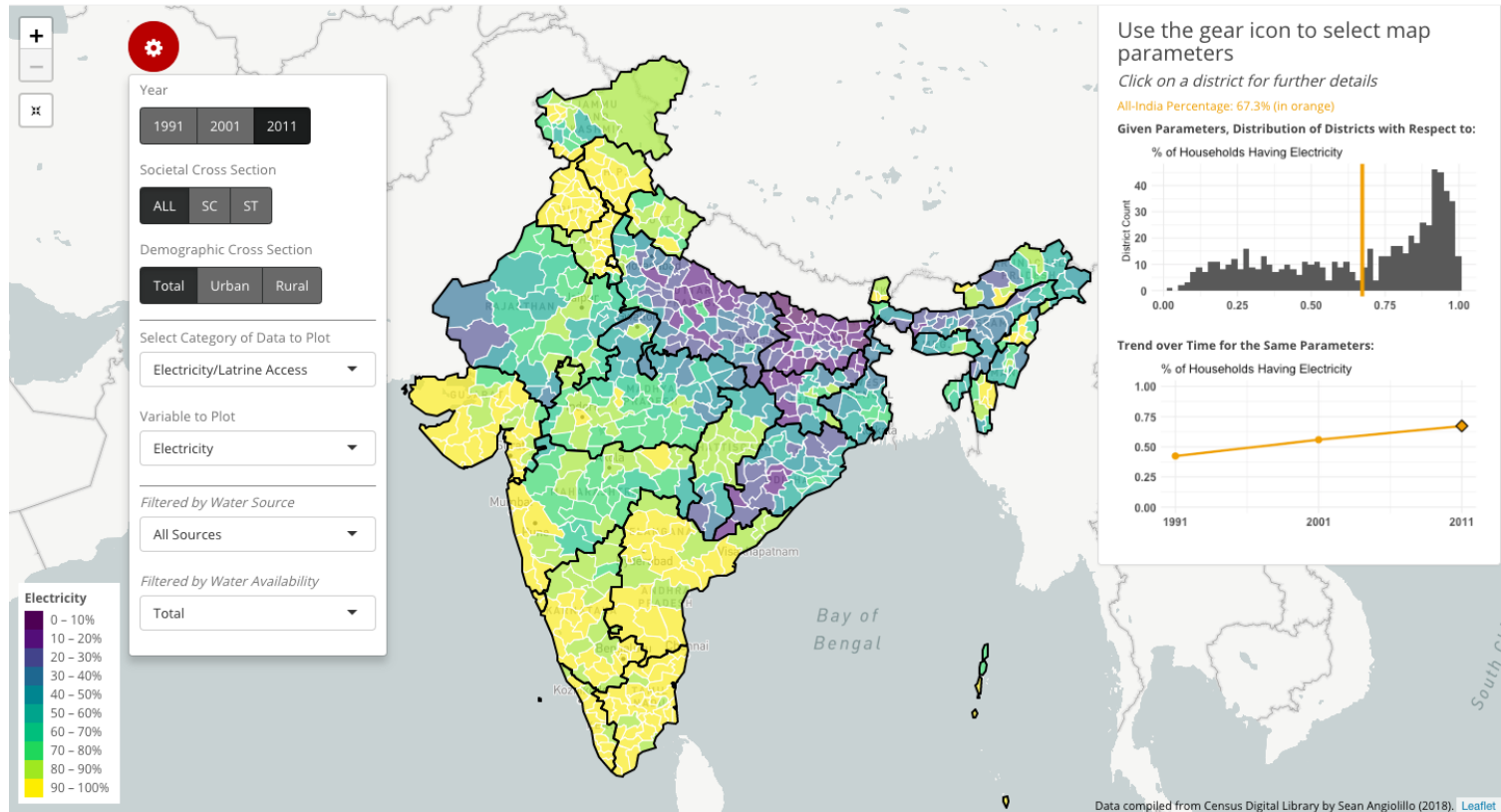


Exploring Electricity, Latrine and Water Access Data in India

with sf, leaflet and shiny



Sean Angiolillo

15 Dec 2018



App: https://seanangio.shinyapps.io/in_household/

censusindia.gov.in/DigitalLibrary/Archive_home.aspx

CENSUS DIGITAL LIBRARY
 (Beta Version)

2011
 Our CENSUS, Our FUTURE.

Government of India
 Ministry of Home Affairs
 Office of the Registrar General & Census Commissioner, India

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- This is only a beta version Send your feedbacks at rgi.rgi@nic.in



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Census Presentations

- 
Data Dissemination-some more details...,India
- 
Houses, Household Amenities & Assets in ...,India

