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SECURING CHILD RIGHTS IN THE FISHERIES SECTOR PROJECT

Child Labour and Trafficking (ClaT) Monitoring Database Report

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CH CHALLENGING HEIGHTS

CEWEFIA UNITY & PROGRESS

SPIMS GEOLOCATION MATTERS

SECRIFISE Securing Child's Rights in Fisheries Sector

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Cover photo:

A child standing in between two fishing canoes

Photo Credits: Hen Mpoano

ACRONYMS

CH	Challenging Height
CLaT	Child Labour and Trafficking
EU	European Union
GPS	Geographical Positioning System
GIS	Geographic Information Systems
HM	Hen Mpoano
QGIS	Quantum Geographic Information Systems
SpIMS	Spatial Data Infrastructure and Management Information Services

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1.0 INTRODUCTION

The Child Labour and Trafficking (CLaT) monitoring database activity was undertaken with the intention of producing a state-of the art relational spatial database system to enhance long-term monitoring of children at-risk and survivors of trafficking. The database was developed under the auspices of the EU-funded Securing Child Rights in the Fisheries Sector (SECRIFISE) project led by Hen Mpoano and implemented in partnership with Challenging Heights and CEWEFIA.

This report presents the different stages that led to the full development of the spatial database, data validation, internal structures, visualization options and opportunities for update. It builds on previously initiated work that resulted in the development of functional information pertaining to the series of approaches explored to collect data to build the spatial data structure, data cleaning and systems development for the underlying database design. These key elements of the spatial database have been revisited in this final report to provide functional understanding of the developed system.

1.1 Brief Description

The activity aimed to develop a spatial database for purposively monitoring at-risk and trafficked children over the long-term. By extension, the database makes available a detailed and up-to-date spatial information about trafficking for utilization by decision makers in the human trafficking space to track trafficking victims and reintegrate them with their families after rescue. To this end, the database possesses an advanced structural data entry functionality which accommodate all current and future data structures generated on trafficked children in Ghana.

2.0 DATA SOURCES AND THEME EXPLORATION

Considered under Phase I of this activity, a team made up of representation from Challenging Height (CH), Hen Mpoano (HM) and Spatial Data Infrastructure and Management Information Services (SpIMS) collaborated to identify and explore already existing data about trafficked children.

The assembled data became the structure for the actual development of the relational geospatial database. The overall data obtained was entered in excel spread sheet and characterized by the following sub-categories:

a. Demographics of trafficked victim
b. Referral to CH
c. Rescue operation
d. Rehabilitation at shelter, and
e. Reintegration day.

While the column names reflected the corresponding contents, SpIMS further identified and reclassified specific columns across the five tabs for consideration into the spatial database design and development. The reclassified columns were inspired by the International Migration Organization's (IOM) acceptable themes for developing trafficking databases for use by interested organizations and departments.

The final themes chosen for representation in the database included:

i. Name of trafficked child
ii. Gender
iii. Biological parent
iv. Traffic/transit route
v. Host parent
vi. Intervention group
vii. Health status
viii. Employment /trade

Following, columns with the headings above were created to allow the updated version of the excel files to be used as spatial database schemas in the actual relational database.

2.1 Data Cleaning and Replenishment

The selected themes were characterized by missing and somewhat incomplete data entries. These missing or incomplete data fields possess the tendency to affect the overall integrity of the resulting spatial database. As a solution, and in collaboration with data builders, an iterative and incremental questioning and feedback plan was employed to provide accurate responses to unavailable data entries. Despite instant resolution and progress made, this process will require further iterations from time to time to ensure the database integrity is kept through the lifespan of the database.

2.2 Data Validation

Following the inability to trace the proper spatial location information of children whose biographies were already in the draft excel data layer obtained from implementing partners, an alternative idea was employed. It was evident that the missing location information were not the sole challenge that required validation. Issues pertaining to misspelt names of trafficked children vis-à-vis the correct names of destination, origin and reintegration communities were tackled at the same time.

