Earth Analytics Applications Project Status Presentation

Rayna Benzeev

Recap of project goals:

"As an output of my research I hope to create a tool to prioritize sites for reforestation that accounts both for biodiversity priority areas and for those places where community support is strong enough to ensure the long-term success of the reforestation project"
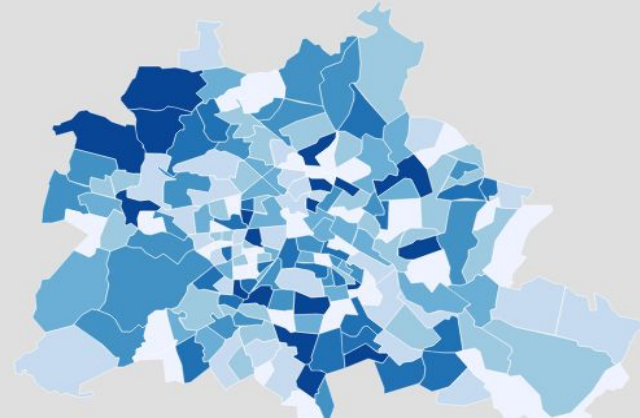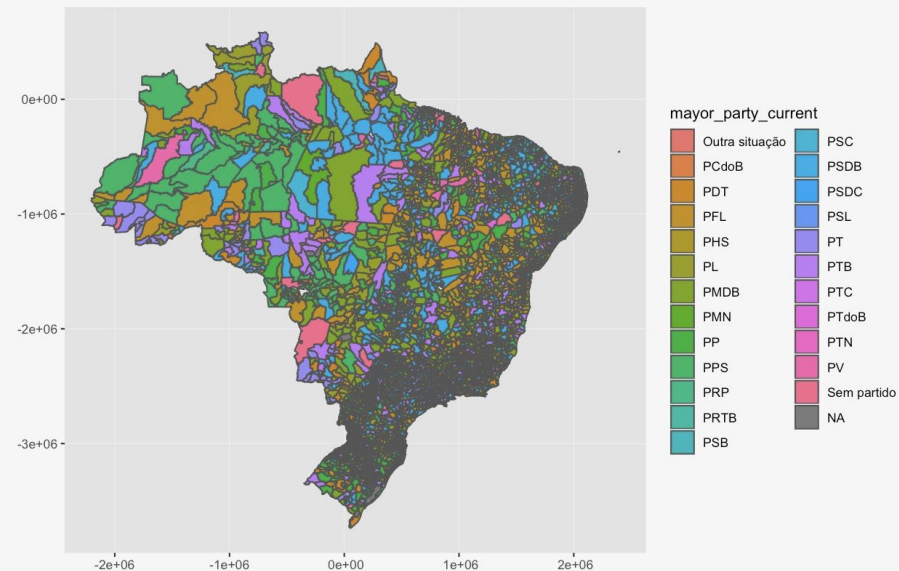
Reminder: What are RShiny and Leaflet?

► RShiny is an interactive web application framework for R that can be used for exploratory data analysis and visualization, to facilitate remote collaboration, and share results