Data Source: **GOI Census Digital Library**

Approaches to Explore the Data

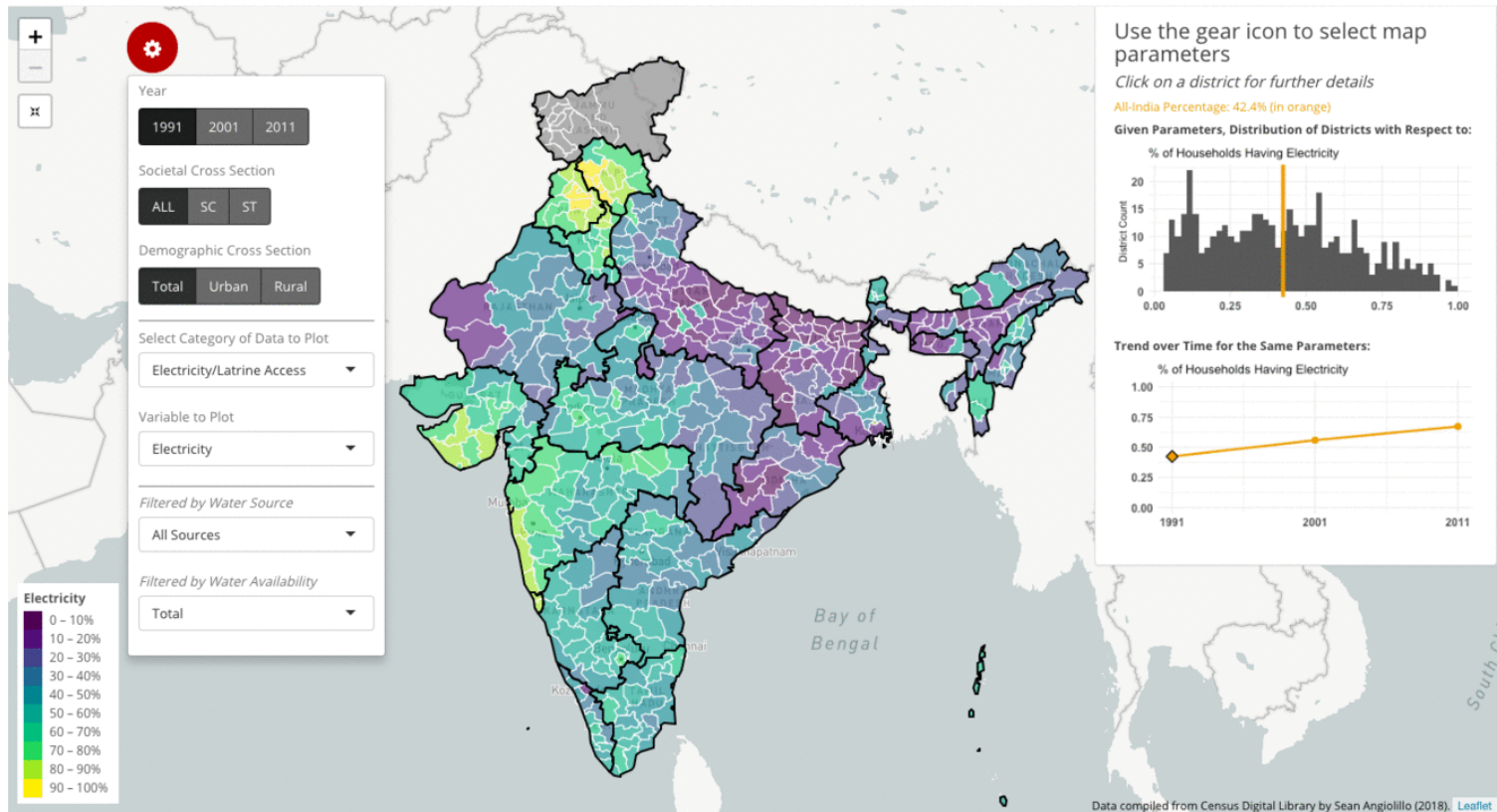
Track a Metric Over Time

Track a District Over Time

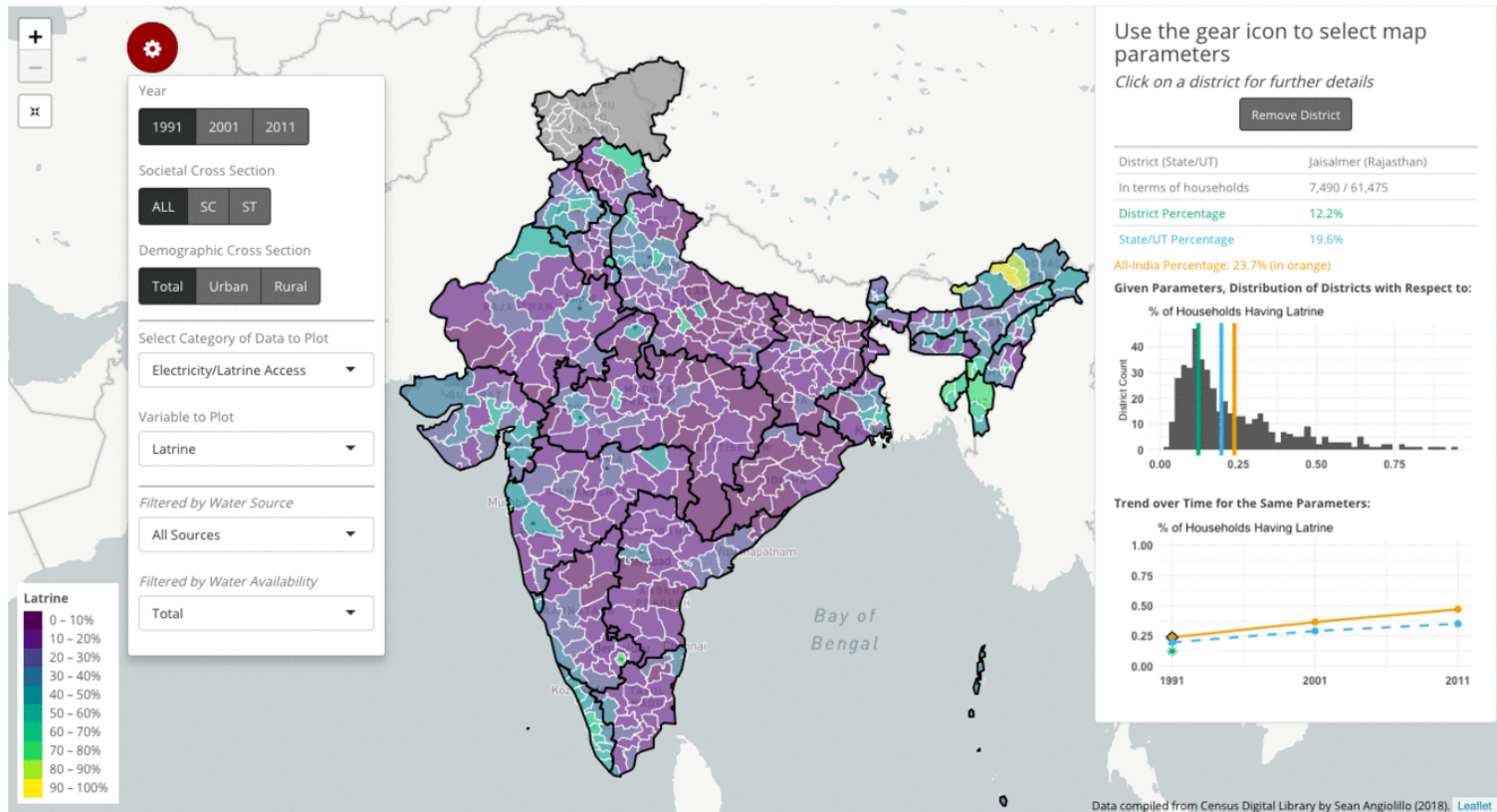