Series of meetings with representatives from both implementing partners were held to correct several anomalies with names of children, locational information, dates and other information pertaining to the specific route children were trafficked. This information provided a firm ground for the development of accurate information in the database development.

Subsequently, a team from SpIMS joined a reintegration and monitoring activity organized by CH and HM in July 2021. This exercise employed geographical positioning system (GPS) points to validate aspect of origin, destination and reintegration location across the route of trafficking. The correct names of affected children were also validated during the exercise. Similarly, the appropriate names of communities and the definite locational information collected via GPS were reintegrated into the database to correct previous locational anomalies.

Some of the locations visited included Winneba, Senya, Dansoman, relevant suburbs of Yeji and other communities along the Volta River. In the case of Volvokura, a community along the Volta River, the team assembled a group of community representatives to guide the precise plotting of the location using GoogleEarth images. This alternative validation approach became necessary due to the inaccessible nature of that community at the time of this exercise.

2.3 Functional Spatial Database Structure/Design/Technical Specifications

The database structure and design was implemented in ArcCatalogue with the development of multiple database domains and schemas congruent to the functionality of the database. For this purpose, three spatial file geodatabase feature classes and three associated records representing file geodatabase tables were developed. For the purposes of ethics and confidentiality, the three supporting records developed in line with the feature dataset allows clients to view and perform smart thematic layer presentations with the minimal and non-confidential spatial data attribute without necessarily exposing the more confidential information captured about trafficked children in the relationship tables (see Fig. 1). A metadata developed for the entire database is provided in Annex 1.

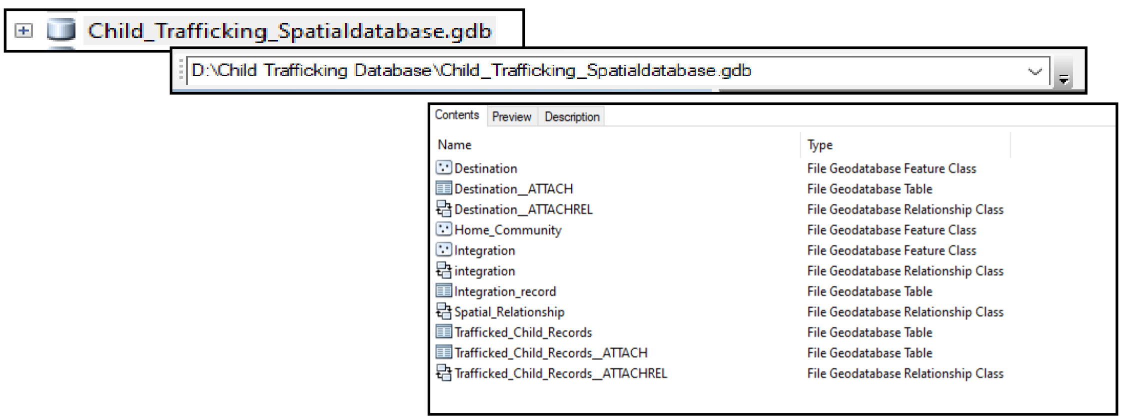


Figure 1:. Internal component of the CLaT Spatial Geodatabase. Visuals from ArcCatalogue

With a unique global ID system established for individual database objects, a spatial join operation connects all database objects to enable client perform all levels of operations, manage and update the database while ensuring the integrity of the individual part of the database is not compromised. The join on both databases were necessary to ensure system functionality and integration with spatial elements to be introduced later.

Figure 2: A representation of the main file geodatabase table as shown in ArcCatalogue

A grounded understanding of the inner structure of the main file geodatabase table which hosts the information about the trafficked children is worth exploring. Granted that this is a technical report, a selection of the relevant column information has been provided as a quick overview. In relation to the structure of the developed spatial database, the image below (*see Fig. 3*) represents the schema's used in the database for capturing victim information:

