OPEN CITIES ZANZIBAR

SPATIAL COLLECTIVE

GFDRR | Global Facility for Disaster Reduction and Recovery

OPEN DRI

ZMI

SMZ SERIKALI YA MAPINDUZI ZANZIBAR

FINAL REPORT

MARCH 2019

Open Cities Africa, is an initiative carried out in 10 cities in Sub-Saharan Africa, to engage local government, civil society, and the private sector to develop the information infrastructures necessary to meet 21st century urban resilience challenges. The project is aligned with The Global Facility for Disaster Reduction and Recovery's (GFDRR) Resilient Cities Program[1] and is implemented through a unique partnership between GFDRR and the World Bank, city governments, and a partner community comprised of regional scientific and technology organizations, development partners, and technology companies to support upcoming or ongoing World Bank supported activities in the selected cities.

[1] See: https://www.gfdrr.org/urban-resilience

Zanzibar City is a densely populated urban area with significant threat of flooding. For the purposes of disaster risk management, the Revolutionary Government of Zanzibar (RGoZ), specifically the Commission for Lands (COLA) and the Department of Urban Planning, have noted with urgency the need to update their Zanzibar Master Plan with locations of all the built structures and flood prone areas in the city.

Spatial Collective, the implementing partner for the initiative spent months on Zanzibar building capacity of the local stakeholders and coordinating various data collection activities. The goal was to generate and visualize datasets critical to disaster risk management and build local capacity in the process.

BACKGROUND

OBJECTIVES

According to the Terms of Reference, this assignment's overall objectives are as follows:

1. Create and/or collate and release open spatial data about the built environment, critical infrastructure, and natural hazards.

2. Develop targeted products and/or tools (e.g., visualization tools, atlas, map series, or mobile application) to assist key stakeholders to utilize risk information towards addressing natural disaster risk in the selected city.

3. Enhance the local capacity and institutional development necessary to support the design and implementation of evidence-driven urban resilience interventions.

4. Promote peer mentorship and build regional networks across cities.

MORE SPECIFIC

More specifically, Open Cities Zanzibar chapter aimed to achieve:

a. Train at least 10 additional members of SUZA (bringing the number of trained and experienced digitizers to 30) on digitization techniques and closely monitor their work.

b. Continue digitization of buildings on Unguja Island and start of digitization activities on Pemba Island.

c. Put several local digitizers in charge of the digitization process. Out of 30 digitizers on Zanzibar, put selected few in charge of quality control.

d. Train several digitizers in digitizing the road networks on Pemba and Unguja.

e. Establish better communication between the morning and afternoon teams of digitizers and COLA staff maintaining the server network.

f.   Finalize digitization of all the buildings on Unguja Island and start digitization of Pemba Islands.

g.   Start digitization of road networks on Unguja and Pemba Islands.

h.   Assign Building Reference Numbers based on the classification put forth by the Client.

i.   Conduct community mapping that included the following:

- using GPS handheld units, collect data on amenities in the area of interest determined by the stakeholders
- using mobile phones complete a household survey of at least 1,000 households

j.   Create and hand over Shapefile and Spatialite dB layers of the datasets.

k.   Provide data to the existing GeoNode instance.

l.   Advise and execute on a schema and methodology for a combination of remote mapping and, secondary, flood mapping of areas of Zanzibar.

m.   Leverage the emerging data communities in Zanzibar, through the community mapping methodology.

n.   Transfer knowledge and skills to local government officials and university students and staff on the digitization and community mapping methodology and building a cadre of students and government staff to implement community mapping.

ACTIVITIES & LANDMARKS

1. Finished digitization of buildings on Unguja Island and set up digitization of Pemba Island.

   a. Digitization work space was established at the Zanzibar's Commission for Lands.

   b. About a dozen State University of Zanzibar students digitized approximately 160,000 buildings, mostly in Zanzibar City.

   c. All the buildings were checked for errors including topology and attribute error.

   d. Finally, 160,000 buildings were added to the preexisting dataset of 200,000 buildings on Unguja Island, completing digitization of Zanzibar Archipelago's largest island.

   e. All of the 360,000 buildings were checked for quality.

   f. Building reference numbers were assigned to each building, following the nomenclature convention put forth by the Commission for Lands.

   g. Concurrently, about half a dozen digitizers added approximately 20,000 buildings on Pemba Island.