Compare Urban vs. Rural Households

Compare SC/ST vs. All Households

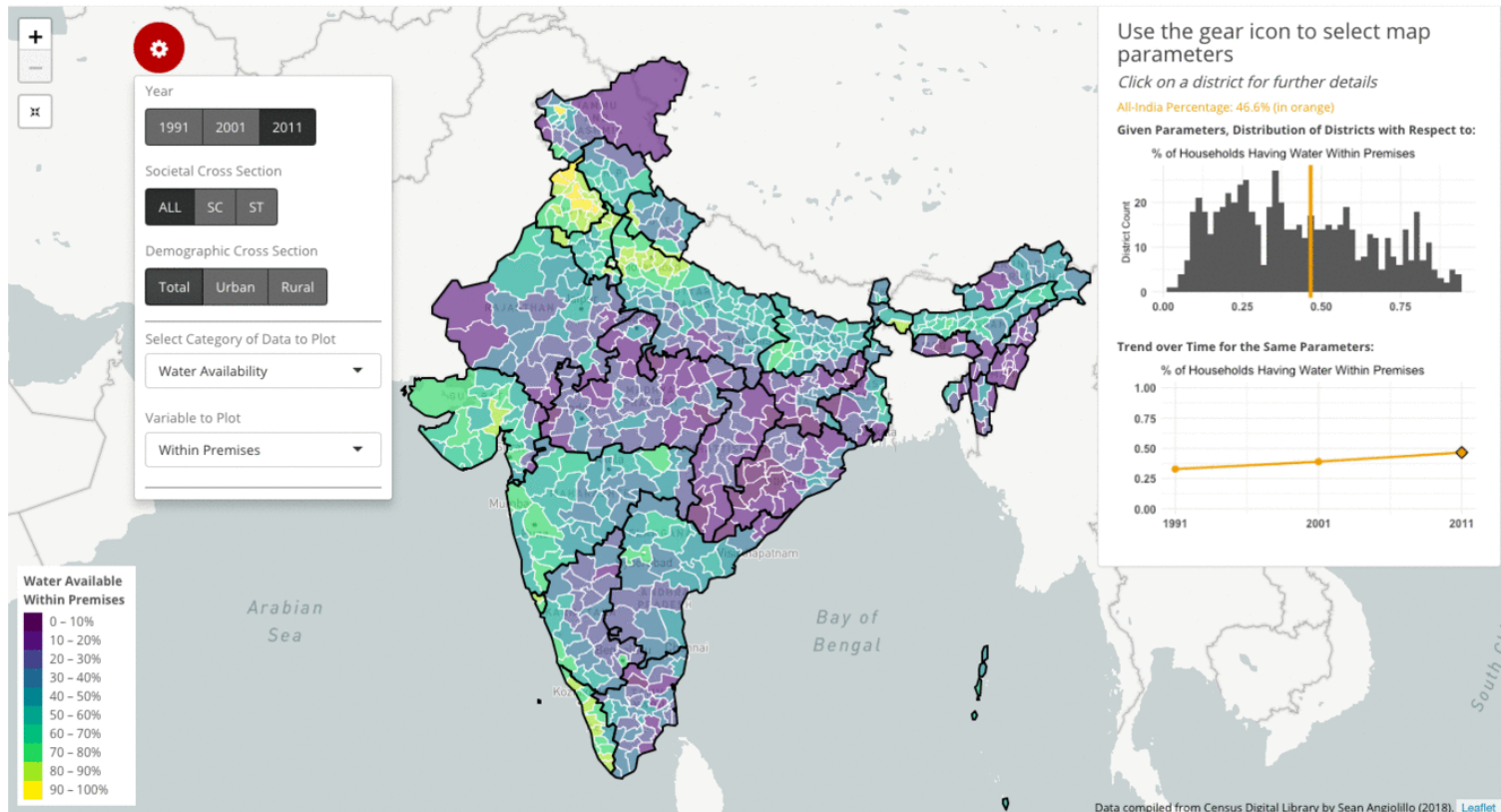
Check Household Density



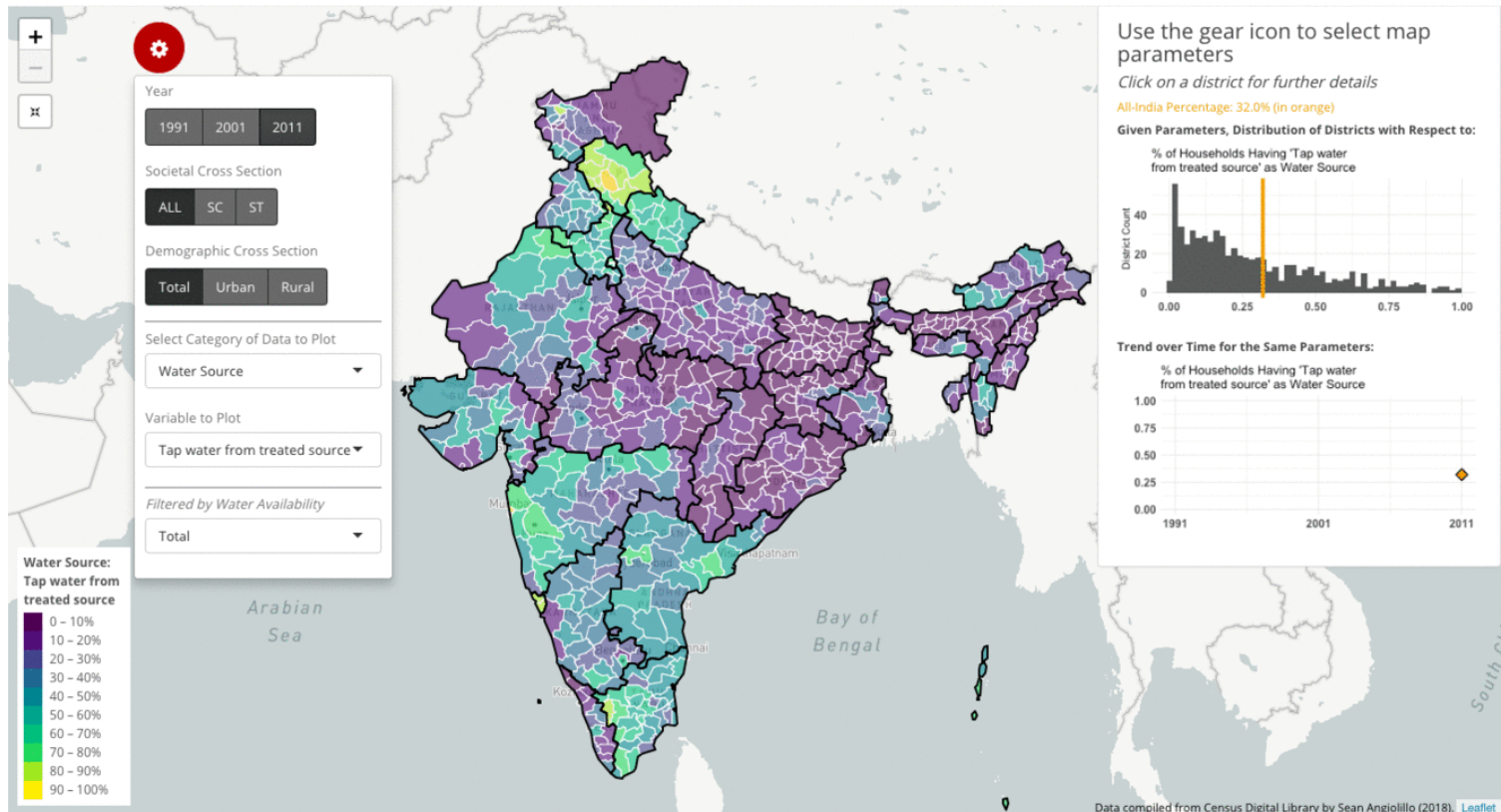
Track a Metric Over Time: Electricity Access



