



# INTEGRATION OF SPATIAL TECHNOLOGY AND WEB APPLICATION FOR REVENUE MOBILIZATION

## Case study: Kwadaso Municipal

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### ABSTRACT

#### Context and background:

The government usually has always had problems with revenue mobilization. One way of ascertaining the effectiveness of a government is its ability to mobilize funds. Governments all over the world are faced with the general problem of ineffectuality in revenue mobilization and tracking. This often leads to the unavailability of adequate funds for the effective provision of services and infrastructure by government.

#### Goal and Objectives:

The objectives include identifying the various avenues of revenue within the Kwadaso Municipal Assembly and to develop record resolution for administration of assets proprietorship and income collection. Revenue Mobilization Application (RMA) is created primarily based on a geo-database.

#### Methodology:

The idea of tracking all revenue transactions on the field to keep up to date information to improve revenue in the Kwadaso Municipality can be achieved by the development of this Revenue Mobilization Application (RMA). The application has 4 modules; Geodatabase, the map of Kwadaso Municipal, contacts and settings.

#### Results:

This application consists of four modules which are geo-database, and detailed map of Kwadaso Municipal Assembly (KdMA). The geo-database comprises the property column, owners of property, revenue and revenue collector. If the application system is adopted and replicated in other MMDAs, it will eventually increase the tracking, update of data and general mobilizing of revenue.

#### Keywords:

*Geospatial, revenue mobilization, geographic information system*

## **1. INTRODUCTION**

The performance of local government is subject to the availability of adequate funds, which it can generate and use to finance its responsibilities. Metropolitan Municipal and District Assemblies (MMDAs) have been mandated to sponsor local growth curricula with revenue created in their area of jurisdiction but this financial reorganization sequencer of the central administration to envoy fiscal responsibilities to the local assemblies to commence development schemes became a main problem because of absence of investment principal at the local level (Baffour, 2008).

The Local Government Act, 1993 (Act 462) makes provision for the establishment of Metropolitan Municipal and District Assemblies (MMDAs) as the planning authority of the District and the District Planning Coordinating Units as the service wing of the MMDA.

The District Assemblies shall also formulate and implement development plans, programs and means for the efficient collection for the needed funds for the growth of the local area. The capacity of the MMDAs to raise internal revenue is faced with many challenges for them to handle.

The capacity of the MMDAs to raise internal revenue is faced with many challenges for them to handle. Tracking of payment through integration of spatial technology and web application is a way to handle the challenge in revenue mobilization at the local assembly level.

The organization and generation of income at the local assemblies are undertaken by means of the blue-collar methods making it problematic to follow the improvement of the MMDAs in the part of income generation (Yeboah, 2020).

### **1.1 Challenges with Revenue Collection**

Apparently, the obligation of the MMDA cannot be performed magnificently deprived of the adequate resources. It is necessary for the MMDAs to seek a more competent approach to improve their revenue mobilization capacities.

One of the challenges the Public sector faces is revenue leakages from various agencies through to the local the system who are mandated in revenue mobilization; this is because most of the operations in the MMDAs are automated or computerized, consequently there is constrained rheostat, no transparency and no culpability (Tahiru, 2014). This limitation has attracted corrupt practices revenue collectors and consumers conspire to distort bills and other fees that need to be settled.

The issue here is most MMDAs revenue collection processes are mainly manual (paper receipt), where payments cannot be tracked, less efficient and accompanied with fraud.

These glitches can be ascribed to lack of access maps of the area and advanced info on customers, properties and their locations. In view of the problems reckoned above, it therefore authorizes for a study to be steered to find a lasting solution to the peril.

## **2. SPATIAL TECHNOLOGY**

Over the years, revenue collection even at the central government itself has been a challenge. It must be noted that the MMDAs efforts in internal revenue mobilization need to be reviewed constantly because their growth is tied to internal revenue.

When spatial technology is implemented in the mobilization of revenue in the local assemblies, the numerous revenue generation and management challenges confronting the MMDAs would be improved.