2. Acquired datasets critical to disaster risk management with focus on central Zanzibar City. The activities consisted of the following:

   a. Area of interest was established in collaboration with the Commission for Lands and other stakeholders.

   b. Data model was agreed upon and provided by the stakeholders.

   c. Tools for data collection were selected and prepared by Spatial Collective.

d. Participants for the training workshops were selected and mobilized by the Zanzibar's Commission for Lands and State University of Zanzibar.

e. Training in GPS and mobile data collection was carried out by Spatial Collective.

f. Three weeks of intensive data collection was carried out in central Zanzibar City. GPS locations of points of interest, as well as 2,100 household surveys were completed.

g. Data was managed at the Zanzibar's Commission for Lands on a daily basis.

h. Finally, a series of visualizations were produced.

3. Capacity building and stakeholder engagement was one of the main goals of Open Cities. Below are some of the main landmarks achieved:

a. Eight full-time digitizers (4 men, 4 women) were engaged between July 2018 and end of October 2018.

b. Two supervisors were trained and employed between the same periods of time.

c. About 30 people were trained and participated in GPS and mobile data collection.

d. Community members, shehia administrators, and local emergency responders in at least 6 shehia's were engaged in the process.

e. More than 25 training events were held, training up to 50 people on QGIS essentials, QC/QA methodology, JOSM and OSM.

f. A large delegation from Zanzibar attended both FOSS4G conference in Dar es Salaam and MapBox training on Zanzibar.

g. Half a dozen events were held on Zanzibar, reaching approximately 400 people.

h. Open Cities Zanzibar team presented to the Director of Social, Urban, Rural and Resilience Practice at the World Bank.

i. Up to a dozen stakeholder groups were consulted.

j. Half a dozen technical staff at the Zanzibar's Commission for Lands were trained in setting up field data collection.

4. Final Product

a. Approximately, 160,000 buildings were digitized and added to the preexisting dataset of 200,000 buildings on Unguja Island, completing digitization of Zanzibar Archipelago's largest island.

b. All of the 360,000 buildings for Unguja Island were checked and corrected for errors.

c. Building Reference Numbers were assigned to each building.

d. Approximately, 20,000 buildings on Pemba Island were digitized.

e. Several roads on Unguja Island were digitized.

f. Approximately 2,100 household surveys were completed and GPS points collected in 6 shehias.

g. Interactive map of the area of interest was done and is openly available.

h. A series of blog posts, social media posts, and manuals documenting and promoting Open Cities activities Zanzibar were written and shared.

Additionally

i. All drone imagery is made available to the public under a creative commons license.

The main challenge we encountered concerns the decision to upload the existing layers into OSM.

The government is the major stakeholder on Zanzibar. In the first phase, a staging area was used for digitization to satisfy requirements of the Commission for Lands to keep more control over the data. Since then, COLA has become more open to the idea of uploading the data to OSM. However, no agreement has been reached so far on whether to upload the data to OSM.

The director of Urban Planning recently said in one of his emails that "the question of OSM has not been decided by [the] Commission for Lands so far, and we hope that no one will upload this information to OSM before the approval form COLA."

At the beginning of this project, Spatial Collective mentioned that the ability to share the final data source depends upon agreement as to the licensing amongst the parties, which will be brokered by the World Bank. Furthermore, in one of our emails to the World Bank we tried to explain our position in this matter:

> "Our role in this project is a Technical Consultant and as such, we can only propose to the government what to do with the data. We've been pushing for OSM for more than a year but they've been reluctant to do it. We have made some positive strides in this direction recently but it is a bit difficult for us as they see us as a mere service provider. I think the World Bank should push a bit more on this. The World Bank should help the government understand the importance of open data and we, as technical consultants, will help them open it once they approve. I guess what I'm trying to say is that we will not be able to do this without the support of the World Bank."

Uploading the data to OSM remains a major topic, especially because this is one of the major deliverables for the Open Cities Project.