► Leaflet is a powerful open-source Javascript library that powers interactive maps on the web
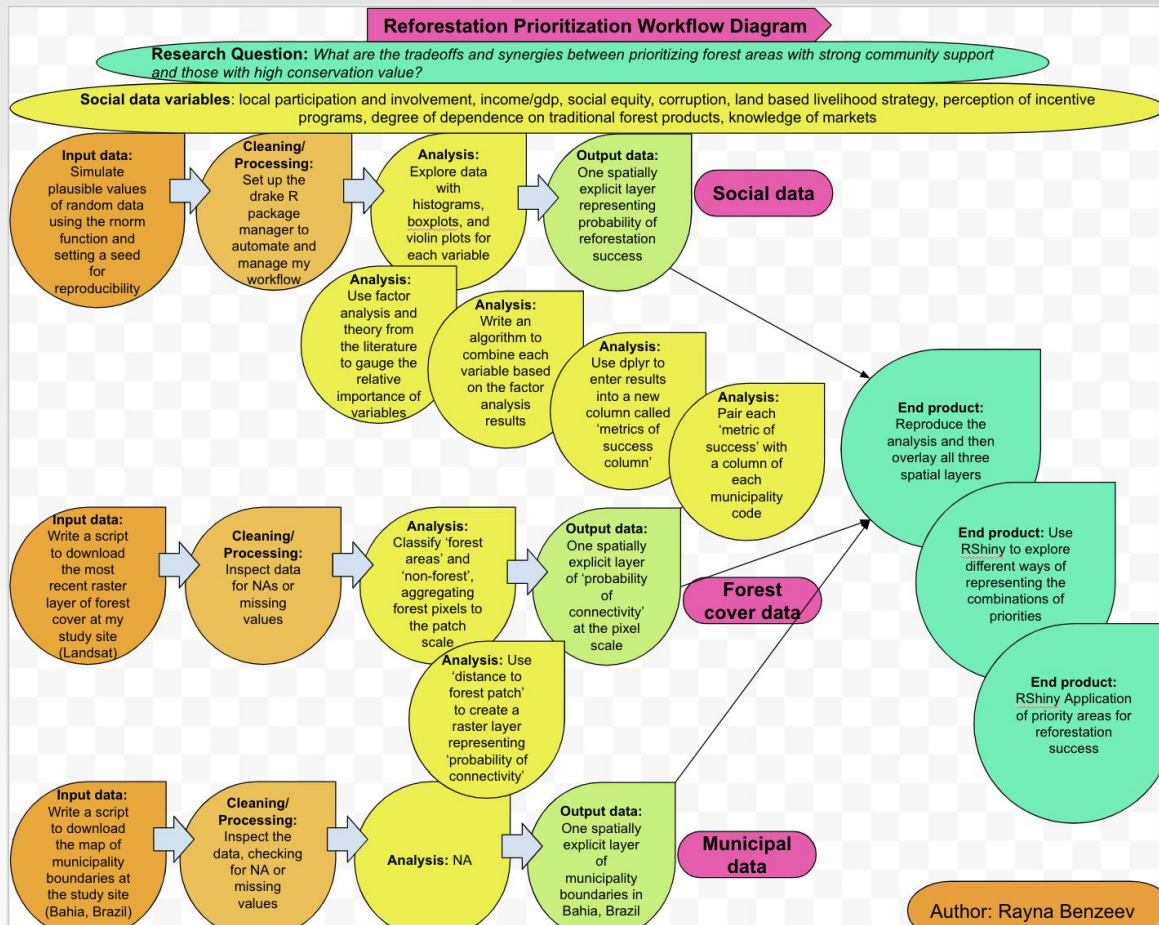