

Zach Bowyer
Prerit Chaudhary
Sagnik Ghosal
Raman S V
Adithyaa V

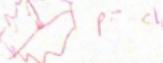
A one- or two-paragraph synopsis and short reflection on what you discovered about your final concept from the FDS activity.

To summarize our specific FDS process, we first created brainstorming sheets in class on 10/3. After we had our brainstorming sheets made, we began work on drafting the final brainstorming sheet, labeled sheet 1. We then met out of class on 10/4, where we finalized sheet 1, created/finished sheet 2, and outlined various aspects of sheet 3 and sheet 4. On 10/5, we created rough drafts of sheet 3 and sheet 4. From there, the team met on zoom 10/6 to discuss sheets 3, 4, and 5. On 11/8 we met to both formalize sheets 3 and 4 and finalize sheet 5.

We intend to examine the greenhouse gas emissions of various countries, both historically and currently and draw on these observations to highlight, compare, and contrast the ecological impact of food, agriculture, and husbandry with that of more traditional yet less reported sources of emissions, such as private jets and sporting teams. We also intend to see the change in consumption and production of different types of food and if that has had an impact on the environment through CO₂ emissions over the last few years. For examining/comparing specific countries, we are planning on using a world colormap, bar charts, and pie charts. For looking at the impact of food, agriculture, and husbandry, we plan on using a custom graph that slices up an image of a food item (cow, chicken, etc.) into regions that could be quantified as things like: "Percentage of food item consumed by each geographic area" or "percentage of emission types from each food item." For comparing food emissions to other emissions types we plan on using bar charts. In terms of filters, we plan on having a dashboard with 4 views. The first view will act as the executive summary that will be static and will communicate each of our 3 main stories with a general audience in mind. We will have buttons under each static visualization on view 1 that will take the user to view 2, 3, and 4 respectively, which are meant to be detailed versions of each story that are interactive. For interactivity, we plan on adding specific filter and zoom functionality for each visualization separately as we see fit.

Overall, the FDS activity led to some great and productive conversations about how we are going to tackle the project. One key takeaway from this activity was that we realized that we were better off asking interesting questions about a topic we were passionate about (climate change and world health) before looking for datasets since we knew data was abundant. Additionally, the finalized design sheets (2,3,4,5 specifically) are especially useful because they give us a good reference point moving forward about how we are going to design(structure) our dashboard. This front-loading of general design ideas should help the team have clearer-cut roles and be able to formulate and track goals much easier. We also appreciated the FDS activity because it helped us filter out good and bad ideas early in the process.

Zachary Bowyer brainstorm sheet

<u>Brainstorm Zach</u>	<u>General Idea</u>	<u>Final Climate</u>
1. World Heatmap of Vegetation - 2D map	Black - Green = Low - H2O Footprint Title (with food) greenhouse gases	H2O Footprint
2. Solar Food pyramid vs carbon footprint - what are the most odds?	Green - grey scale 	Green
3. What is the best "balanced diet" that is environmentally friendly? Low we can calculate based on nutritional needs and footprint from max	Ex: Best diet: X, Y, Z, 1, 2, 3 = X.XXX carbon footprint	
4. What are the leading sustainable food sources? More people/capita?		
5. Heatmaps Heatmaps of where foods are most created/Common?		
6. "Best" Food items possible	 natural fresh	
7. Are there more sustainable cooking styles?		
8. What about % of thrown away/squished food? Who throws away most per capita?		
9. Common crop heatmaps of world?		
10. Why should I care, I'm not % of world consumers are food based and could be mitigated by best practices?		
11. How do separate glasses = carbon, methane, nitrous oxide, etc...  p= class in glass cloud shape.		
12. Do rain or per areas do better?		
13. Correlation matrix of (carbon/foods) A field score relationships between foods that may be closer together?		
14. Is this food a leading out our indicator of general climate issues? Highly doubtful		

