Open Data **Analytics Dashboard** For Policy Makers

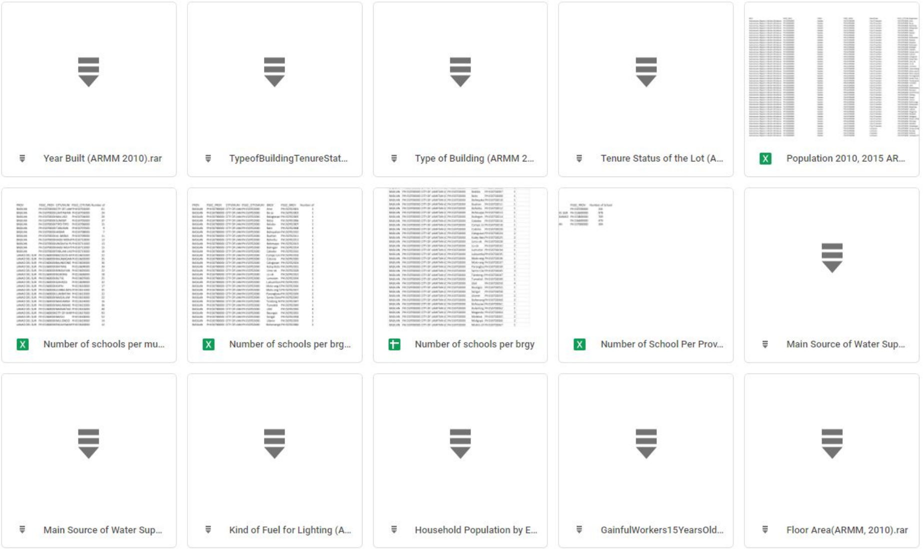
Aldrin Lambon

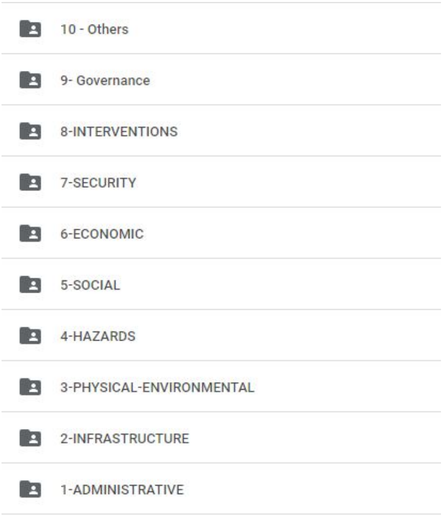
Proposal Checklist

- ❏ Decision-making based on usable and open information.
- ❏ Focus on development-related data
- ❏ System to make simultaneous decisions at the same time.

