be, data can be obtained from even the transport agencies, to query the travel history of offenders, the crime pattern in Nigeria, how they have moved and why they have moved.

This would give the law enforcement insight into decisions to make. Data queried from the national identity commissions can be also used to ascertain if truly a suspected offender is a citizen of Nigeria which gives more insight on how to approach such crimes. In addition to plotting the geographical attributes of criminal phenomena, law enforcement agencies seek answers to why a specific crime occurs in a certain area. It's no doubt that Crime has an inherent geographical quality.

Using GIS in combating crime can help in Intelligence gathering, Performance review, Crime analysis, Criminal investigations mapping crime hotspots, targeting reassurance, and also Research agendas like Publishing crime statistics to the public/government officials or other stakeholders, Spatial significance, Spatial regression, Modelling and simulation and also Crime prediction. a suspected offender is a citizen of Nigeria which gives more insight on how to approach such crimes.

This would also help the NPF to tell if they are responsible for such crimes or not. With the help of some GIS tools, NPF can determine if such incidents happened when officers were on duty or not. The NPF would be able to come out with substantial evidence to back them up with whatever decision they are to make.



"

MOST CRISIS COMMUNICATION EXPERTS AGREE THAT "TRANSPARENCY IS KEY TO MAINTAINING OR RETAINING THE PUBLIC'S TRUST".

About Map

The above map was created using ArcGIS pro, The data used was obtained from Wikipedia and Twitter using the events hashtags.

The research department of different security agencies can use this tool to visualize the effect of such protests and give an insight on how to tackle such events based on priority, and for more complex datasets, machine learning and Deep learning can be used for more predictive analysis

MAP GALLERY

SEE THE BEST MAPS DEVELOPED BY GIS PROFESSIONALS FOR VARIOUS INDUSTRIES

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ACCIDENT TRENDS IN GHANA

This report visualizes motor accident data on a regional level over a 20 year period from 1991-2011. The data is displayed on an Operations Dashboard, making use of the various elements to uncover trends and perform statistical analyses.

The breakdown consists of Total Accidents, the total number of accidents per region within the period, the number of accidents per year, the vehicles involved per year and, victim information (casualties and fatalities).

Methodology

The data was downloaded in a CSV format and redesigned to enable compatibility in ArcGIS Pro. The total Accidents per Region were joined to the old Ghana Regional shapefile. The rest of the data was added to the new Ghana Regional Data via a relationship class.

The data was then published into ArcGIS Online as a feature class to be visualized using the Dashboard. The feature class was used to create a web map and then the Dashboard was created using the web map.

Conclusion

Over the 20 year period, there was a steady increase in casualties and fatalities from approximately 9,700 to 16,200 and 920 to 2,200, representing a 67% and 126.8% increase, respectively. In the same period, between 1993 and 1994, there was a significant drop in cases relative to the other years across most regions. Again, the most affected age group was the 26-35 years bracket with the least being the 65+years bracket. The analyses also showed that significantly more males were affected than females over the period.

Overall, with this dashboard, the relevant stakeholders involved in road safety, administration and management such as the Driver and Vehicle Licensing Authority (DVLA), the National Road Safety Commission and the Motor Traffic and Transport Department of the Ghana Police Department, can all leverage on the insights provided in formulating a national strategy to improve safety on our roads.

Software

ArcGIS Pro v2.8.1, ArcGIS Dashboards, ArcGIS Online. Data Source: Open Source data

Author

George Oduro (Sambus Geospatial - Ghana) Gerald Bempong (Sambus Geospatial - Ghana)

ATEWA FOREST RESERVE PROJECT

The Atewa Range Forest Reserve is located in Akyem Abuakwa in the eastern region of Ghana. It is the largest forest reserve in the country, covering an area of 17,400 hectares. The range is one of the highest priority ecosystems in West Africa for its high species diversity, high levels of endemism, and great hydrological importance. The tropical rainforest range is the headwaters of three major rivers: the Ayensu, Densu, and Birim. In addition, a total of 165 million tonnes of bauxite is believed to be present in the range.

Due to the range's rich mineral and timber deposits, activities of Galamsay (illegal mining) and deforestation have increased in the Atewa tropical rainforest in recent years. As a result, the team decided to assess the impact of Galamsay and deforestation on the forest reserve between 1990 and 2020, as well as to answer some questions about the forest's changes.