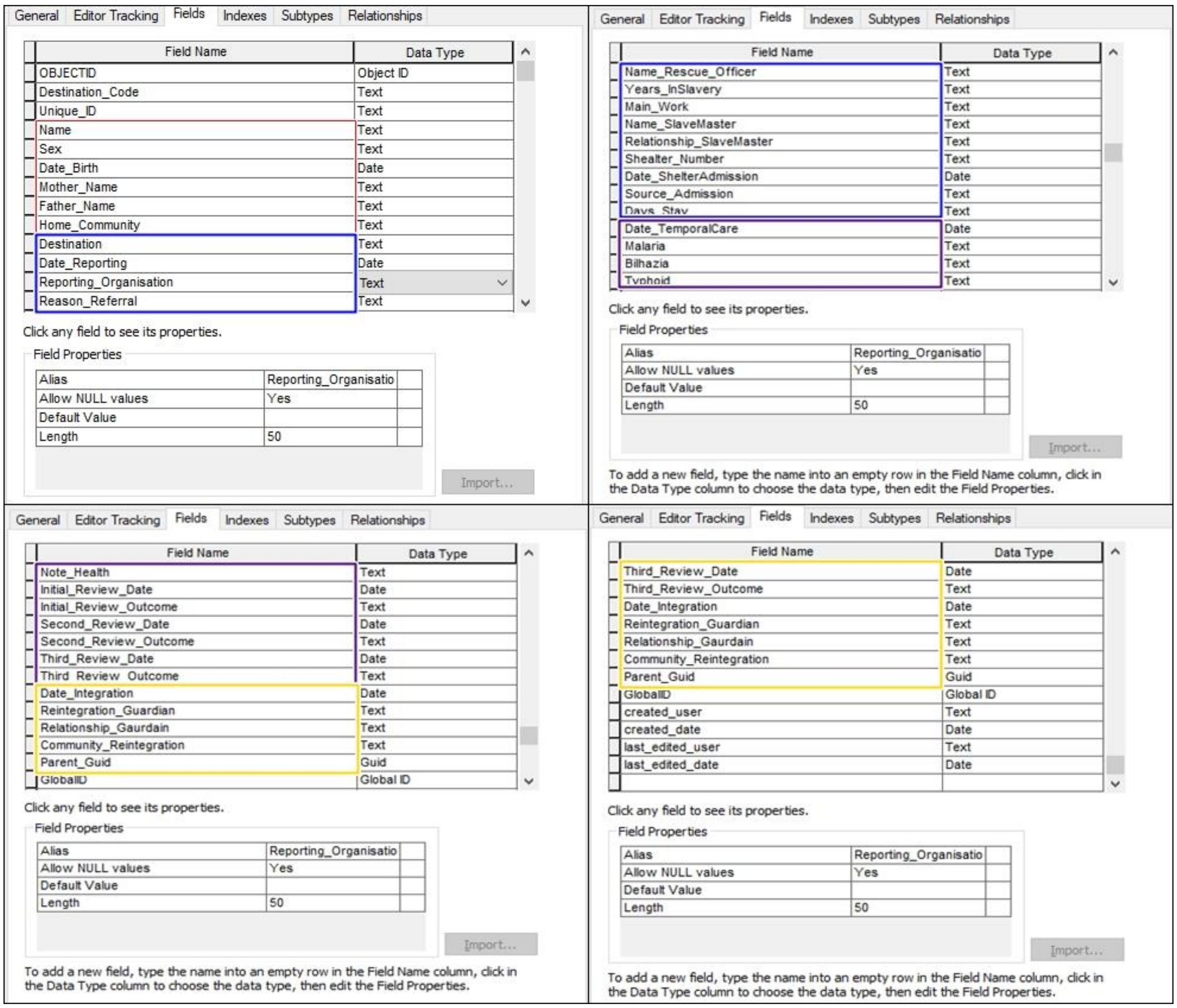


Figure 3: CLaT Database schema representation and shown in ArcCatalogue.

Table 1 below presents a descriptive summary of selected database schemas. It is important to note that a simple nomenclature for the schemas were chosen to allow easy interpretation of what sort of information is rendered in the main records table.