According to (Hanigan, 1988) Geographic Information System is described as any information administrative system which can:

- Capture, save and recover information based on its spatial position;
- Detect locations within a beleaguered location which meet specific conditions;

According to (MUSWII, 2012) GIS benefits organizations of all sizes and in almost every industry. There is a growing awareness of the economic and strategic value of GIS. The benefits of GIS generally fall into five basic categories: Cost Savings and Increased Efficiency Better Decision Making Better Recordkeeping

The objectives of this research are:

- To identify the various avenues of revenue within the Kwadaso Municipal Assembly.
- To develop record resolution for administration of assets proprietorship and income collection.

## **3. METHODOLOGY**

The idea of tracking all revenue transactions on the field to keep up to date information to improve revenue in the Kwadaso Municipality can be achieved by the development of this Revenue Mobilization Application (RMA). The application has 4 modules; Geodatabase, the map of Kwadaso Municipal, contacts and settings.

The geodatabase consists of the properties, property owners, revenue and tax collectors. The map modules show the details of structures or properties linked to the database within the study area. Contacts such as email addresses, phone numbers and website of the municipality can be assessed in the contact module. Finally, the setting module is designed to enable the administrator make changes with regards to the database, login and password creating and resetting.

The KdMA RMA is a lively system that can be restructured to billet extra information and permits for expurgation.

## **4. RESULTS**

### **4.1 Login interface**

This interface only allows users with staff ID and the password of their choice to access the application. These credentials are assigned by the help of the system administrator. The application was designed such that wrong entry of credentials disallows a user to assess the content of the application. In the case of a user forgetting his password, an option allows the user to send a link to his email account to enable the user to reset the password.