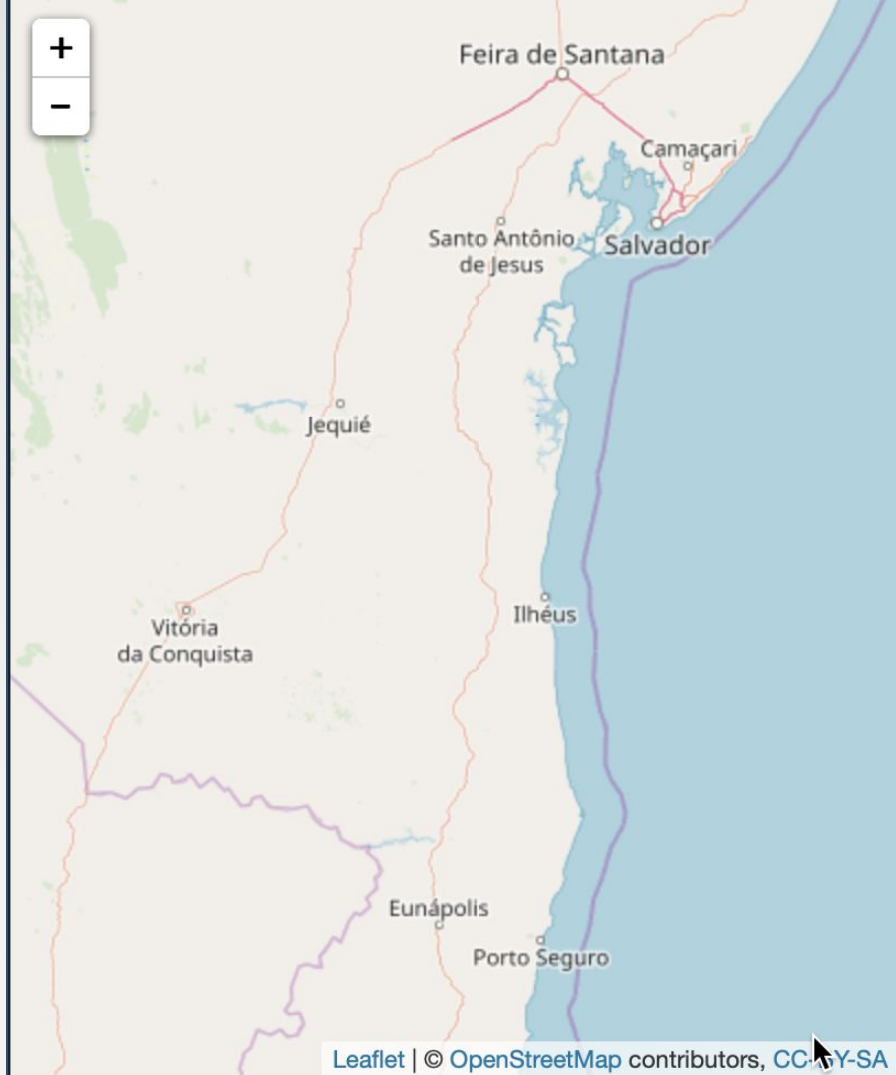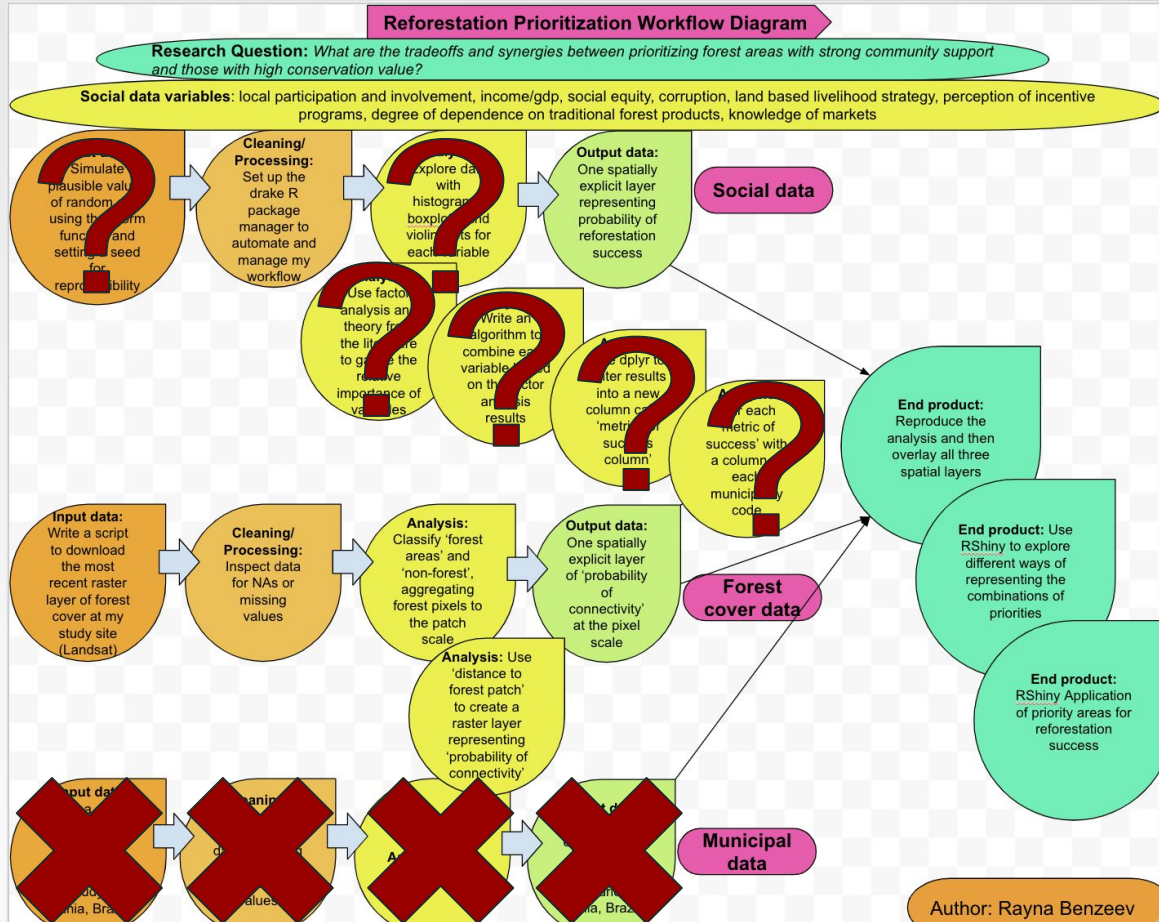
Description of end products:

Completed Tasks

Reforestation Prioritization Workflow Diagram

Research Question: *What are the tradeoffs and synergies between prioritizing forest areas with strong community support and those with high conservation value?*

Social data variables: local participation and involvement, income/gdp, social equity, corruption, land based livelihood strategy, perception of incentive programs, degree of dependence on traditional forest products, knowledge of markets

Input data: Simulate plausible values of random data using the rnorm function and setting a seed for reproducibility

Cleaning/Processing: Set up the drake R package manager to automate and manage my workflow

Analysis: Explore data with histograms, boxplots, and violin plots for each variable

Output data: One spatially explicit layer representing probability of reforestation success

Social data

Analysis: Use factor analysis and theory from the literature to gauge the relative importance of variables

Analysis: Write an algorithm to combine each variable based on the factor analysis results

Analysis: Use dplyr to enter results into a new column called 'metrics of success column'

Analysis: Pair each 'metric of success' with a column of each municipality code

End product: Reproduce the analysis and then overlay all three spatial layers

Input data: Write a script to download the most recent raster layer of forest cover at my study site (Landsat)

Cleaning/Processing: Inspect data for NAs or missing values

Analysis: Classify 'forest areas' and 'non-forest', aggregating forest pixels to the patch scale

Output data: One spatially explicit layer of 'probability of connectivity' at the pixel scale

Forest cover data

End product: Use RShiny to explore different ways of representing the combinations of priorities

Analysis: Use 'distance to forest patch' to create a raster layer representing 'probability of connectivity'

End product: RShiny Application of priority areas for reforestation success

Input data: Write a script to download the map of municipality boundaries at the study site (Bahia, Brazil)

Cleaning/Processing: Inspect the data, checking for NA or missing values

Analysis: NA

Output data: One spatially explicit layer of municipality boundaries in Bahia, Brazil

Municipal data

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Completed Tasks

Reforestation Prioritization Workflow Diagram

Research Question: *What are the tradeoffs and synergies between prioritizing forest areas with strong community support and those with high conservation value?*

Social data variables: local participation and involvement, income/gdp, social equity, corruption, land based livelihood strategy, perception of incentive programs, degree of dependence on traditional forest products, knowledge of markets

Social data

Cleaning/ Processing: Set up the drake R package manager to automate and manage my workflow

Output data: One spatially explicit layer representing probability of reforestation success

End product: Reproduce the analysis and then overlay all three spatial layers

End product: Use RShiny to explore different ways of representing the combinations of priorities

End product: RShiny Application of priority areas for reforestation success

Input data: Write a script to download the most recent raster layer of forest cover at my study site (Landsat)

Cleaning/ Processing: Inspect data for NAs or missing values

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Forest cover data

Analysis: Use 'distance to forest patch' to create a raster layer representing 'probability of connectivity'

Municipal data

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Current Challenges

- ► rJava package

```
> library(xlsx)
Error: package or namespace load failed for 'xlsx':
 .onLoad failed in loadNamespace() for 'rJava', details:
  call: dyn.load(file, DLLpath = DLLpath, ...)
  error: unable to load shared object '/Library/Frameworks/R.framework/Versions/3.5/Resources/l
ibrary/rJava/libs/rJava.so':
  dlopen(/Library/Frameworks/R.framework/Versions/3.5/Resources/library/rJava/libs/rJava.so, 6)
: Library not loaded: /Library/Java/JavaVirtualMachines/jdk-9.jdk/Contents/Home/lib/server/libj
vm.dylib
  Referenced from: /Library/Frameworks/R.framework/Versions/3.5/Resources/library/rJava/libs/rJ
ava.so
  Reason: image not found
```

Remaining Tasks

- ► Learn how to use Drake and set it up in R
- ► Create an updated workflow diagram
- ► Integrate my knowledge of Rshiny and Leaflet with the code of the Strassburg et al. paper
- ► Amend the code to crop for my study site
- ► Simulate ecological models