Table 1: A selected representation of data schema in the trafficked children records

DATABASE SCHEMA	DESCRIPTION
Unique ID	Uniquely identifying number of trafficked children across both databases
Name	Full name of trafficked child
Sex	Gender/Sexual orientation of trafficked child
Home Community	Origin community of trafficked child
Destination	Final destination of trafficked child for purposes of work etc.
Date_Reporting	Date trafficked child was found by rescue team and officially considered as a victim
Reporting_organization	The organization that reported the case of the trafficked child
Reasons_Refferral	Original reasons for which the child was trafficked, originally backed by good intensions
Name_Rescue_Officer	The name of the rescuer who rescued the trafficked child
Years_InSlavery	The number of years the child spent away from their home as a trafficked child
Main_Work	The kind of work undertaken by the trafficked child
Name_SlaveMaster	Name of person under who benefits by exploiting trafficked child
Relationship_SlaveMaster	The relationship of trafficked child to exploiter
Shelter_Number	Name of the shelter home where trafficked child was initially rescued to
Date_ShelterAdmission	Date when trafficked child was admitted to the shelter house
Days_Stayed	Number of days trafficked child lived in the shelter home
Date_Reintegration	Date trafficked child was reintegrated with family
Reintergration_Guardian	Name of guardian trafficked child was reintegrated with
Community_Reintegration	Name of community where child was reintegrated

2.4 Implementation

The database was developed to work with a MySQL and SQL databases frameworks in the back. From Fig. 3 with support from Table 1, the database structure can be seen to be divided into four major color-coded components. The red line borders around the trafficked victim's demographic information, the blue line captures the route, number of years trafficked, nature of work undertaken during the period when they were trafficked, as well as the relationship between the trafficked victim and their "so-called" slave masters. In the third section bordered in violet, the past and present health condition of the victim is documented, while the yellow color code captured victim integration and reintegration into society.

2.4.1 System Features/Security:

The functional requirements of the database include what the data base will do and how it will be used.

- Completed task: At present, a total of 89 out of 89 original entries have been fulfilled. It must be noted that the system includes data of children trafficked and rescued by previous and current project undertaken by CH on one hand, and those trafficked and rescued under the HM and CH partnered project funded by the EU.

- System integrity and security
  The database has been designed with core data integrity and confidentiality check already integrated into its core structure. With the dualized design framework, it is easy for the technician to simply display point information with specific themes which averages individual information from the main database table which features the full records of the trafficked child. Thus, representing pictorial or mapped representation under particular category without directly making reference to a specific child is doable. Additionally, a technician can easily export the spatial aspect of the data for use on other activities without the main table which carries the sensitive information about the trafficked child.

2.5 Visualization of CLaT: A Demonstration

Despite being developed within ArcGIS 10.8 (ArcCatalogue), a commercial/proprietary software framework, the resulting relational geospatial database system and accompanying spatial data structures and attribute information can be easily accessed for visualization in opensource Geographic Information Systems (GIS) software tools. A notable example of such platforms is Quantum GIS (i.e. QGIS). Available QGIS versions from 2.29 and above could serve a key purpose a preferred option for database visualization. Otherwise, a standard proprietary ArcGIS from versions 10.1 can do the regular database visualization task. See the next page and Appendix for additional visualization of selected themes strategically drafted from the attribute information of the data objects.