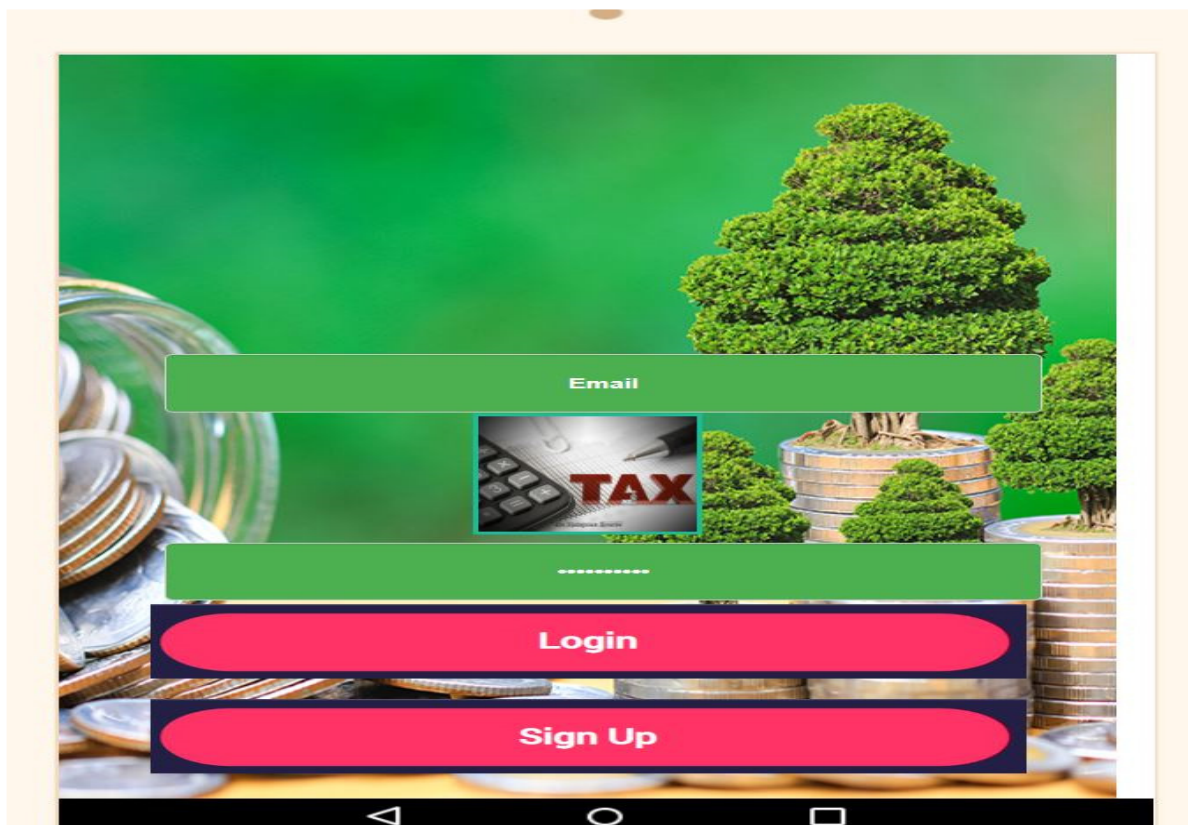


Figure 1 Login interface

### **4.2 Kdma Rma Control Panel**

After user has successfully logged in, the control panel of the application pops up showing the following modules; Geodatabase, the map of Kwadaso Municipal and contacts.



Figure 2 Control Panel

#### 4.3 Geodatabase

The Geodatabase module consists of the property owner, property information, revenue details and revenue collector's information. The information stored in the Geodatabase are done by official staff of the municipal.



