

Mapping Homelessness in Lomé, Togo (West Africa) during Covid-19

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Community and Regional Planning

Web mapping Final Project- Spring 2020

Background

- “Stay home!”, the confinement catch phrase to fight Covid-19
- International human rights law recognizes everyone’s right to an adequate housing
- But millions around the world live in life- or health- threatening conditions
- What is the place of homeless people as more exposed people during Covid-19 in Lomé, Togo?

Aim

The aim of our platform is to help solving this equation by starting from the city of Lomé in Togo, by locating, analyzing and visualizing data and by allowing those who can help protect homeless people because they are indeed one of the most vulnerable strata of the population .

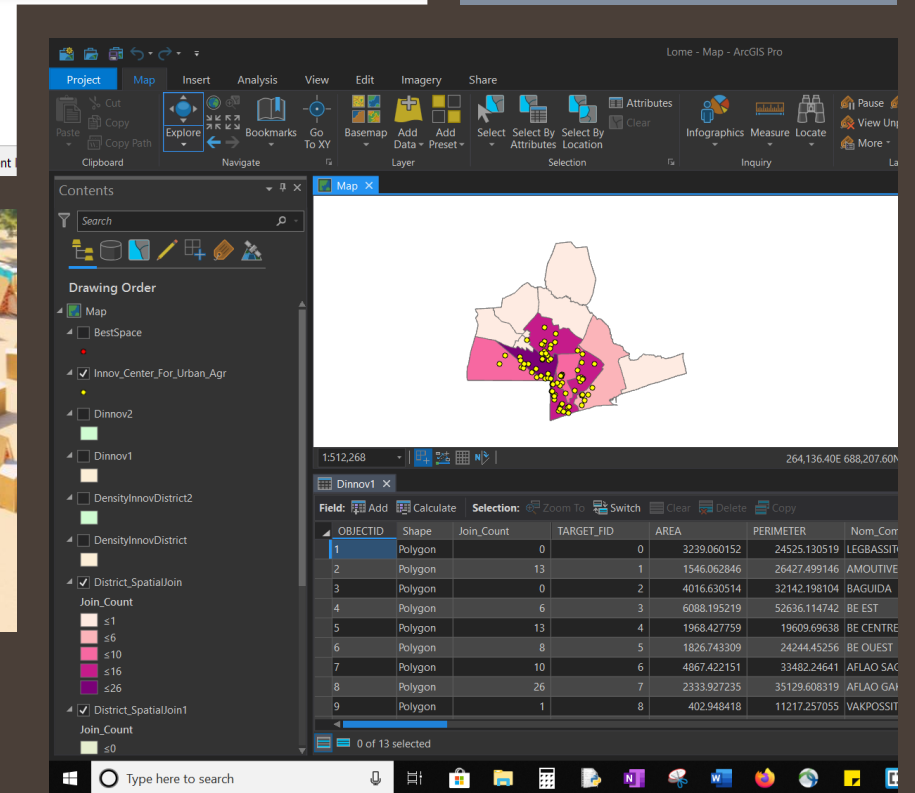
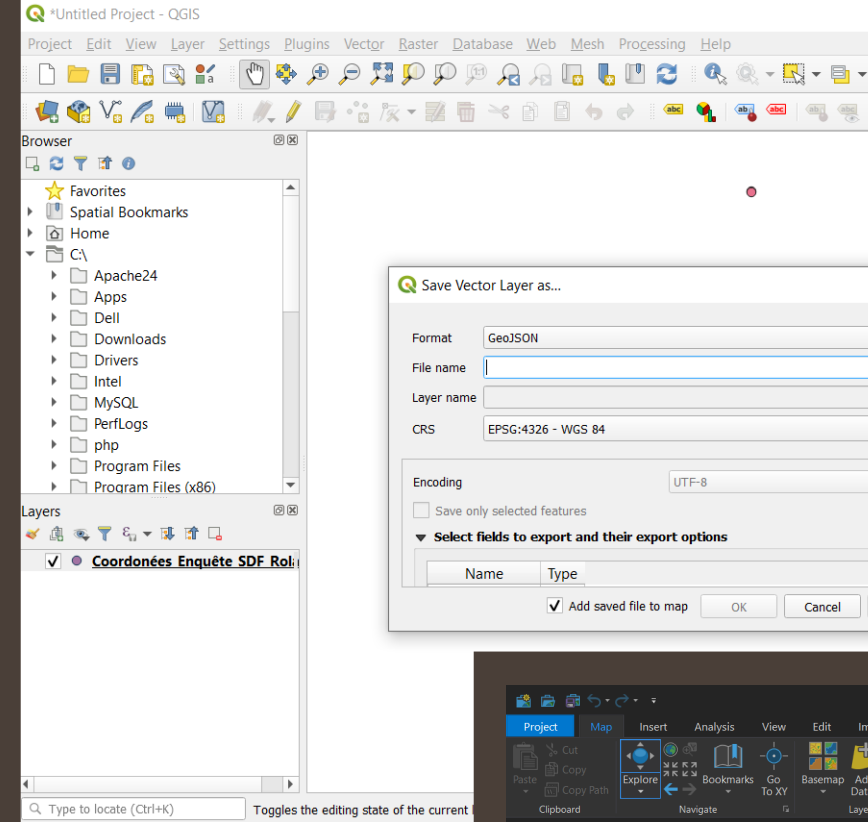
Technology and tools