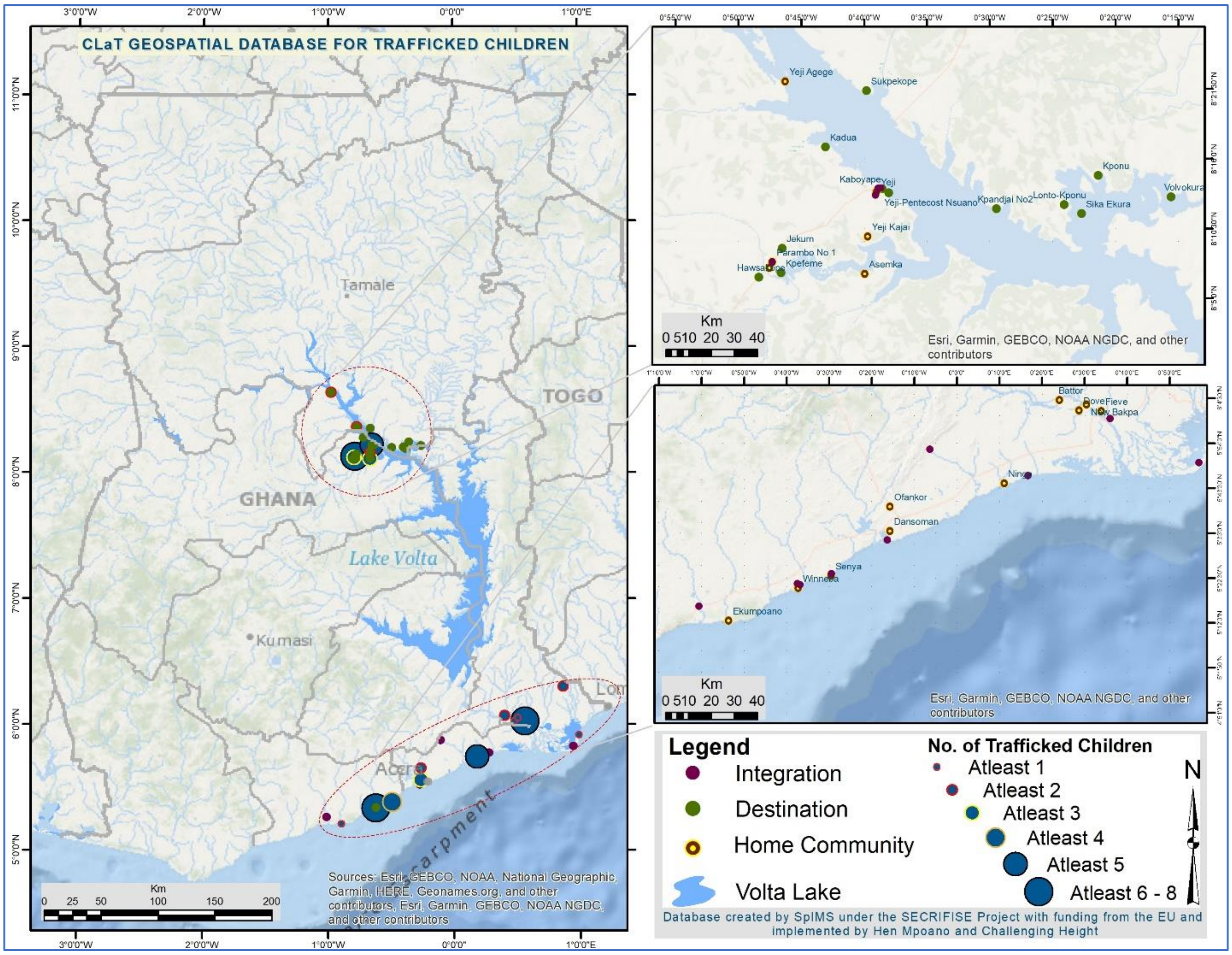


Figure 4:Mapped representation of selected themes from the spatial database. Image shows the home communities of trafficked children, the destination where they began their trafficking activities and the final locations where they were located.

2.6 Opportunities for data update

The template and a short description of the headings as seen in Fig. 3 and Table 1 are self-explanatory and could serve as referral in a bid to update the system as and when new information about a trafficked child becomes available. Relatedly, it is useful to note that new information about children already captured in the system could be added. The technician is able to toggle the edit feature within the GIS tool in use to update either the table of records of the trafficked child or the file geodatabase feature class. To update the system, both feature dataset and accompanying records ought to be done concurrently to ensure the full integrity of the system is maintained.

3.0 FUTURE OF CLaT MONITORING DATABASE

The database is currently functional as a stand-alone system with a MySQL and SQL back-end and can receive SQL queries to highlight and visualize relevant information for decision making and for further follow-up action. Nonetheless, the ideal situation would be for the database to be completely wrapped up and made available on secured GeoServer or WebGIS platform where quarterly infographic output can be developed to tell the story about the changing status of trafficking victims in Ghana.

