Use of GIS to extend and improve the register of users for fee collection of public services: application to waste

**Introduction**

Kosovo declared its independence from Serbia in 2008 and has been in a long battle since the disintegration of Yugoslavia. The whole country has suffered from this unstable situation that results in big lacks of basic services such as proper waste collection systems. This project focuses on the Municipality of Gjakova (purple on the map) and has two main objectives:

1) Create a reliable database of clients
2) Trace people who are not registered and do not pay for the service

The overall goal for the Municipality is to distribute the fee invoices to all its inhabitants.

**Results**

After combining the two files from the electricity register (KEDS), 3 main areas are identified where clients have missing types (from north to south):

- Herce
- Fjetërishan
- Gjërnia/Damjan

All these clients are then separated by their type of buildings with a corresponding color (zoom on the city of Gjakova).

- Pink: Households
- Green: Small/medium businesses

**Methods**

The first step is to combine different databases deriving from the electricity company (KEDS) to know the GPS locations and types of buildings. Additional data is provided by the current waste operator (Cabrali).

The second step is to create a new complete database containing client IDs, names, addresses, GPS coordinates, types of buildings and corresponding taxes.

The third step is to identify areas (with the help of GIS) where fee collection is not done in a suitable way. This means detecting places where clients are not yet registered in the database, do not receive any invoice or do not pay.

**Discussion**

After merging all databases, an improvement potential of 20% has been calculated. This represents a significant amount of money that should be collected by the Municipality. If the fee collection was done properly, the expected revenue is:

- KEDS: 35,946
- Cabrali: 71,13

**Future Perspectives and Conclusion**

A meeting with the local municipal team in Kosovo was organized to improve the database and fee collection service. The main conclusions are:

- Put a punishment in place by refusing to deliver renting or building permits if the fee is not paid.
- Create an app to help the "door-to-door" collectors to modify information about clients.
- Send one envelope per year containing 12 invoices.

Finally, it is important to keep in mind that it is a "step-by-step" process. Each step needs to be retouched several times to be improved. It requires patience and time as well as fast adaptation skills.