Technology	How I used it
GitHub	To create the repository for the website index html and all the files I used during the project like jpg, geojson, CSV, pdf, etc.
HTML+CSS+JS	To make the website visible online, well structured, and nice to see
Leaflet, plugins	To create my Lomé map with the right location, and elements like layers control, important infrastructures markers, legends and use the plugins to add shapefiles to the map and permit to users to add data to the map.
MapBox	To create a basemap and map tile layers and customize it with the Mapbox Studio Style tool
GeoJSON.io	To draw and create geojson files for Lomé global homelessness areas
geojsonlint	To validate my geojson files I created
Carto	To create the animated heat map of Lomé population CSV and crowdmap data base
Beautifyer.io	To clean and final codes
canvasjs.com	To create the html5 charts
leaflet-providers	For my basemaps
HTML Form Elements	To create buttons and forms for the user to interact with the map
ArcGIS Pro & QGIS	To visualize and convert Shp data into CSV (extraction)

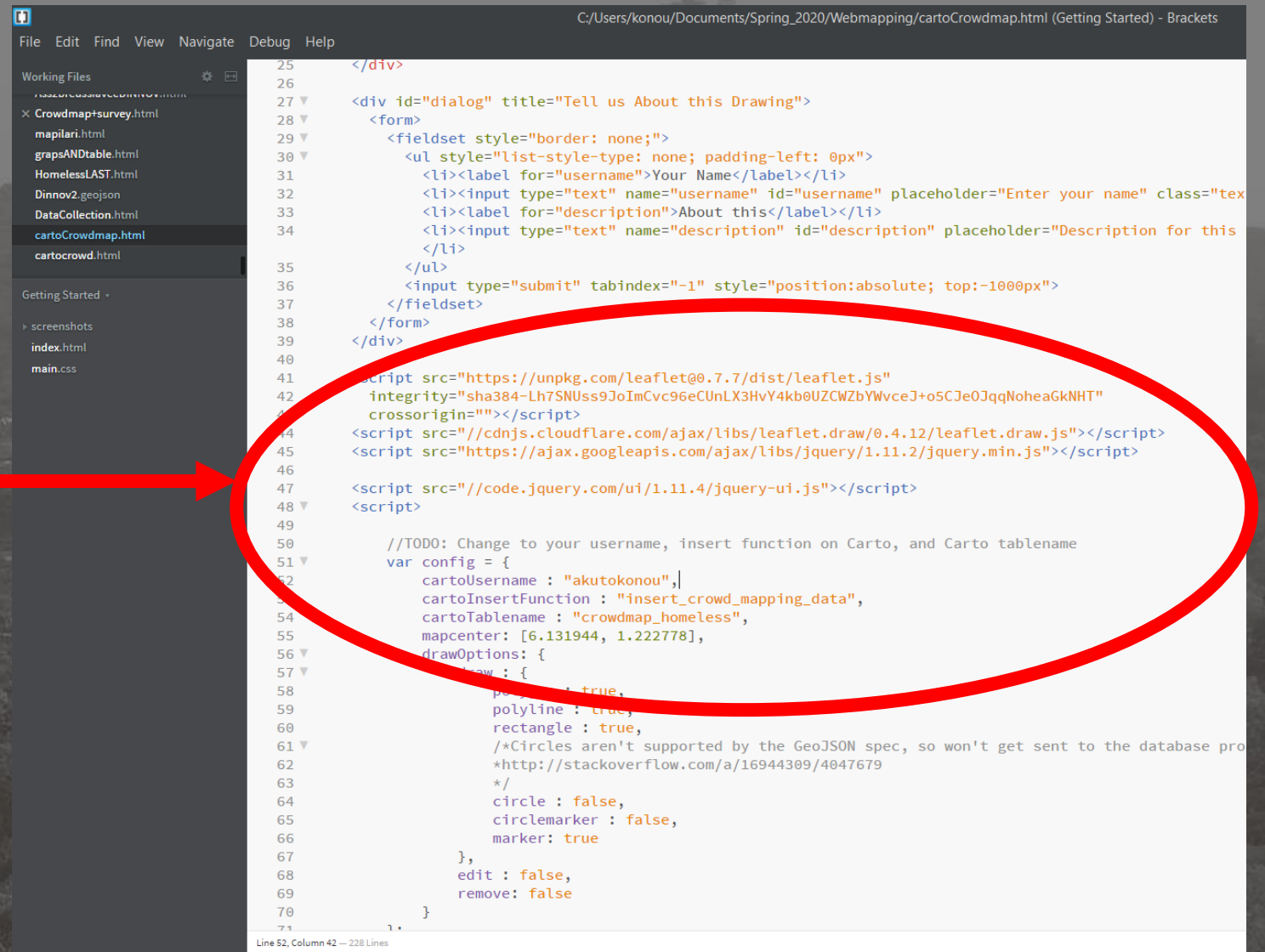
Data sources

Data	Format	Ready for use/Created/Converted?	From what to what/Tools	Source links/documents/myself
Lomé boundaries, districts, roads, green spaces	Shp	Ready for use	-	Togo National Direction of Cartography. (2016). PGCIT Project. (Got by email from a colleague there).
Lomé innovation Spaces	Shp	Ready for use	-	OIF (2015). Innovation network. CartelInnov. OpenStreetMap. Retrieved from https://www.francophonieinnovation.org/reseaux/carteinnov.html
Global homeless areas	geojson	To be created	-	My field work and analysis
Possible sites for urgent camps for homeless people	geojson	To be created	-	My field work and analysis
Mapbox tile layers	tile layers	Ready for use	-	https://www.mapbox.com/
Esri World Imagery, Carto DB Positron, Openstreetmap	tile layers	Ready for use	-	https://leaflet-extras.github.io/leaflet-providers/preview/
Images	jpg	Taken onsite	-	https://unsplash.com

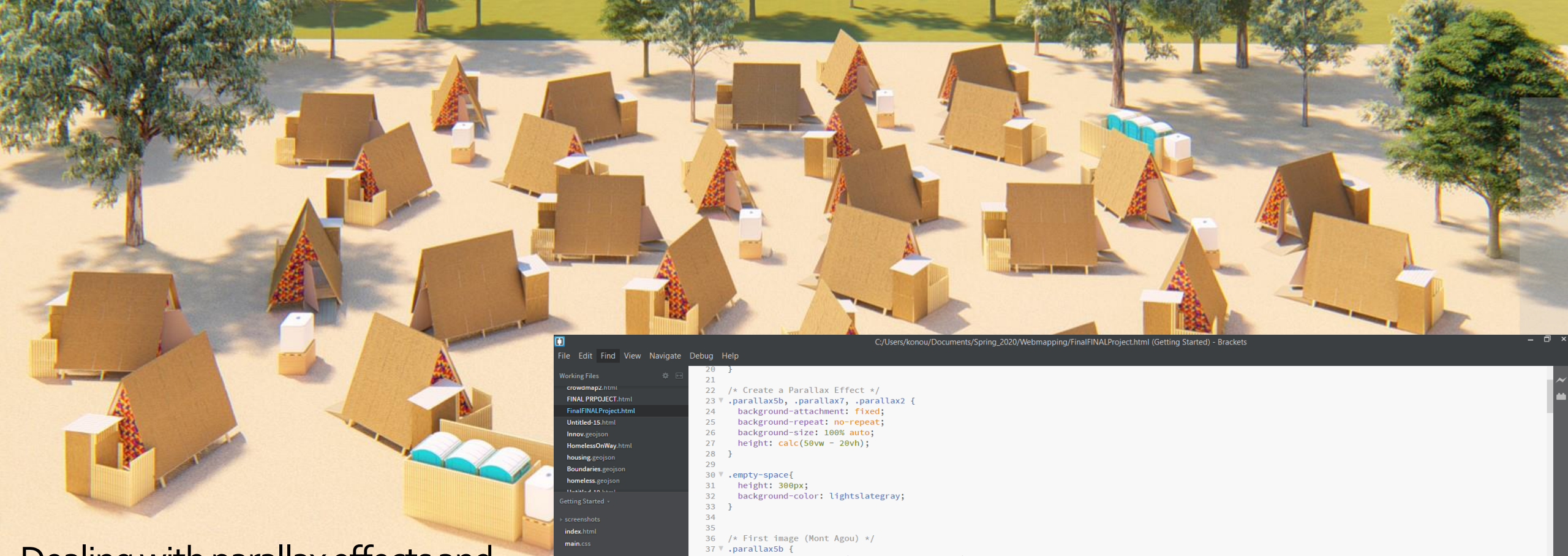
Data management and conversion with ArcGIS Pro and QGIS