Though the system currently consists of data covering four child trafficking hotspot regions, the system can be expanded to accommodate data about children from across all sixteen regions in Ghana. This is to affirm that; the underlying foundations of the database is not limited to boundaries and or restrictions. Despite being conducted for four regions across the country, the system is capable of handling data collected across the country at large. Adapting the setup to accommodate does not require any special pre-parameterization whatsoever. Technicians need to obtain the relevant data and spatial information about the location of the trafficked children to fulfill the requirement of the system.

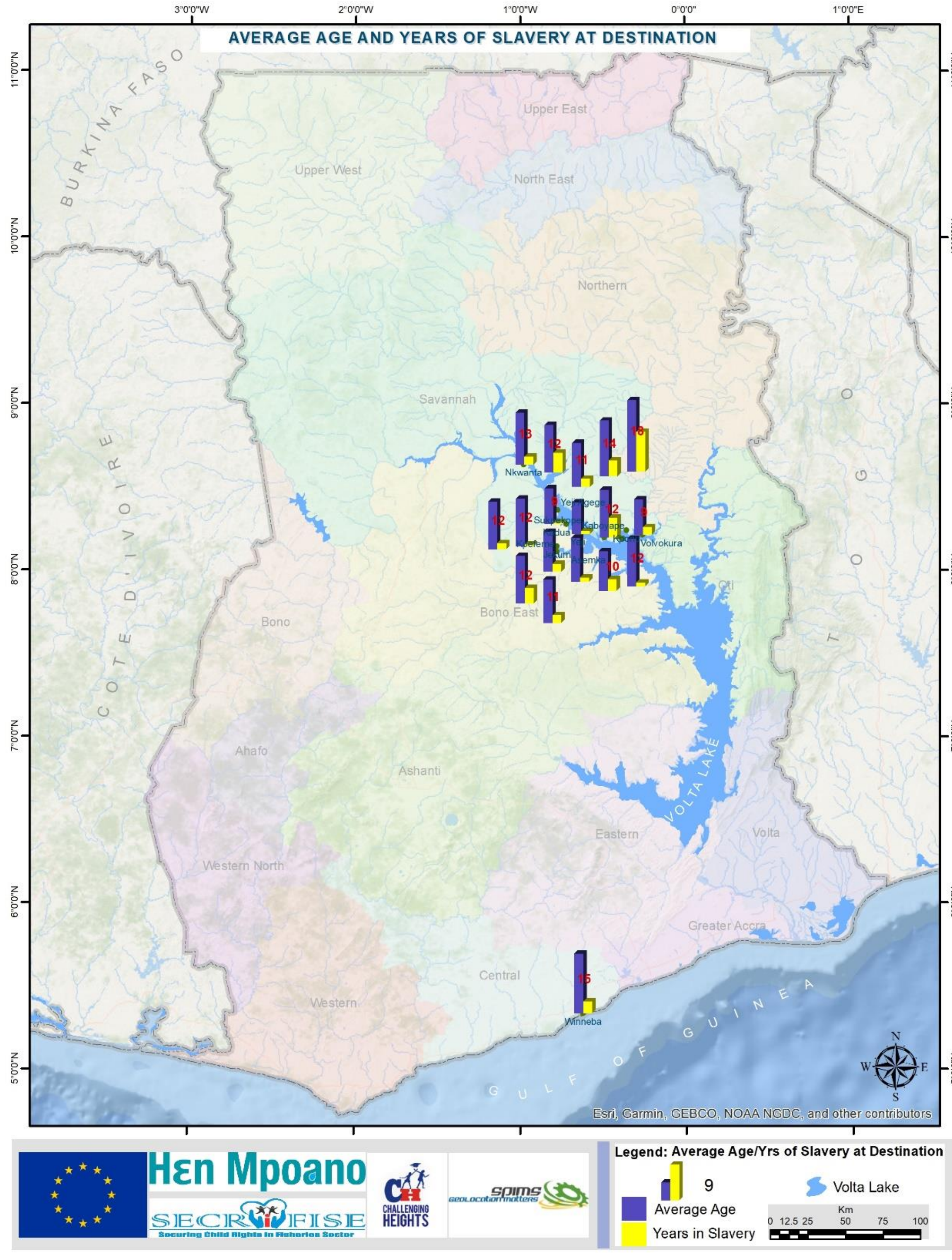
Hosting the database on a Webserver allows for a secured option not just for updating the system, but to ease access to the database and its useful functionality for web-based geo-visualization opportunities. The endless possibilities of this option dwells on the opportunity to link the WebGIS to a Mobile GIS Application which then could serve as an interface for collecting and updating the main database. The opportunity to integrate the stand-alone MobileGIS and WebGIS would allow a fast-paced data collection and evidence building opportunity to capture current and future occurrence of trafficking. The system could also be updated to receive photo as a means to build evidence. On both ends, this evidence building character of the system could be utilized as means to not only gather facts, but also aid decision making. Additional update to the attribute information gathered could be transformed into infographics to spark visual thinking and strategic decision making.