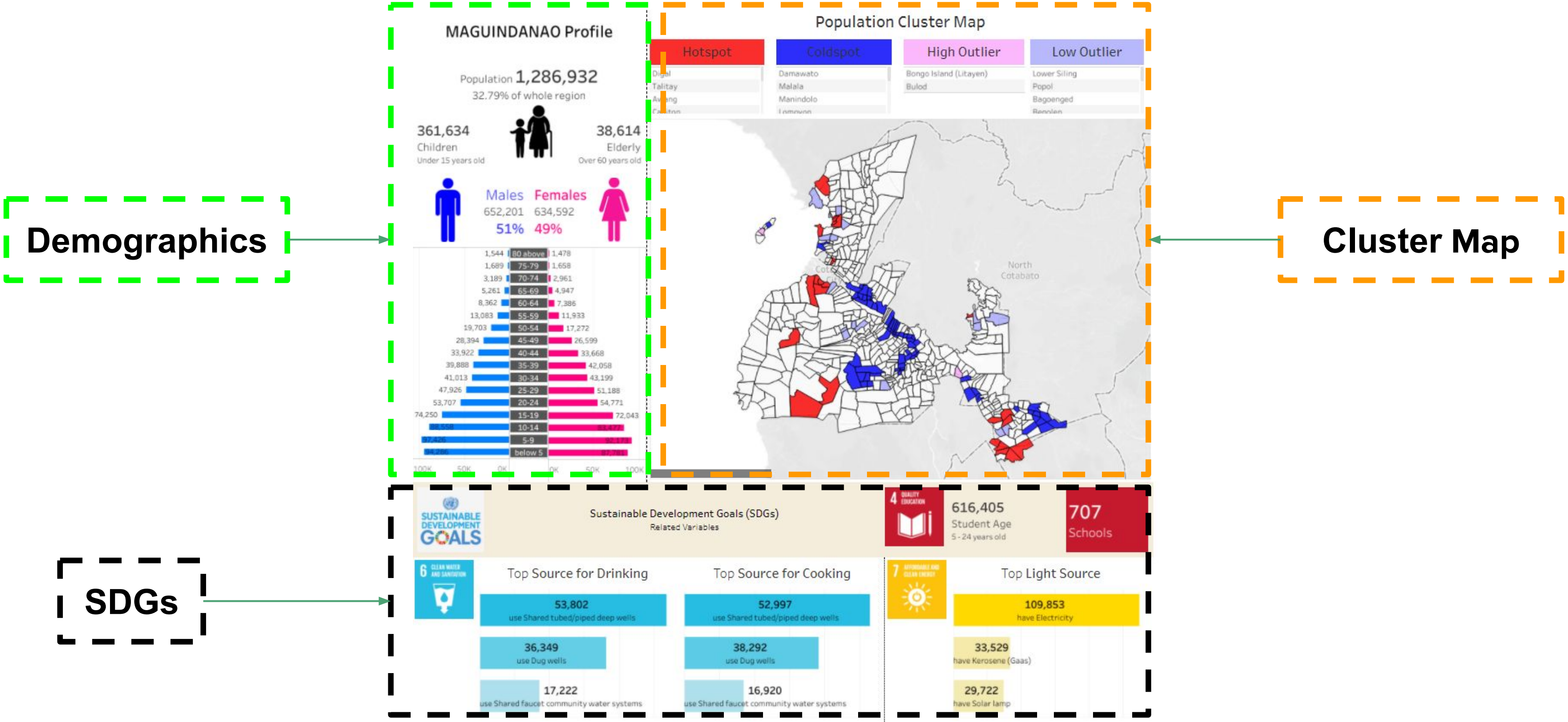
Open Data

Excel Files, Zip Files, Shapefiles, etc...