MAIN
CHALLENGE

WAY
FORWARD

1. Establish a City Laboratory.

2. Finish digitization of buildings on Pemba Island.

3. Update the entire road network on Unguja and Pemba Islands.

4. Capture land use data.

5. Continue with household survey.

6. Collect data on access to public services.

7. Build strong data analytics capabilities on the islands.

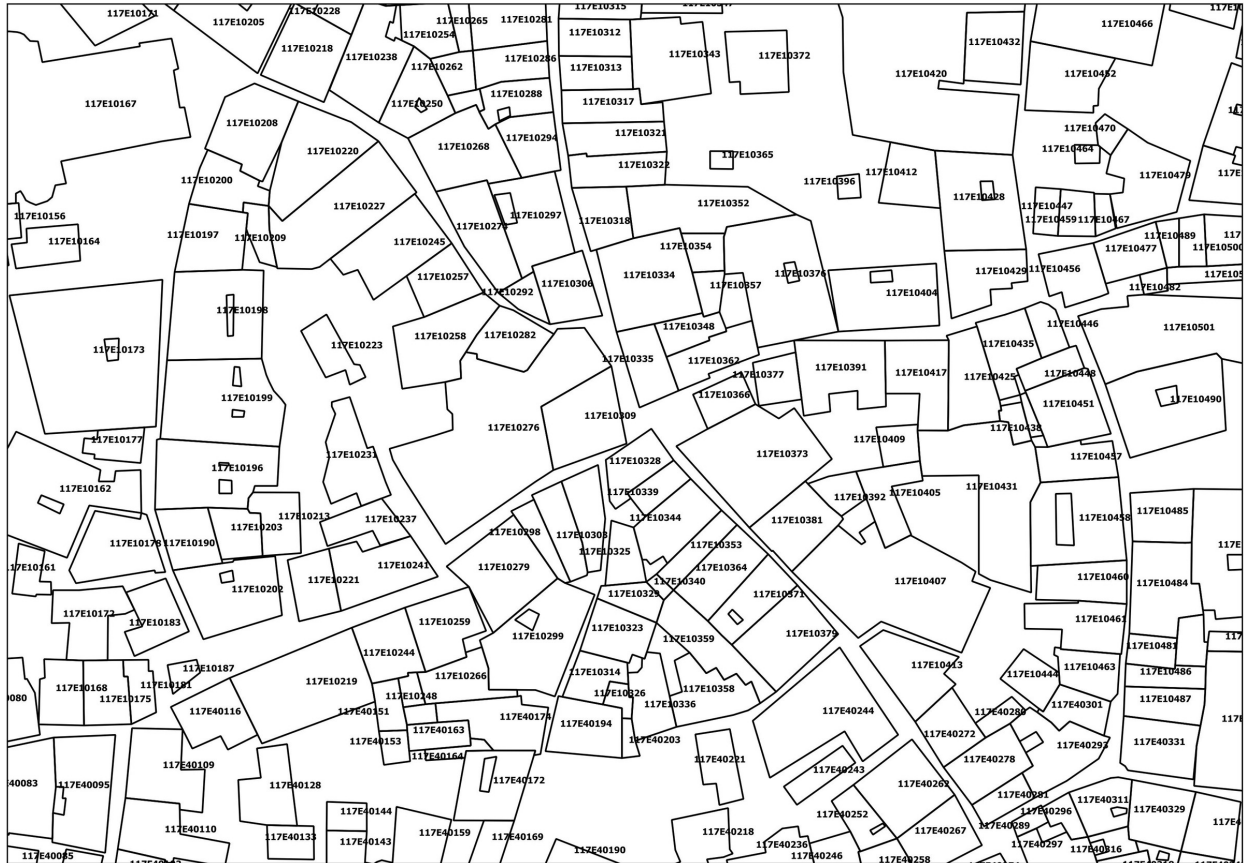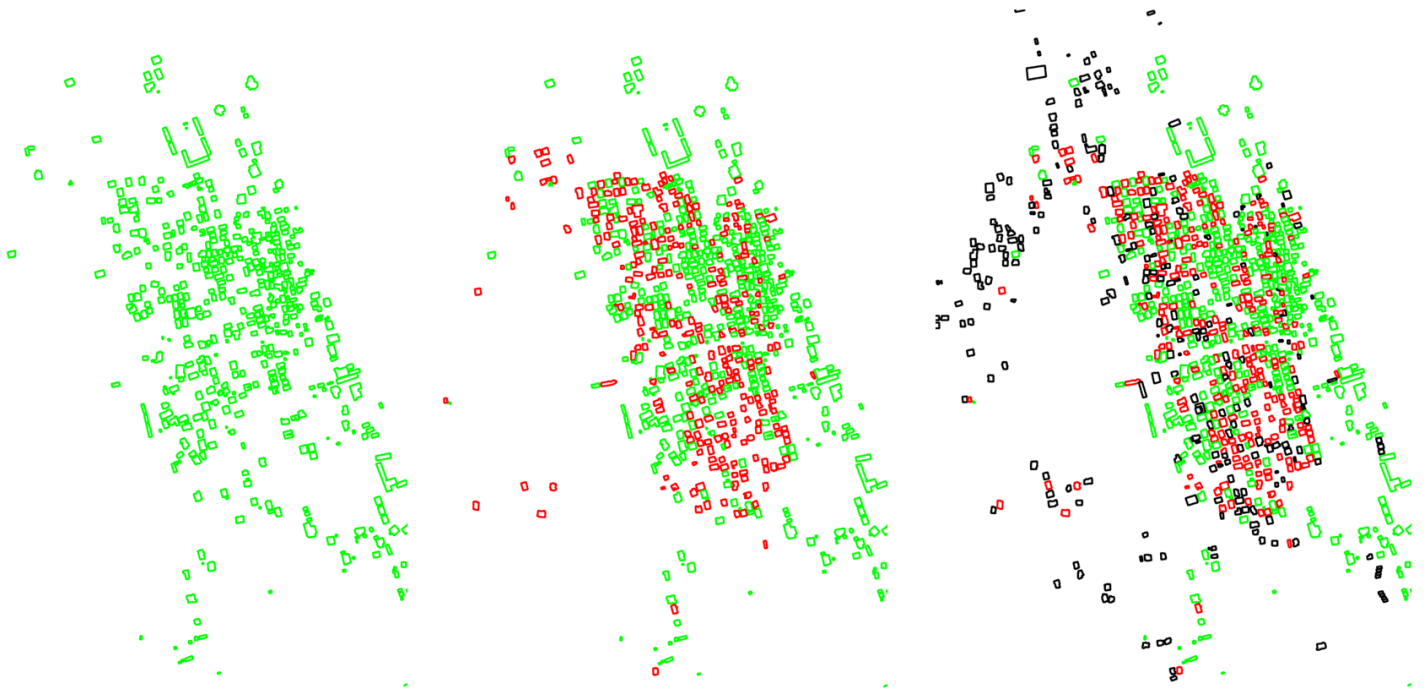8. Open data and bring it closer to the people.