Finally, for deployment of the database on a webserver or a typical WebGIS platform, the technician has the opportunity to restrict, through a series of administrative right and privileges, access and editing capabilities through the ArcCatalogue platform before deploying the database on the WebServer or WebGIS platform.

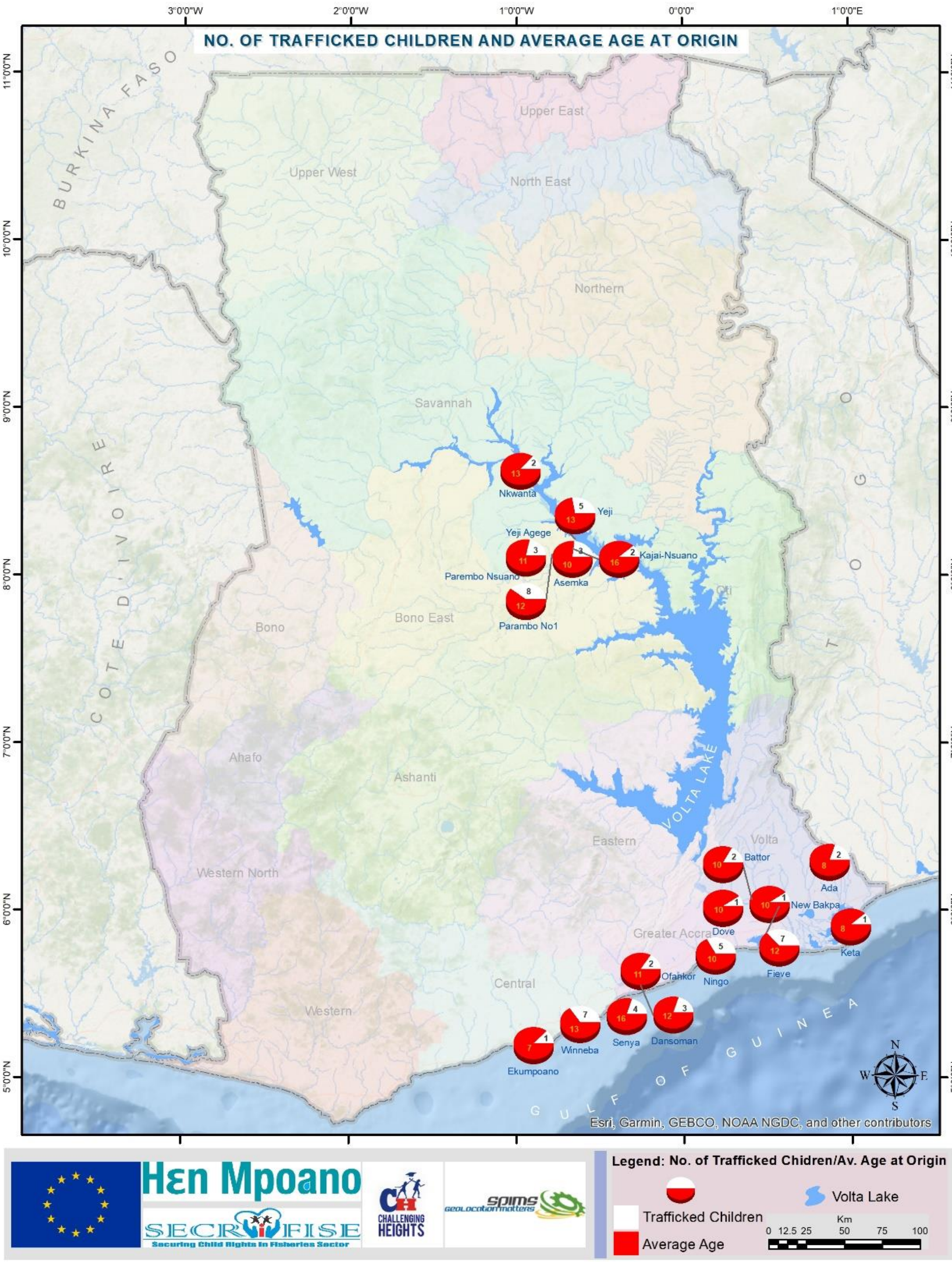
4.0 CONCLUSION

This activity presents a learning experience towards the development of a relational spatial database structure for monitoring child trafficking in Ghana, and perhaps the first of its kind across the West African sub-region. The processes employed, the adaptions made and the robustness of the final products affirms the power of geospatial technologies and its contribution to advancing anti- child trafficking campaigns in our local communities. A key recommendation is the development of WebGIS to periodically present the statistics about child trafficking phenomenon, and to provide a snapshot of the spatial data and statistics on a website to allow easy access and manipulation of the data to make on-the-fly maps and graphs to inform decision making at the local, regional and national levels.

APPENDICES



Appendix 1: Years of Slavery and Average Age of Trafficked Children at Place of Destination



Appendix 2: Number of Trafficked Children and Average Age at place of Origin

CLaT Database

Tags

Child Trafficking, Children, Fisheries Sector, West Africa, Ghana, Central Region, Oti Region, Greater Accra Region, West Africa, Spatial Database

Summary

The objective of the assignment is to develop a CLaT monitoring database that integrates both spatial and non-spatial information. The idea was to develop a monitoring database to strengthen the information system to enable long-term monitoring of rescued survivors as well as rehabilitation and reintegration processes of the same.

Description