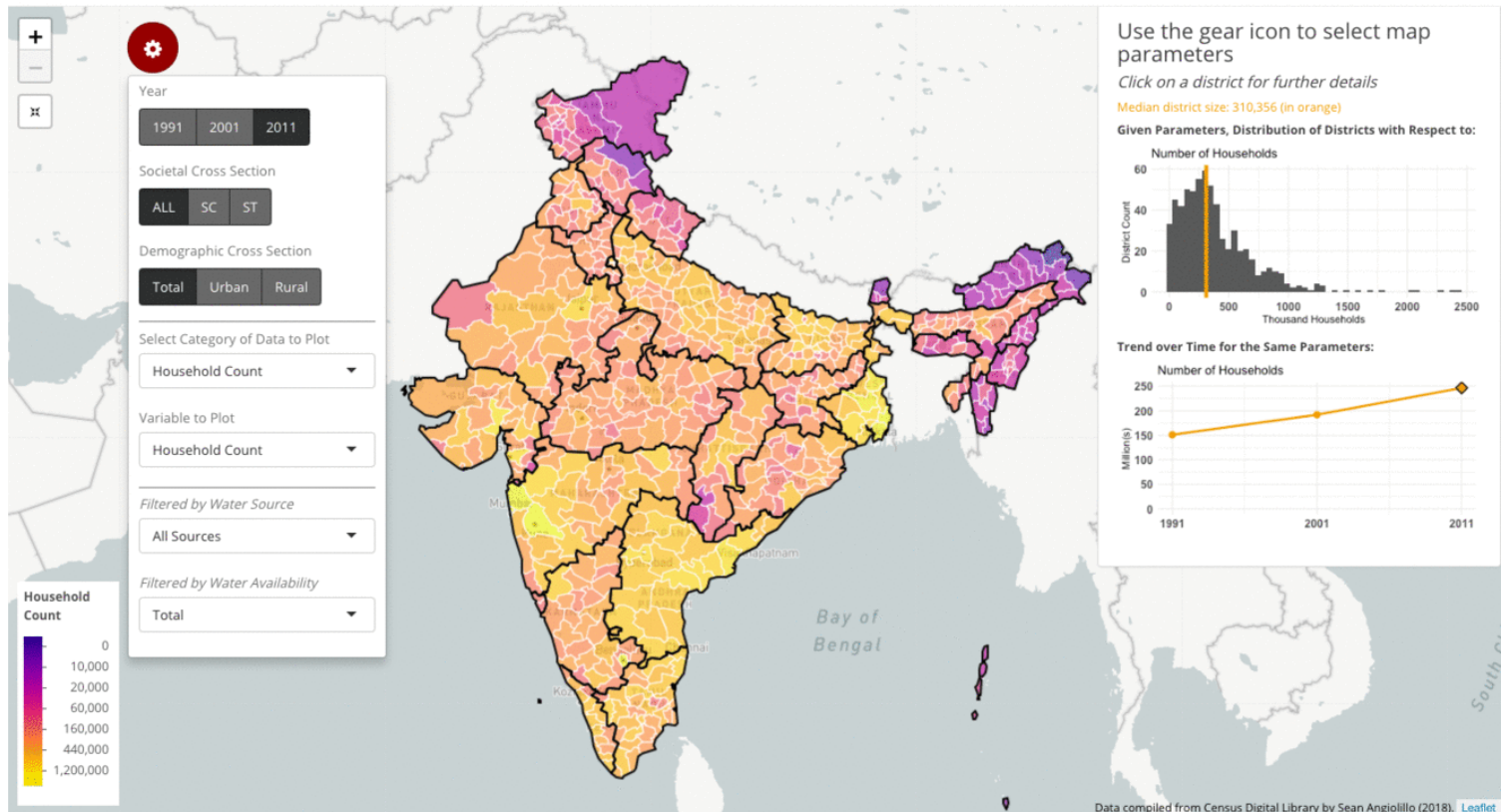
Track a District Over Time: Latrine Access in Jaisalmer, Rajasthan



Compare Urban vs. Rural Households: Water Availability Within Premises (2011)



Compare SC/ST vs. All Households: Treated Tap Water as Water Source (2011)



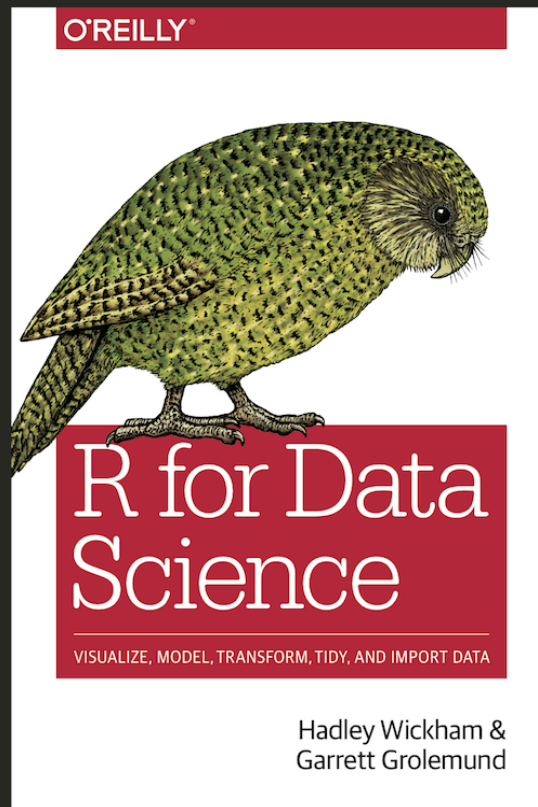
Check Household Density: Zoom to see 9 Delhi Districts (2011)

App Anatomy

1. Wrangle the Data => dplyr, etc
2. Join Spatial Polygons => sf
3. Draw the Map => leaflet
4. Make it Interactive => shiny

1. Learn the

<https://r4ds.had.co.nz/>



Data Wrangling Goal => A tidy dataframe

Data Wrangling Tips

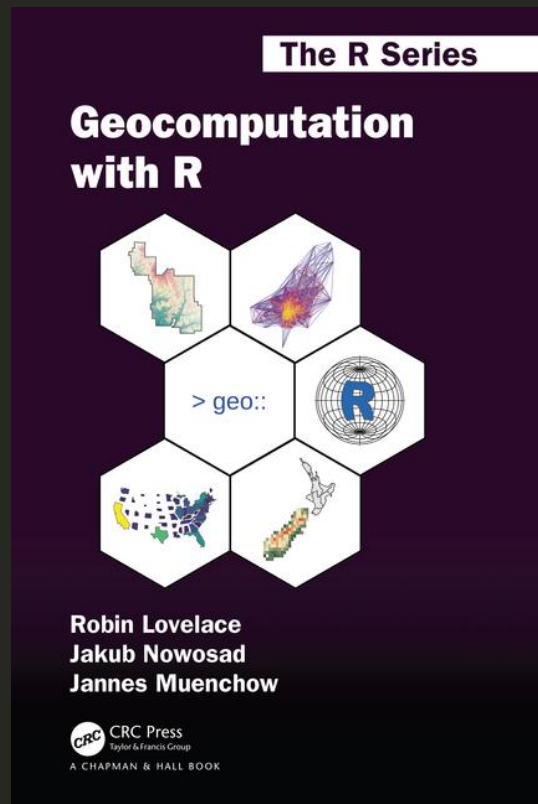
District names are not unique identifiers.

Check for multiple sheets when reading Excel files.