Using CartoData
(customizing the
code from a Github
user code, for
crowdmap data
collection and
storage).



```
25 </div>
26
27 <div id="dialog" title="Tell us About this Drawing">
28   <form>
29     <fieldset style="border: none;">
30       <ul style="list-style-type: none; padding-left: 0px">
31         <li><label for="username">Your Name</label></li>
32         <li><input type="text" name="username" id="username" placeholder="Enter your name" class="tex
33         <li><label for="description">About this</label></li>
34         <li><input type="text" name="description" id="description" placeholder="Description for this
35       </ul>
36       <input type="submit" tabindex="-1" style="position:absolute; top:-100px">
37     </fieldset>
38   </form>
39 </div>
40
41 <script src="https://unpkg.com/leaflet@0.7.7/dist/leaflet.js"
42   integrity="sha384-Lh7SNUs9JoImCvc96eCUUnLX3HvY4kb0UZCWZbYVwceJ+o5CJe0JqNoheaGkNHT"
43   crossorigin=""></script>
44 <script src="//cdnjs.cloudflare.com/ajax/libs/leaflet.draw/0.4.12/leaflet.draw.js"></script>
45 <script src="https://ajax.googleapis.com/ajax/libs/jquery/1.11.2/jquery.min.js"></script>
46
47 <script src="//code.jquery.com/ui/1.11.4/jquery-ui.js"></script>
48 </script>
49
50 //TODO: Change to your username, insert function on Carto, and Carto tablename
51 var config = {
52   cartoUsername : "akutokonou",|
53   cartoInsertFunction : "insert_crowd_mapping_data",
54   cartoTableName : "crowdmap_homeless",
55   mapcenter: [6.131944, 1.222778],
56   drawOptions: {
57     draw : {
58       polygon : true,
59       polyline : true,
60       rectangle : true,
61       /*Circles aren't supported by the GeoJSON spec, so won't get sent to the database pro
62       *http://stackoverflow.com/a/16944309/4047679
63       */
64       circle : false,
65       circlemarker : false,
66       marker : true
67     },
68     edit : false,
69     remove : false
70   }
71 }
```

```
File Edit Find View Navigate Debug Help
Working Files
crowmapz.html
FINAL PROJECT.html
FinalFINALProject.html
Untitled-15.html
Innov.gejson
HomelessOnWay.html
housing.gejson
Boundaries.gejson
homeless.gejson
Getting Started
> screenshots
index.html
main.css

20 }
21
22 /* Create a Parallax Effect */
23 .parallax5b, .parallax7, .parallax2 {
24   background-attachment: fixed;
25   background-repeat: no-repeat;
26   background-size: 100% auto;
27   height: calc(50vh - 20vh);
28 }
29
30 .empty-space{
31   height: 300px;
32   background-color: lightslategray;
33 }
34
35
36 /* First image (Mont Agou) */
37 .parallax5b {
38   background-image: url('image/parallax5b.jpg');
39   min-height: 100%;
40 }
41
42 /* Second image (Portfolio) */
43 .parallax7 {
44   background-image: url('image/parallax7.jpg');
45   min-height: 100%;
46 }
47
48 /* Third image (Portfolio) */
49 .parallax2 {
50   background-image: url('image/parallax2.jpg');
51   min-height: 100%;
52 }
53
54
55 letter-spacing: 10px;
56 .hover-opacity {cursor: pointer;}
57
58 /* Turn off parallax scrolling for tablets and phones */
59 @media only screen and (max-device-width: 1600px) {
60   .parallax2, .parallax3, .parallax4 {
61     background-attachment: scroll;
62     min-height: 300px;
63   }
64 }
65
66
67
```

Dealing with parallax effects and mobile device responsive code. This actually was the problem!:D Adding the mobile responsive code, turns the parallax effect off for the desktop. And vice versa. I finally chose making the desktop the priority.

Geojson file creation, drawing feature by feature with geojson.io, so that I can make the inventory map.

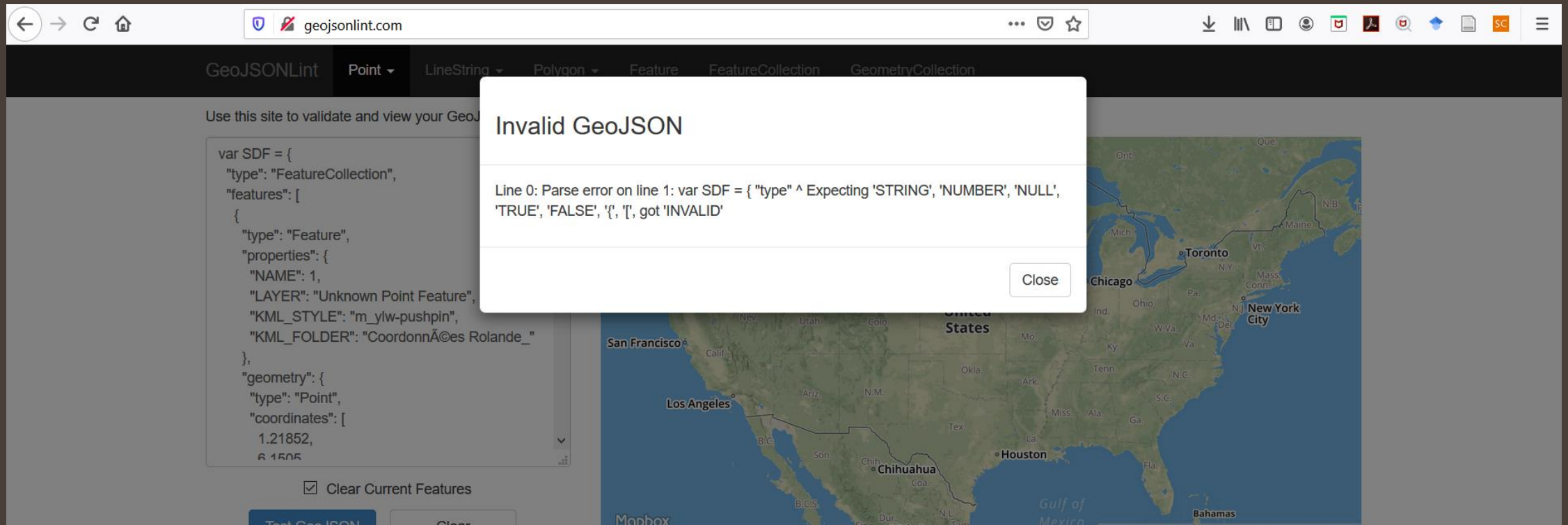
The screenshot shows the geojson.io web application interface. The map displays a coastal area with several labeled locations: Sanguera, Lomé, Denu, Adafienu, and Gbedzekope. A yellow polygon is drawn on the map, and a style editor is open over it. The style editor shows the following properties:

stroke	
stroke-width	2
stroke-opacity	1
fill	
fill-opacity	0.5
area	63.20

Below the table, there is a checkbox for "Show style properties" which is checked, and buttons for "Save", "Cancel", and "Delete feature".