MAPS

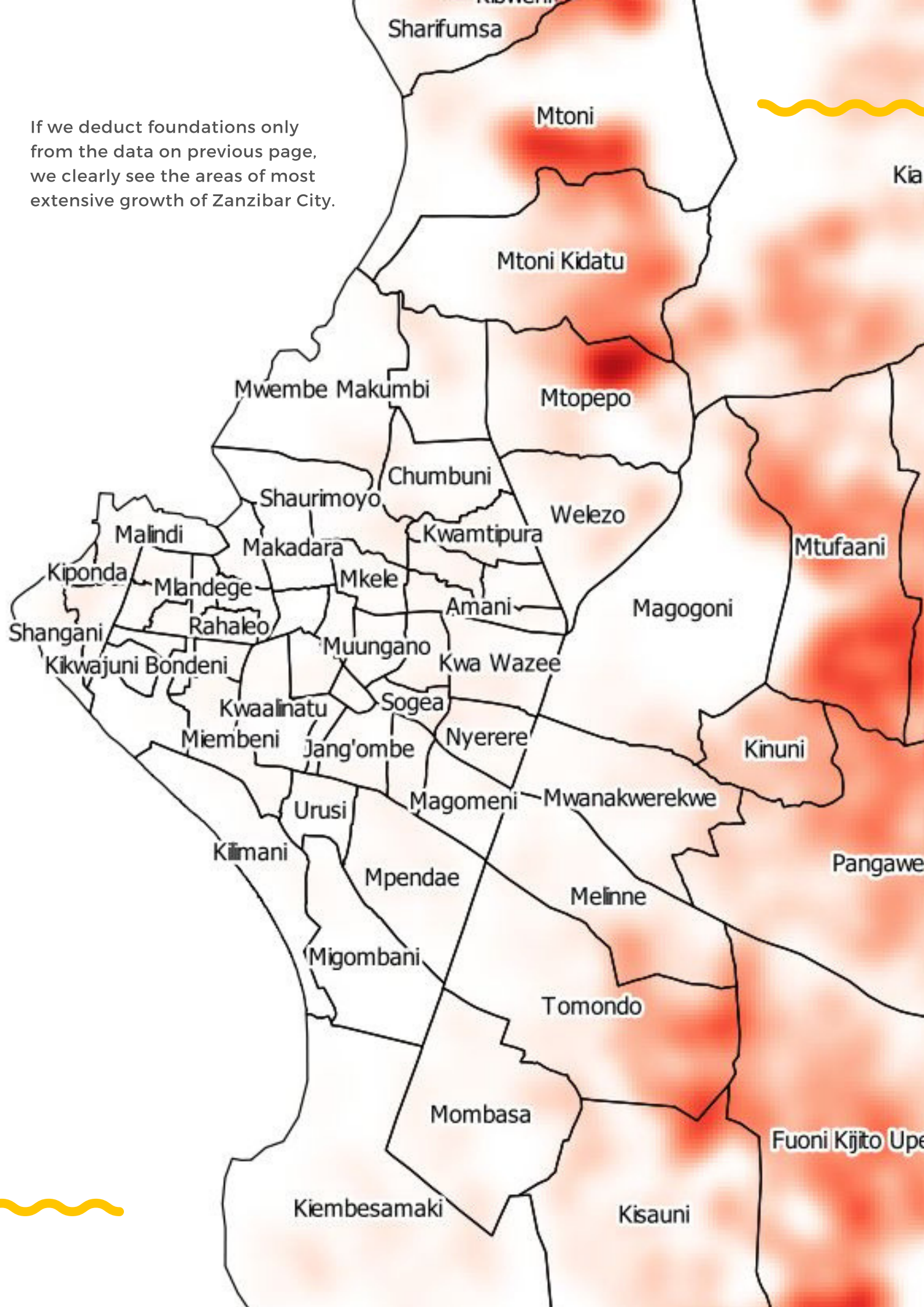Unguja Island presented only through
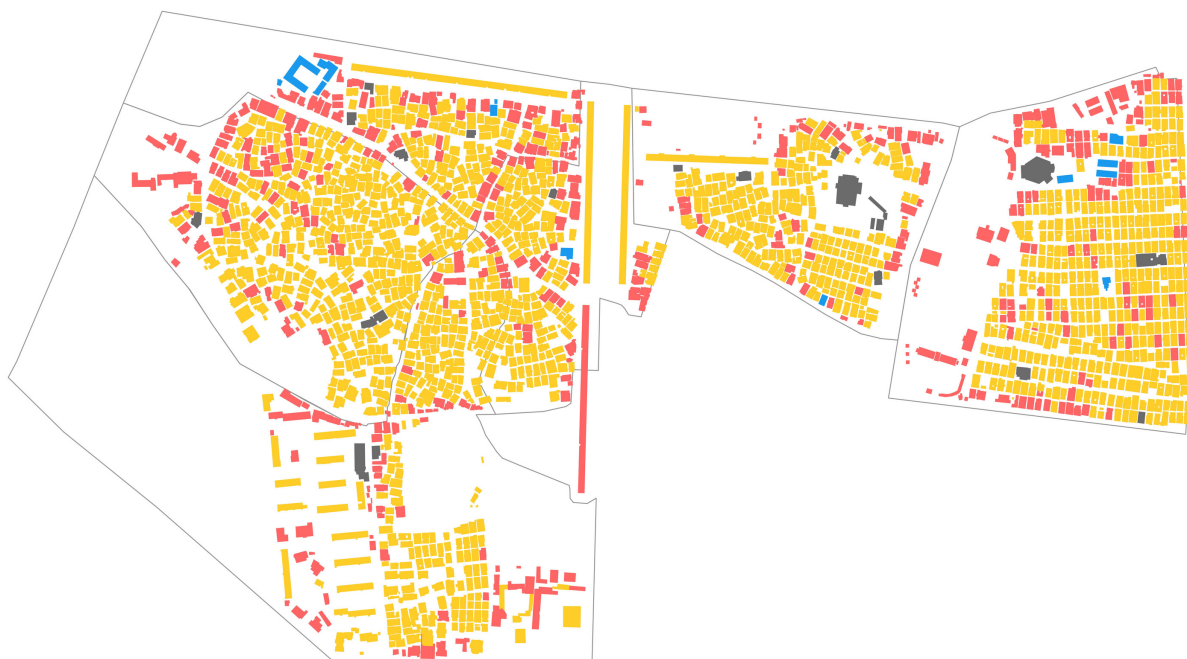buildings (360,000)

Building Reference Numbers assigned to buildings in historic Stone Town

Using custom tagging, we are able to deduct locations of complete buildings (green), buildings under construction (red), and foundations (black).

If we deduct foundations only from the data on previous page, we clearly see the areas of most extensive growth of Zanzibar City.

Sharifumsa

Mtoni

Kia

Mtoni Kidatu

Mwembe Makumbi

Mtopepo

Chumbuni

Shaurimoyo

Welezo

Kwamtipura

Malindi

Makadara

Mtufaani

Kiponda

Mlandege

Mkele

Shangani

Rahaleo

Amani

Magogoni

Kikwajuni Bondeni

Muungano

Kwa Wazee

Kwaalinatu

Sogea

Kinuni

Miembeni

Jang'ombe

Nyerere

Urusi

Magomeni

Mwanakwerekwe

Kilmani

Pangawe

Mpendae

Melinne

Migombani

Tomondo

Mombasa

Fuoni Kijito Upe

Kiembesamaki

Kisauni

Type of building in City Center

Points of interest, buildings, open spaces

Areas that experience flooding during heavy
rains (red)

Areas lacking official waste collection (yellow)

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