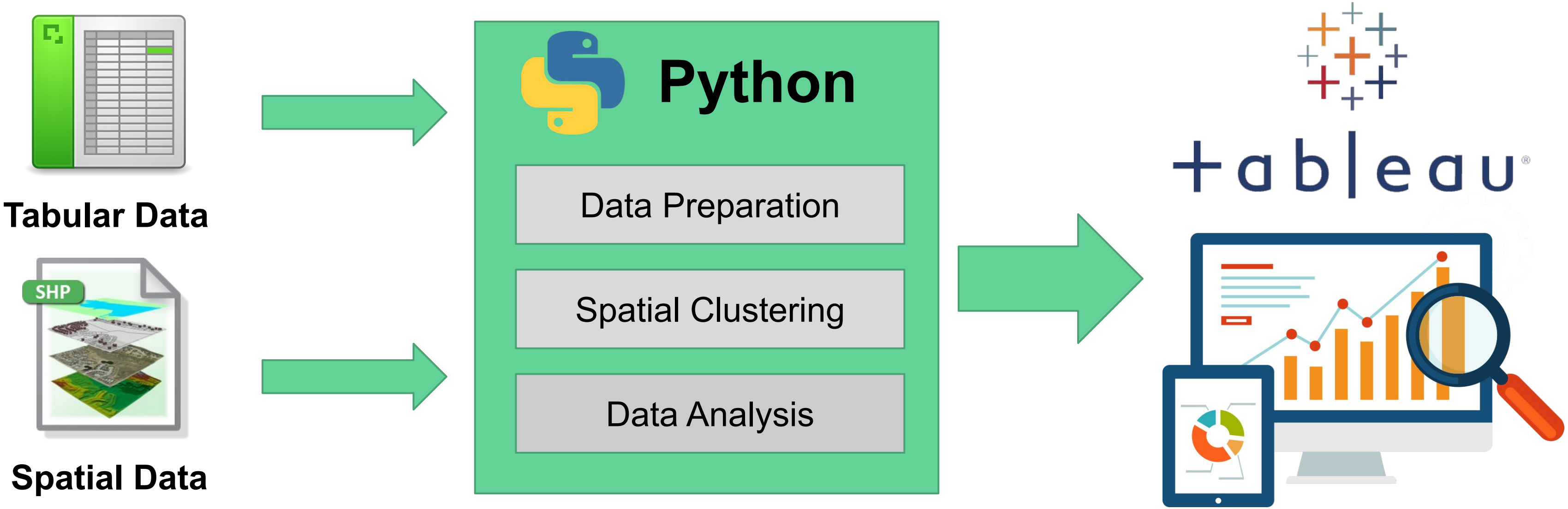




Analytics Dashboard



Pipeline



APPENDIX

Data Scope

Spatial Data:

Administrative Boundaries ARMM Barangays (PSA, 2016), Administrative Boundaries ARMM Provinces (PSA, 2016)

Tabular Data:

Population, Number of Schools, Water Supply, Fuel for Lighting, Worker Occupation and Construction Material

Analytics Dashboard DEMO

https://tabsoft.co/2FnC5Wn

Moving Forward

- Area-specific dashboards
- Database system
- KPI monitoring system

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Spatial Clustering

Univariate Spatial Clustering of Population Totals at the Brgy Level

Spatial Weights → **Spatial Statistics** → **Spatial Clusters**

Spatial Weights

Queen-based Contiguity
- All barangays that share the same borders are considered neighbors

Spatial Statistics

Moran's I
- Measures spatial autocorrelation based on both feature locations and feature values simultaneously

Spatial Clusters

Local Indicators of Spatial Association (LISA)
- can identify spatial dependency (hot spots, cold spots, and spatial outliers) in a given locality

Appendix: Global Moran's I

The Moran's I statistic for spatial autocorrelation is given as:

$$I = \frac{n}{S_0} \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} w_{i,j} z_i z_j}{\sum_{i=1}^{n} z_i^2} \qquad (1)$$

where z_i is the deviation of an attribute for feature i from its mean $(x_i - \bar{X})$, $w_{i,j}$ is the spatial weight between feature i and j, n is equal to the total number of features, and S_0 is the aggregate of all the spatial weights:

$$S_0 = \sum_{i=1}^{n} \sum_{j=1}^{n} w_{i,j} \qquad (2)$$

The z_I-score for the statistic is computed as:

$$z_I = \frac{I - \mathrm{E}[I]}{\sqrt{\mathrm{V}[I]}} \qquad (3)$$

where:

$$\mathrm{E}[I] = -1/(n-1) \qquad (4)$$

$$\mathrm{V}[I] = \mathrm{E}[I^2] - \mathrm{E}[I]^2 \qquad (5)$$

https://pro.arcgis.com/en/pro-app/tool-reference/spatial-statistics/h-how-spatial-autocorrelation-moran-s-i-spatial-st.htm

Appendix: Local Moran's I

The Local Moran's I statistic of spatial association is given as:

$$I_i = \frac{x_i - \bar{X}}{S_i^2} \sum_{j=1, j \neq i}^{n} w_{i,j}(x_j - \bar{X}) \tag{1}$$

where x_i is an attribute for feature i, $\bar{X}$ is the mean of the corresponding attribute, $w_{i,j}$ is the spatial weight between feature i and j, and:

$$S_i^2 = \frac{\sum_{j=1, j \neq i}^{n} (x_j - \bar{X})^2}{n - 1} \tag{2}$$

with n equating to the total number of features.

The z_{I_i}-score for the statistics are computed as:

$$z_{I_i} = \frac{I_i - \mathrm{E}[I_i]}{\sqrt{\mathrm{V}[I_i]}} \tag{3}$$

where:

$$\mathrm{E}[I_i] = -\frac{\sum_{j=1, j \neq i}^{n} w_{ij}}{n - 1} \tag{4}$$

$$\mathrm{V}[I_i] = \mathrm{E}[I_i^2] - \mathrm{E}[I_i]^2 \tag{5}$$

https://pro.arcgis.com/en/pro-app/tool-reference/spatial-statistics/h-how-cluster-and-outlier-analysis-anselin-local-m.htm