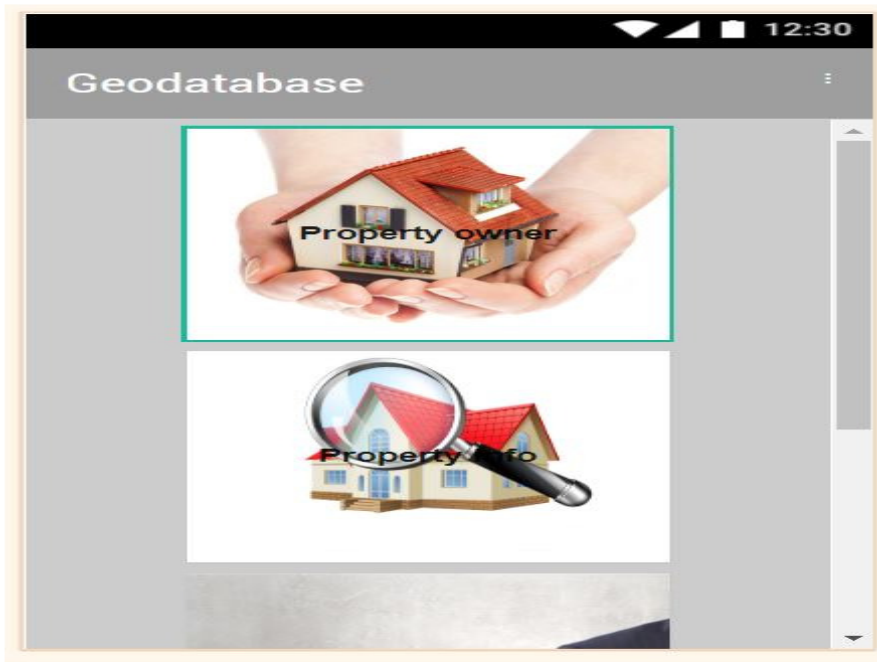


Figure 3 Geodatabase

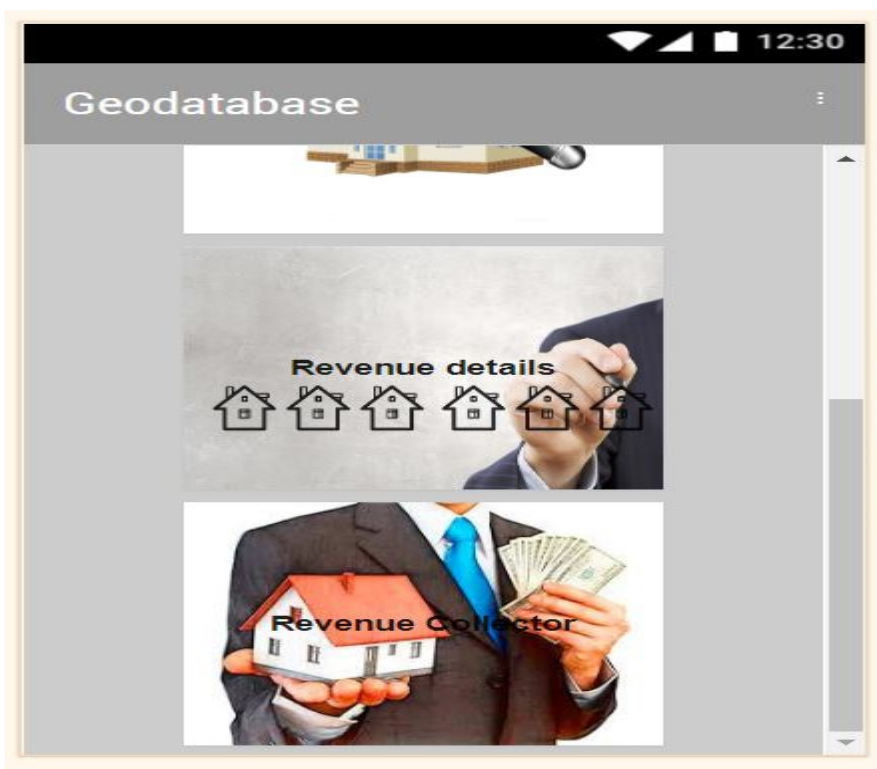


Figure 4 Geodatabase

#### 4.4 Smart Editor Panel

This interface allows users to capture all relevant information related to Property, property owner, Revenue and Revenue collector. Information entered can be edited, deleted and saved into the database.

The screenshot shows a mobile application interface for editing user information. The form contains the following fields and values:

- TaxpName: Mr Amoah
- ResAddress: Plot4 BLK A
- Contact: 243,265,139
- NumberOfPr: 1
- TaxColIN: Michael (with a modal dialog overlaid)
- TaxColCont: 268,951,294
- TaxColEmai: michael123@gmail.com
- TaxColResi: Kwadaso
- Revenueld: (empty)
- VoterID: (empty)
- AmountPaid: 200

A modal dialog titled "Buildings: Mr Amoah 1 of 5" is overlaid on the TaxColIN field. At the bottom of the form are three buttons: "Cancel", "Delete", and "Save".

Figure 5 information display in Smart editor

#### 4.5 User Database

This database gives a summary of all detailed information of entities in the KdMA RMA. The information includes the following