The JSON panel on the right shows the following structure:

```
1 {
2   "type": "FeatureCollection",
3   "features": [
4     {
5       "type": "Feature",
6       "properties": {
7         "stroke": "#c0c0c0",
8         "stroke-width": 2,
9         "stroke-opacity": 1,
10        "fill": "#c0c0c0",
11        "fill-opacity": 0.5,
12        "area": 48.08
13      },
14      "geometry": {
15        "type": "Polygon",
16        "coordinates": [
17          [
18            [
19              1.1994141340255804,
20              6.121214654563565
21            ],
22            [
23              1.1994141340255804,
24              6.117187595503648
25            ],
26            [
27              1.1993229389190745,
28              6.113171173935524
29            ],
30            [
31              1.1996179819107124,
32              6.112221754127695
33            ]
34          ]
35        ]
36      }
37    }
38  ]
39 }
```



Error while validating my Geojson file I created from field survey. It was because I forgot to take of the “var SDF” at the beginning.

And
sometimes
/ ...
creativity in
file
naming!



Trying to figure out how
to make multiple
legends work together
with the control layer.

A screenshot of a code editor interface. The left sidebar shows a file explorer with a list of files: 'FINAL PRPROJECT.html', 'FinalFINALProject.html', 'Untitled-15.html', 'Innov.geojson', 'HomelessOnWay.html', 'housing.geojson', 'Boundaries.geojson', 'homeless.geojson', 'Untitled-19.html', 'Getting Started', 'screenshots', 'index.html', and 'main.css'. A red box highlights the 'Innov.geojson', 'HomelessOnWay.html', and 'housing.geojson' files, with a red arrow pointing from the text 'And sometimes / ... creativity in file naming!' to this box. The main editor area shows JavaScript code for a map application, with a red box highlighting a section of code from line 464 to 511. A red arrow points from the text 'Trying to figure out how to make multiple legends work together with the control layer.' to this highlighted code section. The code includes comments and functions for adding and removing legends from a map layer.

```
File Edit Find View Navigate Debug Help
Working Files
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homeless.geojson
Untitled-19.html
Getting Started
> screenshots
index.html
main.css

464 labels = [];
465
466 div.innerHTML += "<b>Homelessness clusters as:</b><br>";
467
468 // loop through items and generate a label with a colored square for each
469 for (var i = 0; i < availability.length; i++) {
470   div.innerHTML +=
471     '<i style="background:' + getColor(availability[i]) + ' "></i> ' +
472     availability[i] + (availability ? ' ' + '<br>' : '');
473 }
474 return div;
475 };
476
477 legend2.addTo(map);
478
479 // Making possible to add and remove legend1 from layer when selected in control layer
480 map.on('overlayremove', function(eventLayer) {
481   console.log(eventLayer.name + " off");
482   if (eventLayer.name == "Clusters locations") {
483     this.removeControl(legend1);
484   }
485 });
486
487 map.on('overlayadd', function(eventLayer) {
488   console.log(eventLayer.name + " on");
489   if (eventLayer.name == "Clusters locations") {
490     legend1.addTo(this);
491   }
492 });
493
494 // Making possible to add and remove legend2 from layer when selected in control layer
495 map.on('overlayremove', function(eventLayer) {
496   console.log(eventLayer.name + " off");
497   if (eventLayer.name == "Available Land") {
498     this.removeControl(legend2);
499   }
500 });
501
502 map.on('overlayadd', function(eventLayer) {
503   console.log(eventLayer.name + " on");
504   if (eventLayer.name == "Available Land") {
505     legend2.addTo(this);
506   }
507 });
508
509
510
511
```