Implicitly missing data (e.g. STs in Punjab) =>

2. Learn how to work with geospatial data

<https://geocompr.robinlovelace.net/>



Join Tidy Data, Spatial Polygons =>

Spatial Joining Tips

Match differently-spelled census and spatial district names =>

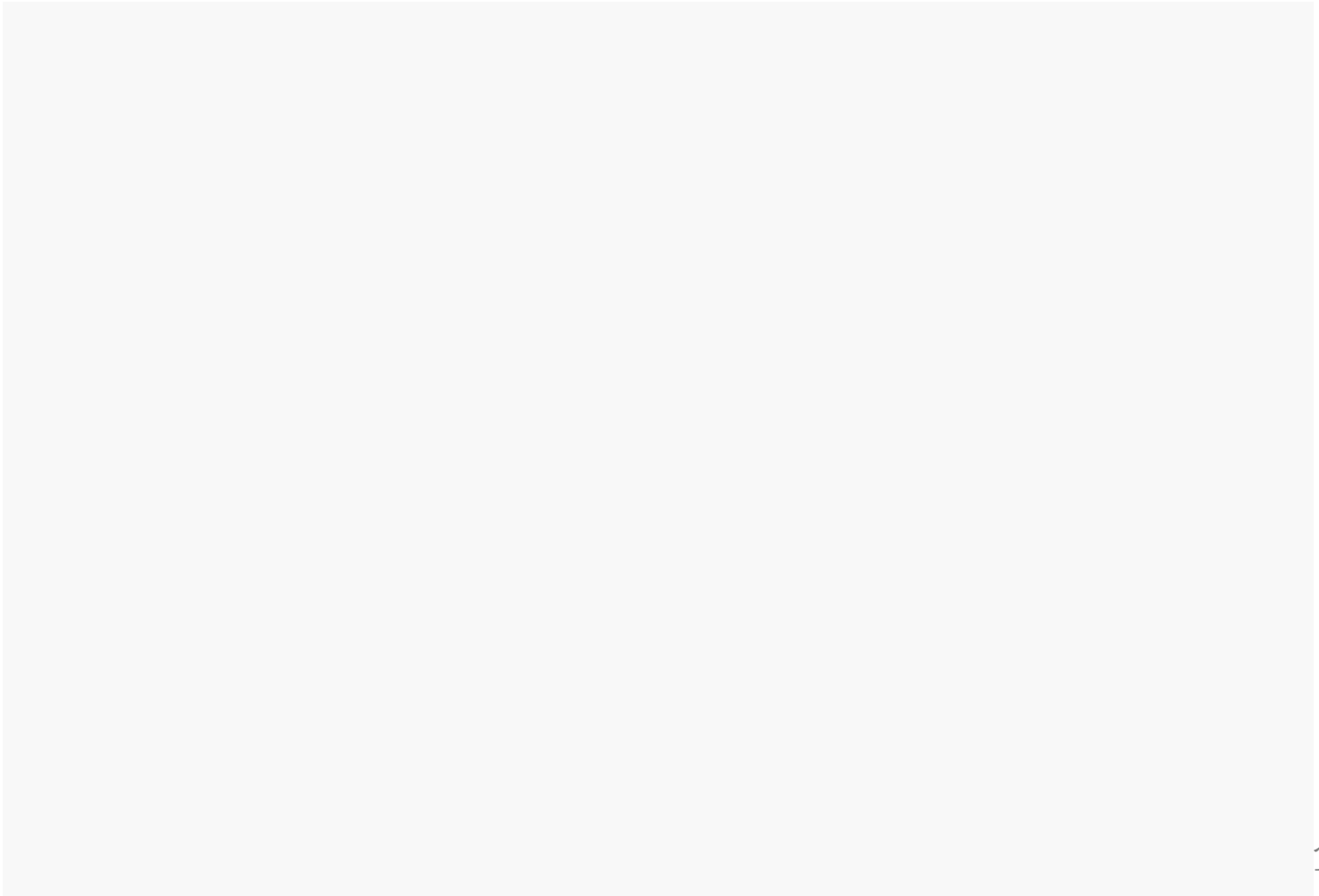
Simplify polygons before joining =>

3a. Learn

<https://rstudio.github.io/leaflet/>

Abhinav Agrawal YouTube Series on "Leaflet Package
in R"

Draw the Map =>



Leaflet Tips

Solve layer issues (e.g. between district shapes and state border lines) =>

Custom Mapbox tiles =>

Capture events like clicks, mouseovers =>

Avoid redrawing the entire map each instance =>

3b. Learn Geospatial Data Visualisation

Kieran Healy, Data Visualization: A Practical Introduction

<http://socviz.co/maps.html#maps>

Claus O. Wilke, Fundamentals of Data Visualization

<https://serialmentor.com/dataviz/geospatial-data.html>

A Few Visualization Choices

Districts vary widely in area and population ==> plot Household Counts

Percentage data maps colors to decile; Logarithmic scale for Household Count data

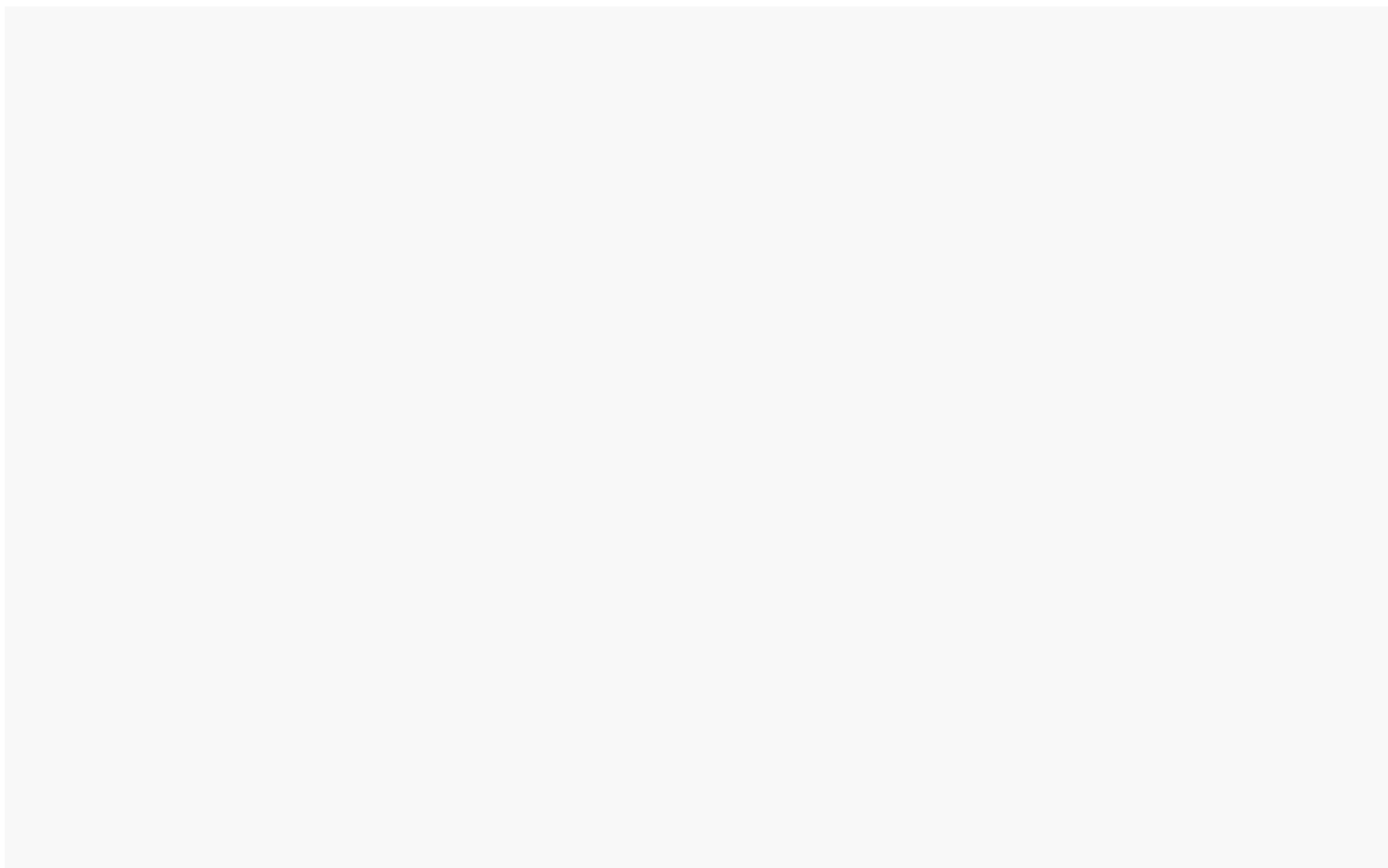
Colorblind-friendly color scales ==> viridis, Okabe-Ito