Securing Child Rights in the Fisheries Sector in the Central Region and along the Volta Lake of Ghana (SECRIFISE) sought to secure child rights in Ghana's fisheries sector by increasing public support for eliminating Child labour and trafficking (CLaT), implementing communitybased initiatives for integrating CLaT victims in mainstream society and supporting enforcement of anti-CLaT legislation, SECRIFISE is targeted at children at-risk of CLaT, victims and survivors of CLaT and re-trafficked children; parents and guardians, including family heads in the central region as well as "slave masters" and "mistresses" in the Volta Lake; community and district child protection committees; state attorneys; anti-Human trafficking unit of Ghana police service among others.

Data contained in this databases are multiple tables and point feature datasets that portrays home communities, destination and reintegration locations of trafficked children across Ghana.

Credits

Securing Child Rights in the Fisheries Sector in the Central Region and along the Volta Lake of Ghana (SECRIFISE) was a three-year project funded by the European Union and implemented by Hen Mpoano, CEWEFIA and Challenging Heights. This relational database on it inherent features were developed by Spatial Data and Information Systems Management (SpIMS), Ghana. The team was supported by the implementing partners under SECRIFISE to fully develop the database and all auxiliary/accompanying dataset.

Use limitations

The right to the use, modifification and revision of all datasets and tables created under SECRIFISE solely reside with all implementing partners under the SECRIFICE Project with strict adherence to the confidentiality state surrouding this database.

Extent

West	6.6224, -3.2589	**East**	8.3064,07312
North	10.9867,-1.2966	**South**	4.7393, -2.0922

Scale Range

Maximum (zoomed in)	1:5,000
Minimum (zoomed out)	1:20,000,000

Appendix 3: Metadata for developed CLaT Database.