Inventory

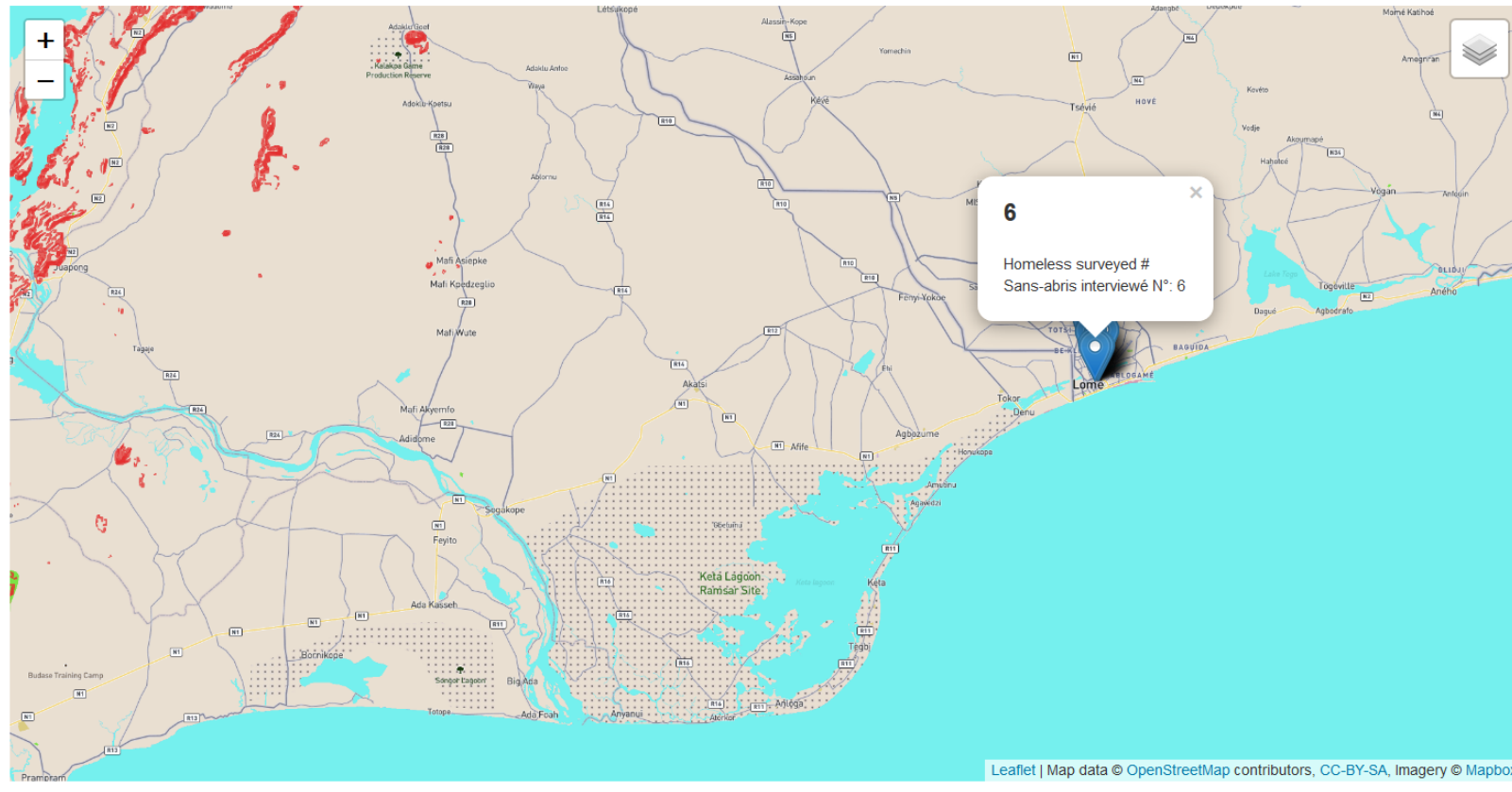
WHAT PLACE FOR HOMELESS DURING A CRISIS LIKE COVID-19 AND BEYOND? |
QUELLE PLACE POUR LES SANS-ABRI PENDANT UNE CRISE COMME COVID-19 ET AU-DELÀ?



Results
(different
maps and
graphs
obtained):