Frequent district boundaries changes makes trend plotting difficult
==> plot more consistent state trend instead

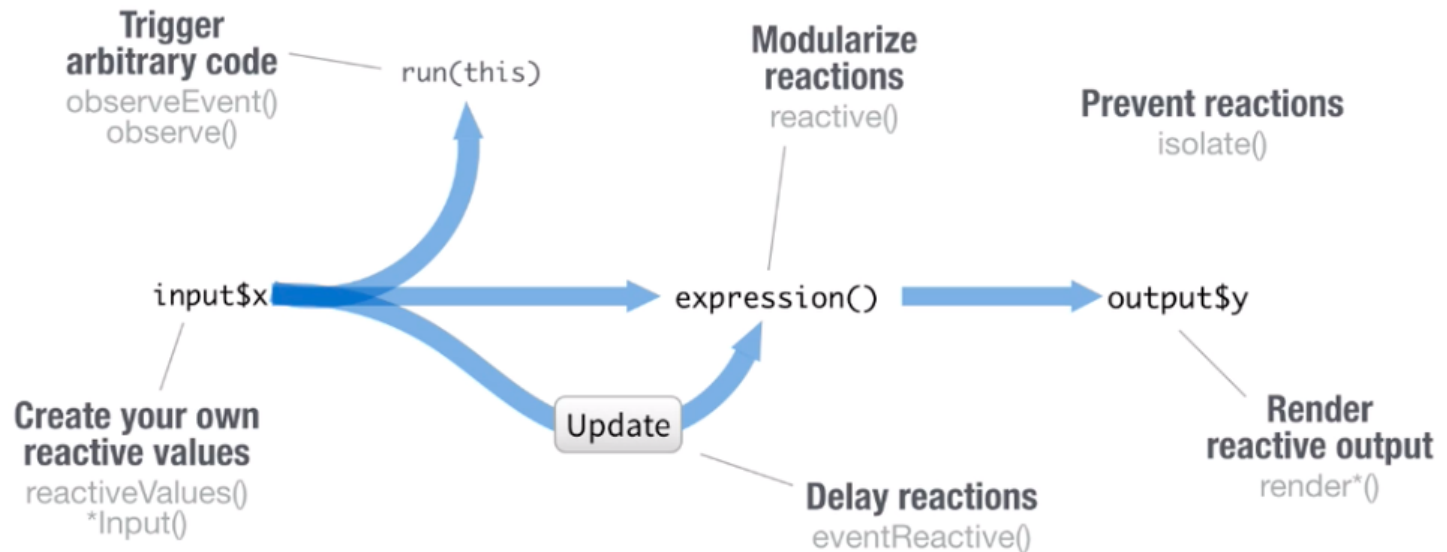
4. Learn

<https://shiny.rstudio.com/tutorial/>

A Very Simple Shiny App











Shiny turns inputs into outputs



Source: How to Start with Shiny Tutorial, Garrett Grolemund

A Shiny Project Directory

		▲ Name	Size
		..	
<input type="checkbox"/>		about.md	4 KB
<input type="checkbox"/>		data	
<input type="checkbox"/>		global.R	25 KB
<input type="checkbox"/>		rsconnect	
<input type="checkbox"/>		server.R	9.9 KB
<input type="checkbox"/>		styles.css	760 B
<input type="checkbox"/>		ui.R	4.7 KB