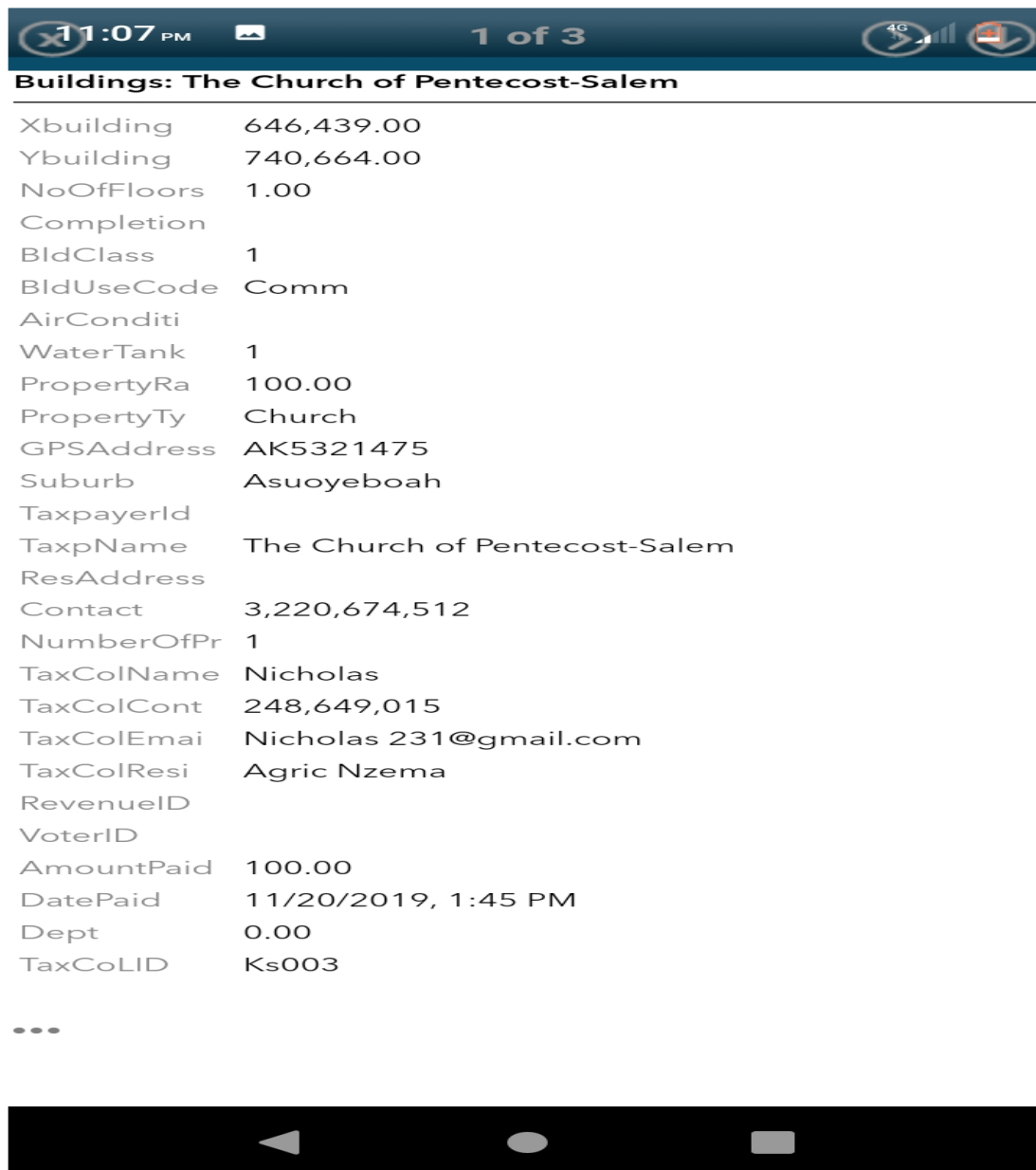


Figure 6 Report window showing summary of user information

#### 4.6 Map of Kwadaso

This interface provides information about the working area, direction to property for easy navigation within the software application.