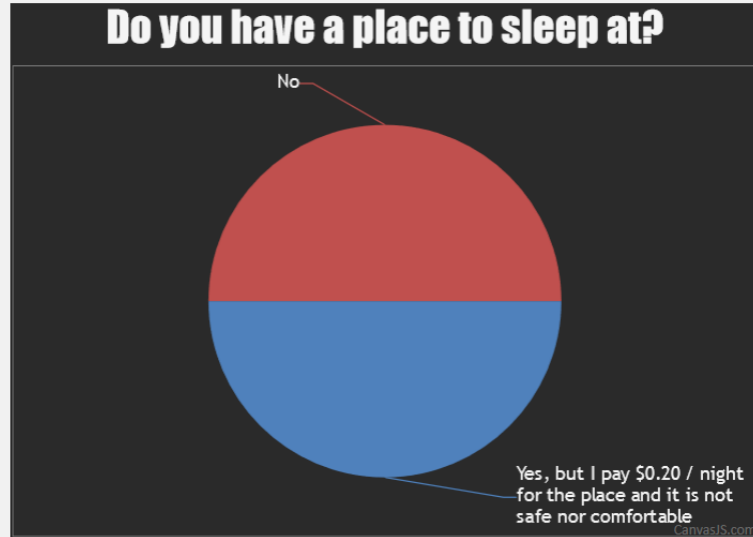
Field survey results map

OUR FIELD SURVEY RESULTS | NOS RESULTATS D'ENQUETES



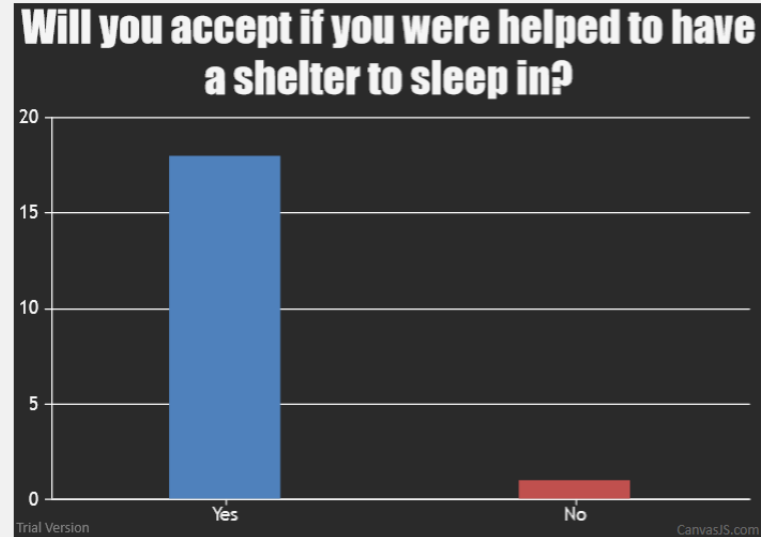
Results
(different
maps and
graphs
obtained):

Survey charts



Pie chart Description

- Half of the respondents confirm that they do not have a place to sleep. However, 100% of those who have a place to sleep say that they pay the night at 200 FCFA and in an unsanitary and uninhabitable place.



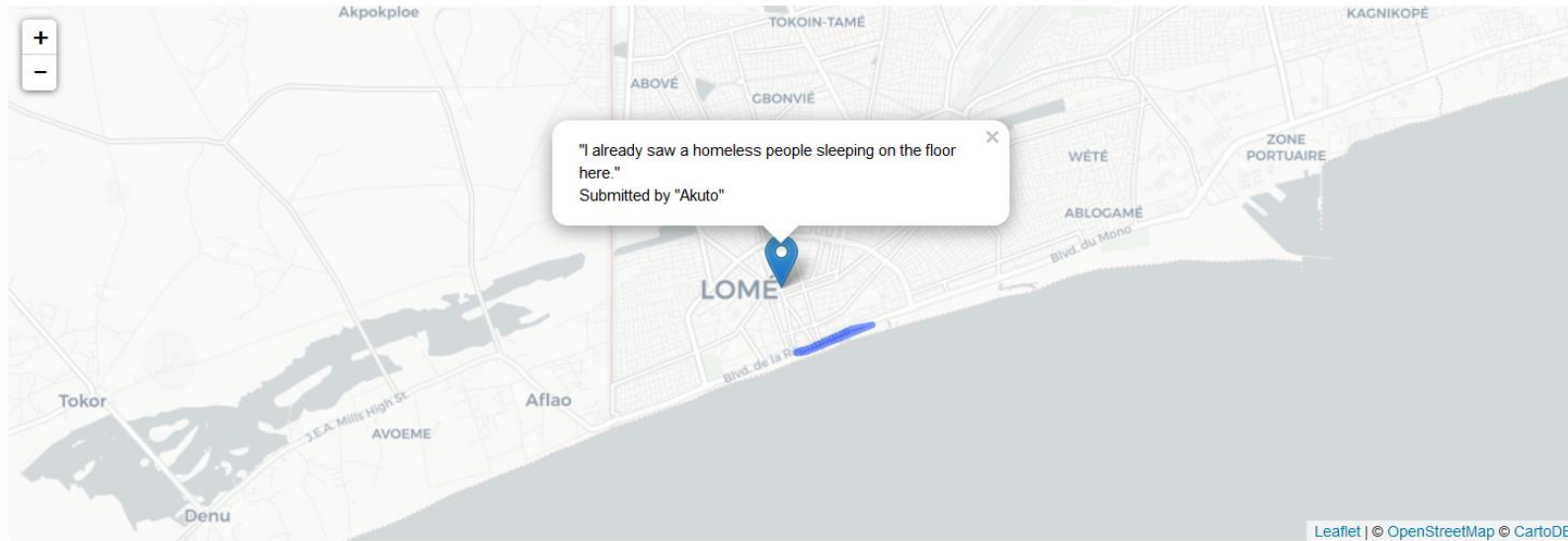
Bar chart Description

- When asked if they would accept housing assistance, they were all positive, except the one who said "no", putting forward the fear of rent that she might not be able to afford.

Results
(different
maps and
graphs
obtained):

Crowdmap

**CROWDMAP: I CAN PARTICIPATE! |
CARTE COLLABORATIVE: JE PEUX CONTRIBUER!**



Click points for more information, or add your own |
Cliquez sur les points pour plus d'informations ou ajoutez les vôtres

[Click to Start Editing](#) | [Cliquez pour Commencer les Modifications](#)