Structuring Shiny UI

Choose an application layout =>

,

Build dynamic UI =>

,

Styling Shiny UI

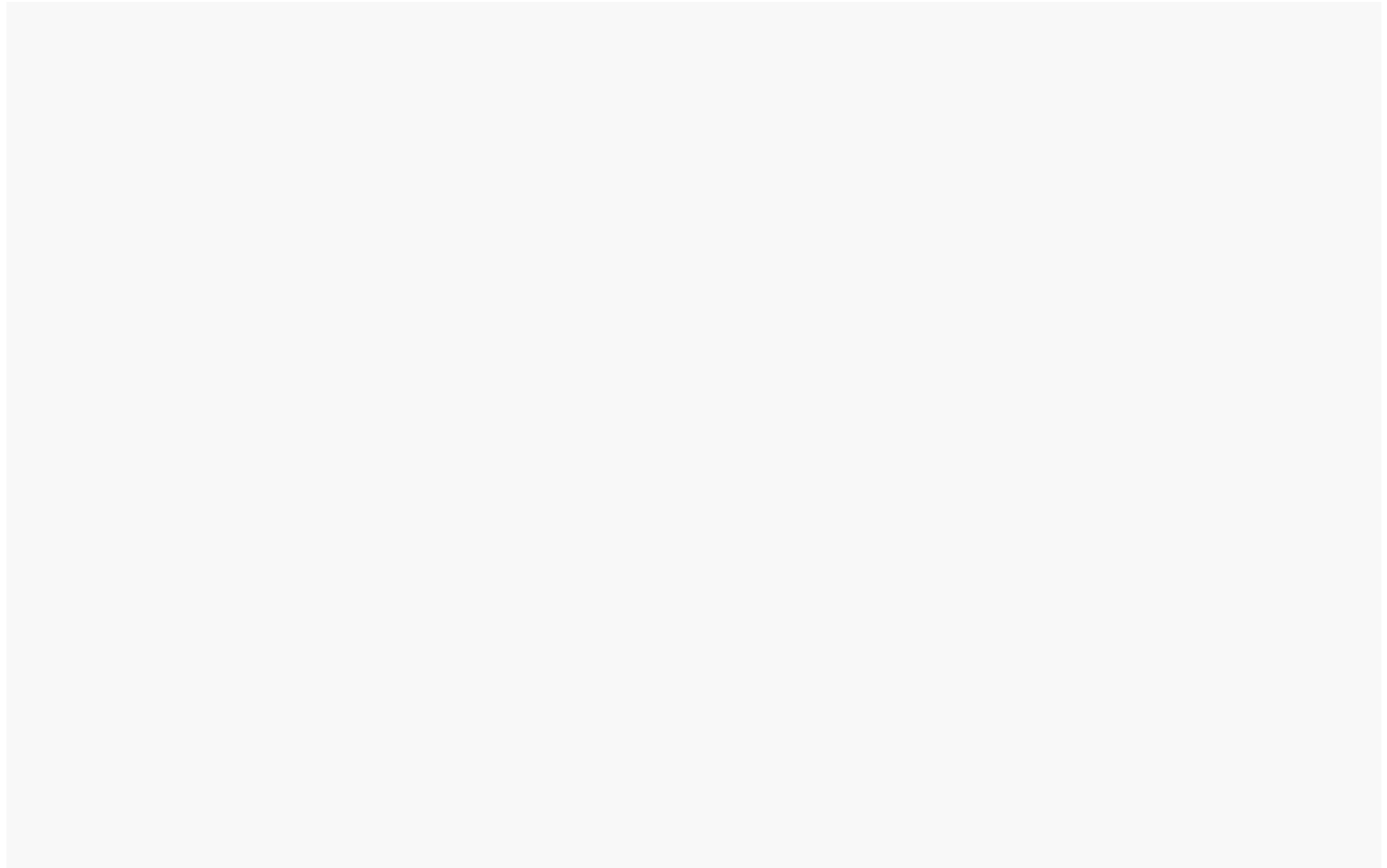
Select a theme =>

Style CSS =>

Explore extra widgets =>

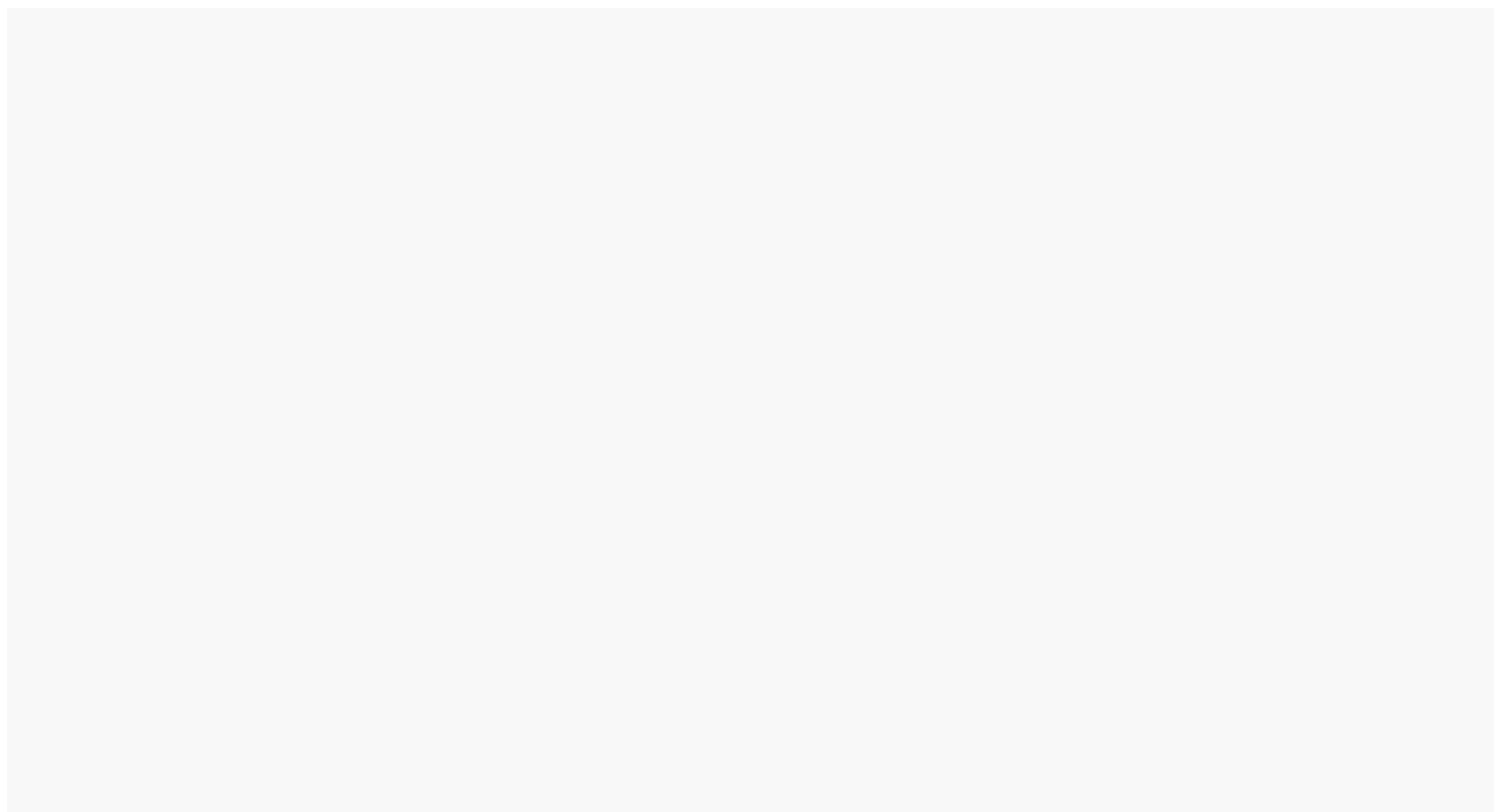
Add waiting effects =>

Shiny Server: Update UI

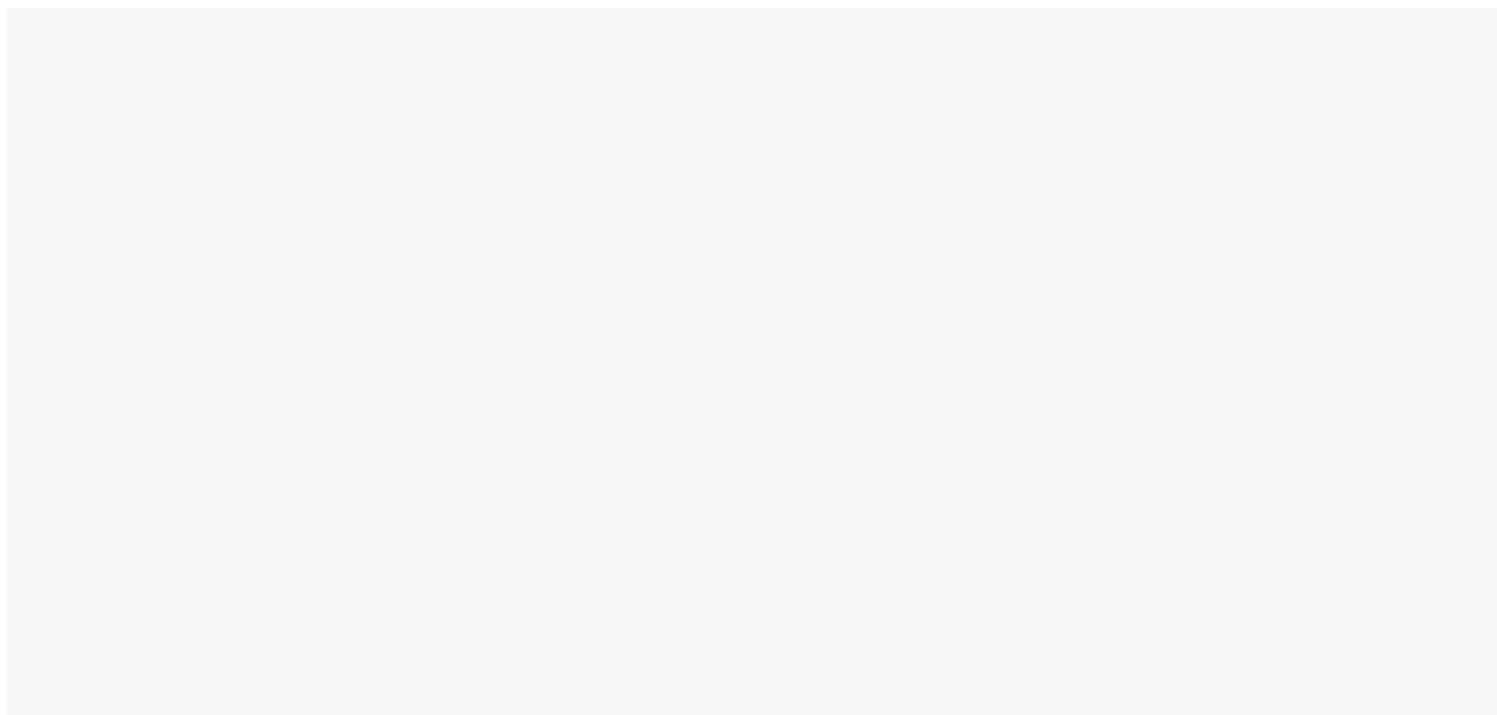


Note: Likely not most efficient solution!