Methodology

ISO DATA clustering Algorithm was used to classify the 1990 image initial with 20 classes. The idea behind 20 classes is that, ISO DATA clustering is an unsupervised classification algorithm so if few classes are used, the algorithm might miss classify some features for a example, a bush might be classified as cultivated land. After the classification checks were done before reclassify the 20 classes into the 3 classes.

Software

ArcGIS pro 2.7 Data Source: Landsat data

Contact

Kwabena Obeng Denteh (Sambus Geospatial - Ghana)

MAP OF ATEWA FOREST





COMMUNITY SITE SELECTION

Site selection involves measuring the needs of a new project against the merits of potential locations. A rural area is an open swath of land that has few homes or other buildings, and not very many people. A rural areas population density is very low. Many people live in a city, or urban area. Their homes and businesses are located very close to one another. (https://www.nationalgeographic.org/encyclopedia/rural-area). It is estimated that 43% of Ghanaians are living in rural areas.

Some challenges faced by people in rural areas in Ghana are lack of schools, poor roads, lack of potable water and Many others. Some rural communities in Ghana have resorted to establishing schools under trees because of no schools in their area. In 2010 the government of Ghana took an initiative to eliminate all schools under trees (2,936). As of 2018 the ministry of education indicated that only 2,031 schools under trees have eliminated meaning after the initiative in 2010 there are still schools under trees. (Schools Under Trees in Ghana – NESPAG).

Methodology

Using multicriteria decision approach and overlay analysis with the following factor

Distance from residential areas, Distance from Industrial areas, How hilly the area is and Distance from rural areas the best locations for schools is to be sited is indicated green on the map.

Some Limitations to the project. Criteria (Factors) used were basic. Weights(priorities) set were based on previous projects. No stakeholder (Community people ,engineers, donors) engagement

Software ArcGIS Pro 2.8.1 Data Source: Esri Basemap | Authors' Data

Contact Kwabana Obang Denteb (

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Kwabena Obeng Denteh (Sambus Geospatial - Ghana)

ISTAINAB $) \sqcap \bigvee \sqcap$ \bigcirc) P V E V T

FUELWOOD HARVEST IN PAIKORO LGA OF NIGER STATE

Fuelwood is a major fuel source used in most households in the Paiko community as can be widely seen. The other major source of energy is kerosene. The widespread use of fuelwood has been linked to several environmental problems ranging from loss of forest woodlands, loss of ecological biodiversity, land degradation, erosion, and even climate change.

This study, therefore, intends to contribute to the understanding of the complex linkages between rural production of fuelwood and urban household demand for cheap fuelwood.

The main categories of land use identified in the study area are built-up area, natural vegetation, waterbody, Woodland, and (Table 3). The pixel statistics of land use in Landsat 8 OLI presented in Table 3.0 shows that the area covered by Woodlands was 167.43 km2 representing 62% of the study area. The vegetation area accounted for 81.47% of the area. Whereas the Built-up area covered 17.64 km2, that is, 6% and the water body occupied 4.39 km2 (2%) of the entire study area.

These land classes suggest that the study area is rich in tree crops and woody vegetation which are largely used for timber and fuel food. The large, cultivated area also indicates that the majority of the populace were farmers.

The society in which we live cannot shy away from the use of wood fuel, because it is a major source of energy both to the poor and the rich, including government and private individuals and organizations. It has also been noted that the wealthy in the society is the most sponsors in cutting down fuelwood at the expense and degradation of the rural communities for cheap labor. Therefore, forest rules and laws should be strictly adhered to in the use of wood fuel.

Software

ArcGIS Desktop 10.8 Data Source: USGS: Landsat 8 OLI, OSGOV: Boundary data

Contact

Tesini Precious Dombo (Sambus Geospatial - Nigeria) E: tdombo@sambusgeospatial.com

FULL MAP AREA OF PAIKORO LGA OF NIGER STATE



FIG 2. Land use cover map of the study area

FIG 3. Spatial Distribution of Harvest, Lumber Zones



Get In Touch

Sambus Geospatial Ghana Office F702/1 Salem Street, Kuku Hill, Osu P.O.Box, AN 16701, Accra North, Ghana Telephone +233 (0) 302 777 127

Sambus Geospatial Nigeria Office No. 19 Ebitu Ukiwe Street, Jabi Abuja, Nigeria Telephone +234 (0) 9 292 2821

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