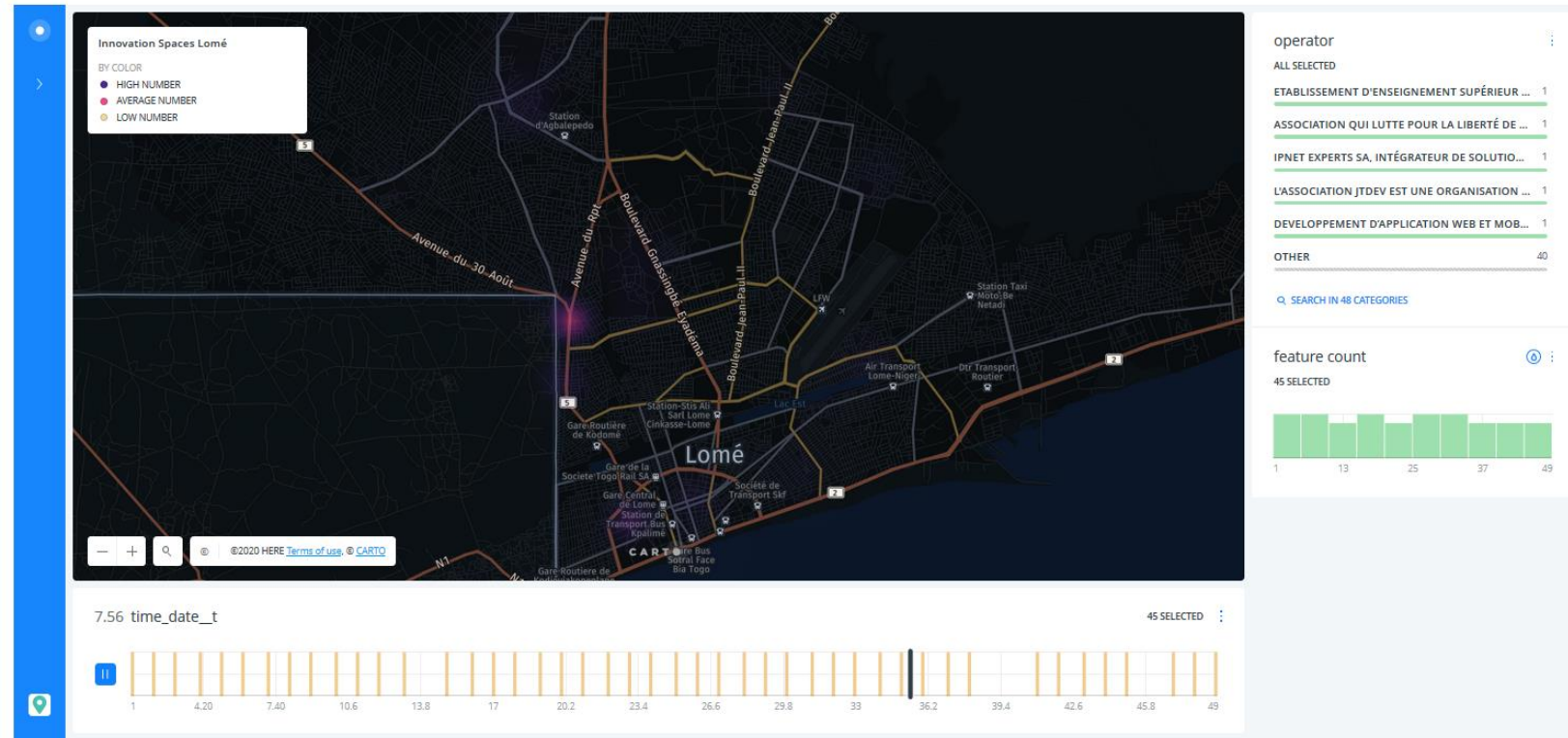
[Stop Your Editing Session](#) | [Arrêtez votre Session de Modification](#)

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Results
(different
maps and
graphs
obtained):

Animated heat map

ANIMATED HEAT MAP | CARTE DE CHALEUR ANIMEE



Results
(different
maps and
graphs
obtained):

Some challenges encountered...

Getting to the crowdmap was the hardest part of the job. Especially, how to be able to store the data that people will add to the card. I was finally able to do it thanks to Carto Data Base.

Having multiple legends appear on the same map at the same time is not easy, even if I already did it in a past assignment.

Sending a team on the field for surveys in Lomé while in Switzerland and putting together the architectural file at the same time also took time and energy.

I wanted to have a platform that was responsive on mobile devices at the same time, but it took us a lot of time, on small things.

The data I got for the field survey was in a format I was obliged to work on a lot before getting the right format.

We couldn't add everything we wanted, or fix all the errors before the deadline, but we will continue to work on it, even beyond the course.

The need to translate everything into French for the inhabitants of Lomé.

However, I enjoyed every little second, and I want to take this opportunity to appreciate Professor Bailey Hanson a lot for her patience and immense help, which could make things possible. Thank you, very much dear Prof Bailey, from the bottom of my heart! 😊



- The subject of homelessness in times of pandemics should be considered closely in Community and Regional Planning and all other fields in general
- We intend to carry on the project by continuously collecting data on the locations of homelessness with our crowdmap
- We expect to find support to continue the architectural project (AH₄H) and help build it, thanks to our startup, and tweak it to make it our thesis project or creative capstone of Masters at ISU (Iowa, USA), also integrating our subject of urban agriculture and health from our PhD research subject at EPFL (Lausanne, Switzerland).
- Any support, partnership and suggestions are welcome!

Conclusion and perspectives



♥ THANK YOU!