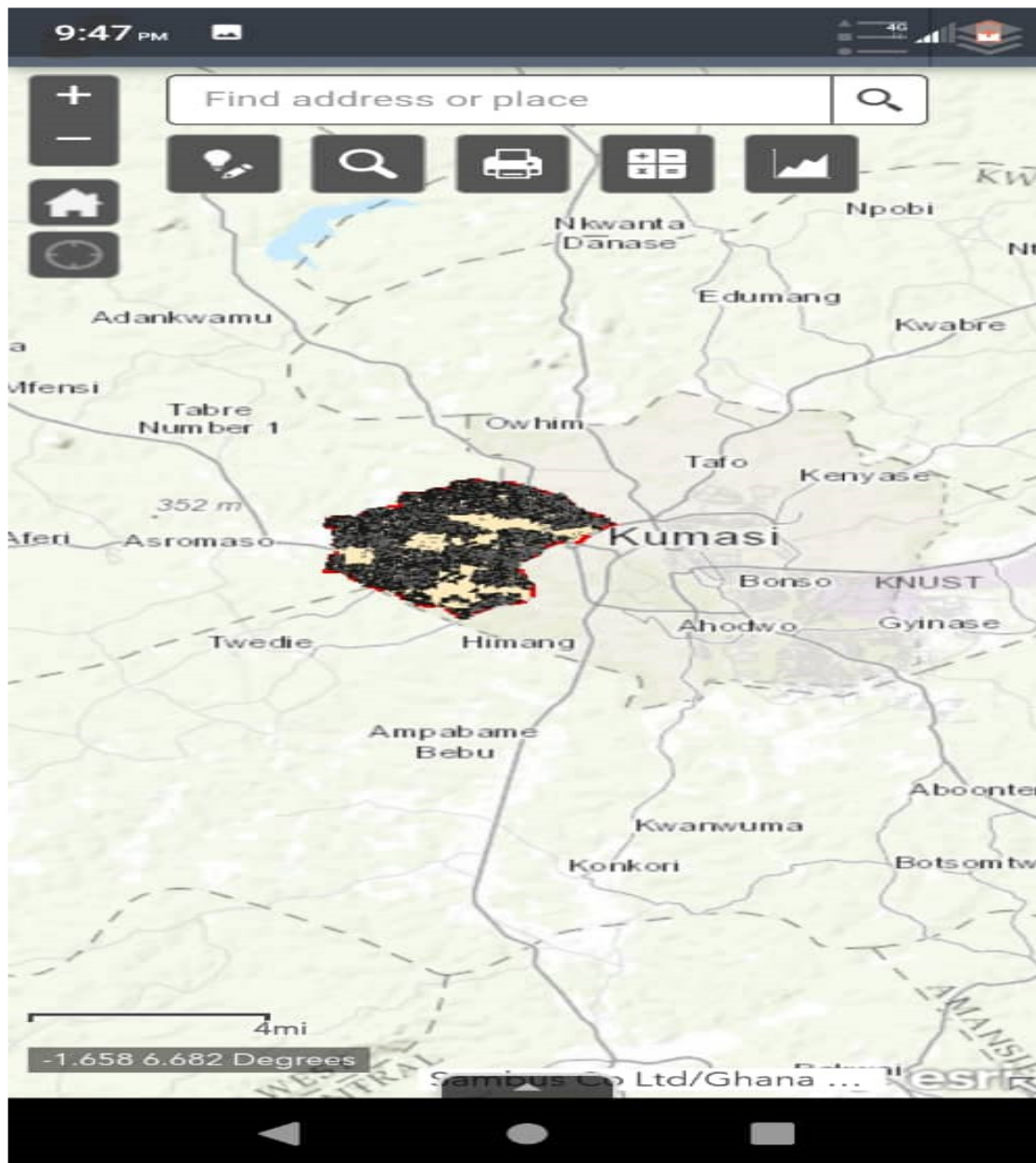


Figure 7 Map interface

## 5. CONCLUSION

KdMA RMA is a web-based software application system designed to track revenue collection procedures, identify the various avenues of revenue and provide a database solution for effective property ownership management and revenue mobilizing procedures. This spatial data and web-based application is the first of its kind the newly created Kwadaso Municipal is going to use in the mobilization of property rate revenue. It is very obvious that integrating GIS into KdMA RMA application can effectively improve the revenue mobilization process in local government.

Spatial data of all properties captured into a secured database provides a platform to access the geographical location of every asset or property within the Municipal.

With regards to identifying the various avenues of revenue within the Kwadaso Municipal Assembly, this software application shows all commercial property purposes such as Hotels, Schools, Hospitals etc. and residential property purposes such as Bungalows and Housing units. Moreover, better records of all record entries relating to payment records in real time are kept and managed in a secured database system. This web-based application will help local authorities overcome the challenges of keeping loads of receipt books and record books associated with property rate revenue collection. The features of this web-based software application which include the data entry and updates will provide easy and better way for updating and querying for information.

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Bright Acheampong (Researcher) and Prof. Ing. Collins Fosu (Supervisor)

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## 10. KEY TERMS AND DEFINITIONS

**Geospatial:** relating to data that is associated with position or location on the earth surface

**Revenue Mobilization:** income accruing from taxation for a particular purpose

**Geographic Information System:** is a system designed to capture, store, manipulate, analyze and manage geospatial data for assisting decision making.