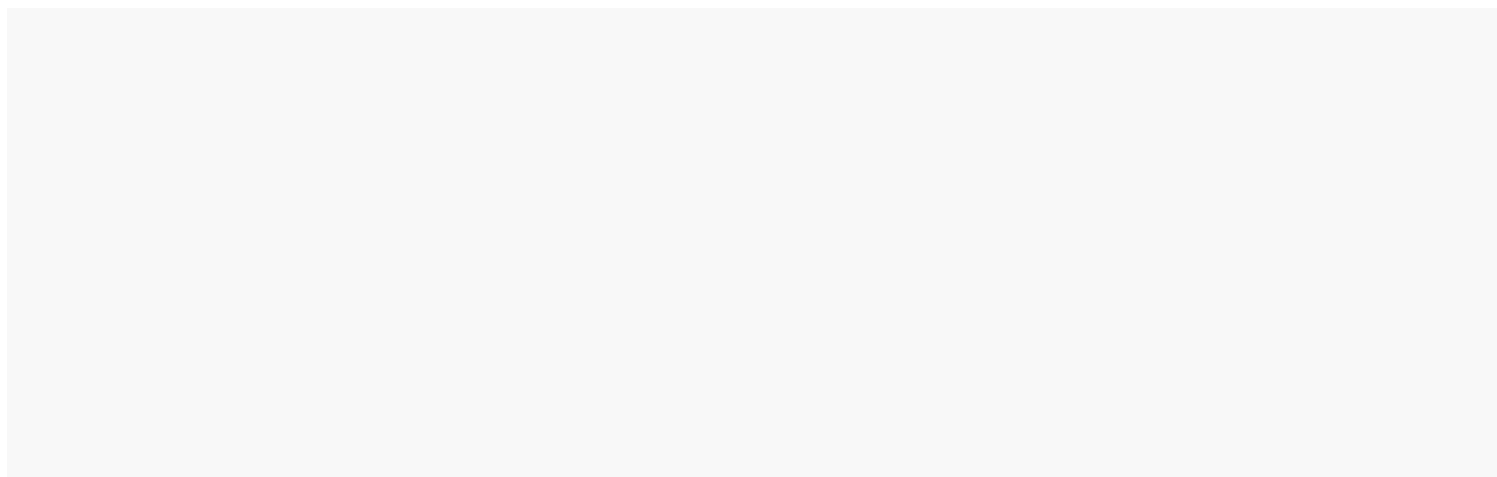
Shiny Server: Reactive Expressions



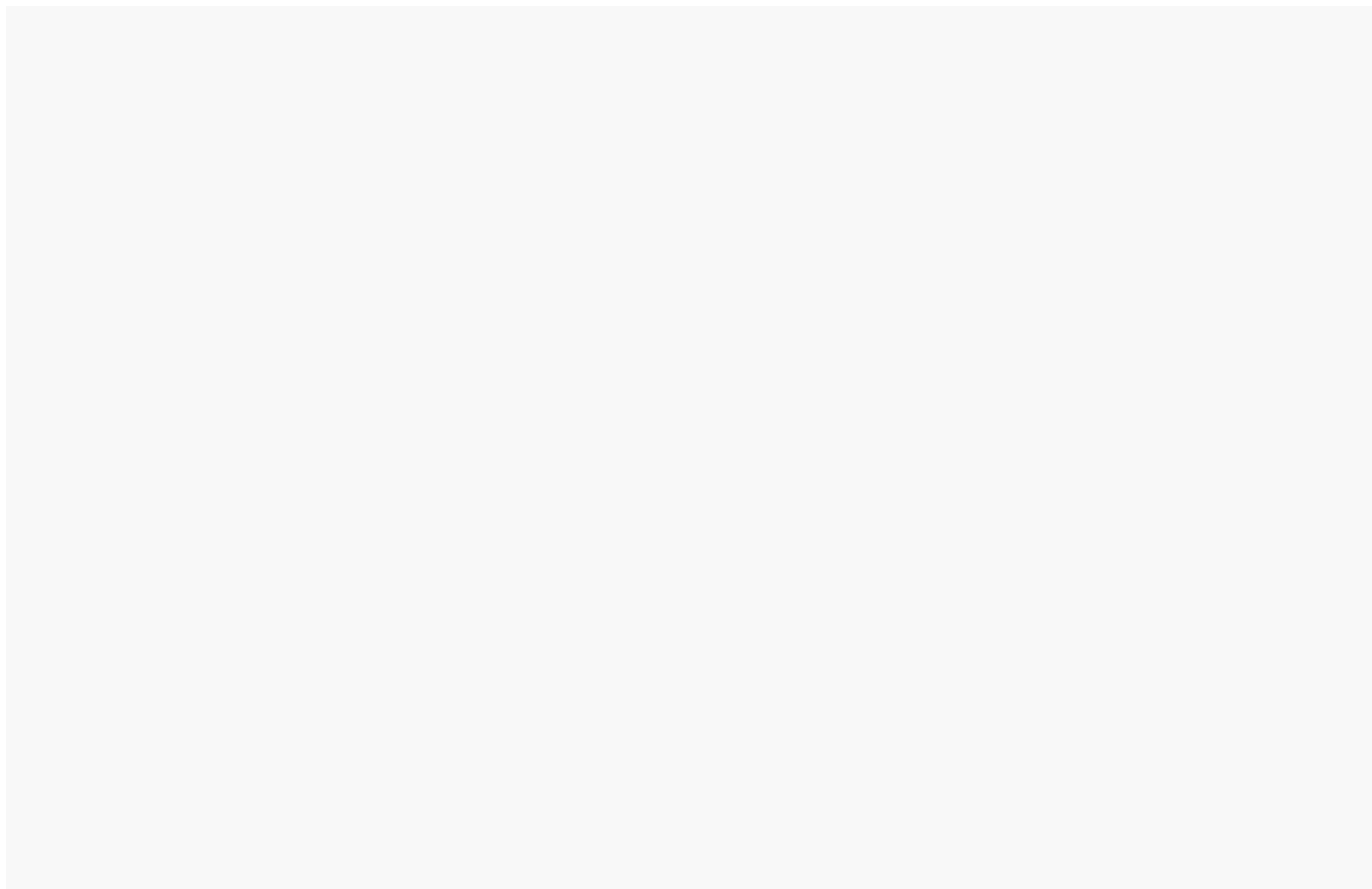
Shiny Server: Map Drawing



Shiny Server: District Click Event (1)



Shiny Server: District Click Event (2)



Thanks!

App: https://seanangio.shinyapps.io/in_household/

Code: https://github.com/seanangio/in_household

Other projects: <https://sean.rbind.io/>