

**URBAN
PLANNING**
TOOLS AS
AGENTS OF
CHANGE:

COLLABORATIVE
SPATIAL DATA FOR
SUSTAINABLE URBAN
DEVELOPMENT IN
INDONESIA

Technical Report:
CollabData

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2020

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1.- Introduction

The complexity behind urban planning involves a lot of effort. It includes the participation of many actors such as experts in urban planning, public policy specialists and decision-makers, and all kinds of technical and economic resources. In most cases, experts have a lot of experience based on general contexts, standards, or specific targets but they lack the knowledge of very specific aspects of a city, such as sociocultural or geographical features. These aspects are well understood by the people that live within the communities, however, in just a few cases there are adequate participatory processes that allow stakeholders to learn firsthand the urban concerns based on the understanding and experience of the inhabitants about everyday problems. In contrast, the current practice is based on spreading investments so as to balance the portion of the budget spent in each sub-district. To shift to an approach that accounts for spatially uneven investment needs, cities must assess the development impact of different options.

Planning agencies need inputs from public stakeholders, the private sector, experts, and inhabitants. Current consultations rely on ad-hoc workshops, often resulting in limited representation and little pertinent debate. Additionally, current methods for processing and digitizing inputs received from consultations are slow, leaving little time for analysis. Community participation is an essential aspect to consider achieving equity and sustainability in urban planning. Decision-making processes that involve community participation are fairer and more representative; as a result, the plans to be implemented are found to be more resilient within the community. When the inhabitants are involved in the decision-making process and follow up on the implementation of plans and policies, there is a higher probability of being consistent with stakeholders' vision and needs. Additionally, according to the legislation of many countries, it is now necessary to legitimize or validate the measures to be carried out before they are put into practice in a community to overcome certain urban issues.

The main goal of this document is to describe the information used, and the methodology followed up for the development of the CollabData tool.

In the Methodology section, we will go into deeper details about inputs and outputs.

2.- Methodology

2.2 CollabData

The CollabData tool supports public consultation processes providing a robust platform that reflects local ground realities, needs, and challenges directly from the inhabitants of the city. It is meant to serve as a platform to mitigate the communication gap that exists between government agencies and the city's inhabitants. The tool should allow multiple stakeholders to collaborate in mapping issues and solutions in 32 categories or government functions, or add more if necessary, in order to inform development plans in an intuitive way.

2.2.1 Inputs required

The CollabData tool requires a set of spatial information containing the area (town, city, country) where the public consultation process will be carried out and information in text format to provide information about the public consultation is also needed. The following sections discuss more details about the spatial information needed.

2.2.1.1 Spatial information

In order to configure a public consultation in the CollabData tool, the admin user should draw a study area of interest, see Figure 1, in the tool (using points, lines, and polygons).



Figure 1. Example of a study area drawn with polygons.

Users can also upload a mbtiles file that includes the study area, as shown in Figure 2. The boundary of a public consultation or study area is a georeferenced map.

Maps +				
Actions	Id	Name	File	
 	1	jakarta	https://api.indonesia.collabmap.in/media/mbtiles/jakarta.mbtiles	
 	2	Rodada	https://api.indonesia.collabmap.in/media/mbtiles/csRRH.mbtiles	

Figure 2. Mbtiles loaded to the CollabData platform.

2.2.2 Ways to show information

The CollabData tool displays the results of the analysis through a set of vectorial information (represented by points, lines, and polygons). The tool shows a spatial map with the results of a consultation. The map can be displayed as a basic map, a heat map, a word cloud, a perception map, and a statistical map.

- Basic maps: These types of maps display the points gathered according to the location where the information was obtained (problem or comment). This is the most simple form to display the data collected.

- Heat maps: Display the magnitude of the points obtained during the consultation as color in two dimensions. These maps help users to identify where the information is clustered or varies over space.

- Word cloud maps: Display the most common words in a public consultation, showing the predominant problems or comments in a specific area. This map clusters the words according to a specific area on the map.

- Pie chart of feelings: Maps use an algorithm to identify feelings in collected sentences, then words are divided into positive, negative or neutral comments.

- Statistical maps: Categorize records according to users' information such as age and gender, displaying in the map points colored based on this information.

In each map, the user can filter the results by categories and source (social networks or the web application), then according to the displayed map, the symbology will change to show categories (raw and word map), density (heat map), perception (perception map), sex or age (statistical map).

An Mbtiles is a file that contains the maps (spatial information) used on the mobile app in order to use the tool offline.

To create these files, the Maperitive software was used. This software can be downloaded from the following page <http://maperitive.net/>. The steps to create a mbtiles map are as follows:

1. Open the software and zoom to the area of your choice.
2. Set Geometry Bounds for your area.
3. Download OSM data for the selected area.

4. Once the data is downloaded remove the web map from the map viewer
5. After this, run this command to generate the mbfile 'generate-mbtiles minzoom=0 maxzoom=17'. This can take a while depending on the area and the performance of the PC.

2.2.2.1 API

An application program interface (**API**) is a set of protocols and tools to develop software applications. An **API** specifies how software components should interact.

The CollabData tool allows users to download the results of the consultations in the formats, CSV, JSON, and API. The information can be accessed by the following link:
<https://api.indonesia.collabmap.in/surveys/results-inputs/>

Then, select the "GET" tab and choose the download format. Depending on the chosen format, the information can be externally analyzed in excel, numbers or any other numerical analysis program. It can also be used to share information between information systems (json, csv).

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