Prerit Chaudhary brainstorm sheet

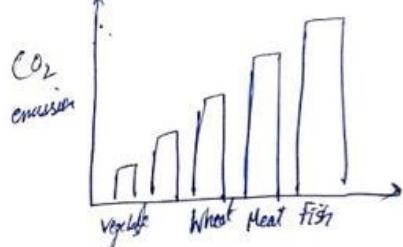
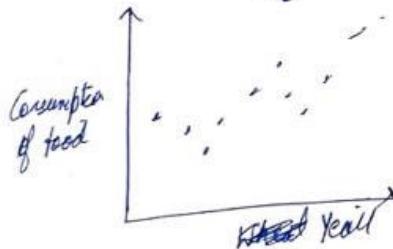
BRAINSTORMING

PRERIT CHAUDHARY

FOOD

- Changes in food consumption over the years
- CO₂ emissions for different type of Food
- Check for CO₂ consumption vs production for each country through food
- Also Check for other factors impacting the environment
Vegan vs Vegetarian vs Meat based Food

cluster countries based on CO₂ emissions and compare consumption of food country wise/ Food type wise



Filter

- 1) Based on countries
- 2) Based on different type of food
- 3) Show pattern for both over the years

- Category
- 1) Bar plot for each kind of food in descending order
 - 2) Create a scatter plot for to show pattern over last few years to show trend

Combine and Refine

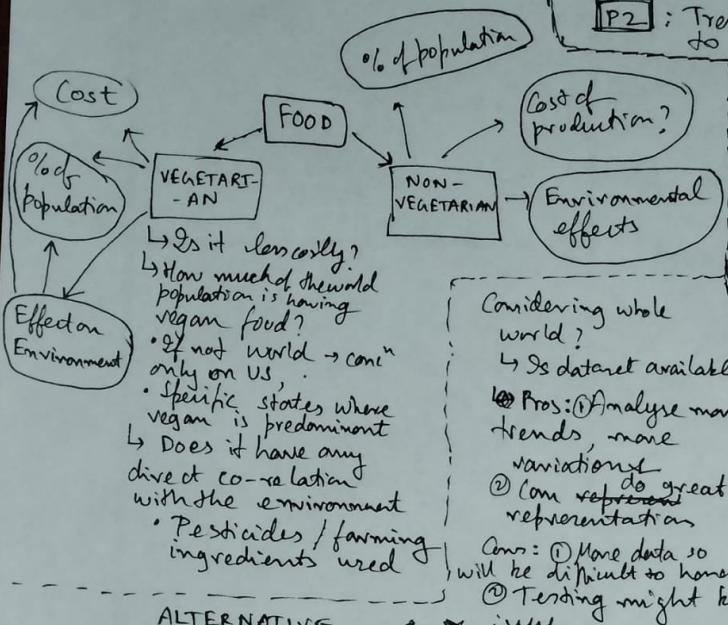
- create a executive summary like overview of all different metrics
- Drill down on every sub story to create and generate insights using a separate tool

Sagnik Ghosal brainstorm sheet

Ideas:

Main focus → Food

Q1. Foods people prefer more but is detrimental to environment



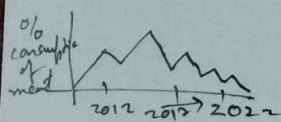
ALTERNATIVE

Focus on US → specific states!

- (Better)
- ↳ less amount of messy data
- ↳ can we concentrate only on a state? Very narrow then!

Q2: Are there foods

which costs more yet people are buying → interesting hidden fact !!



Non-veg food got preference somewhere

OR
Veg-food got preference at some place → why??
the pattern!!

Filter:

P1: Effect of food production on Environment [In terms of CO₂, Methane, Pesticide usage, Lands becoming no-longer sustainable]

P2: Trends → Africa becoming veg to Non-Veg or VICE-VERSA.
Why ?? [We can show this to show why → more hot, a long lasting disease from a particular kind of food]

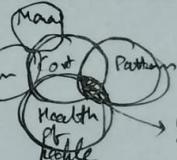
P3: ~~Watching~~ Bringing out patterns in people's health with the type of food being consumed [Can be an interesting multivariate visualization]

P4: food people are buying despite high cost (money) → Why ??

Categorize:

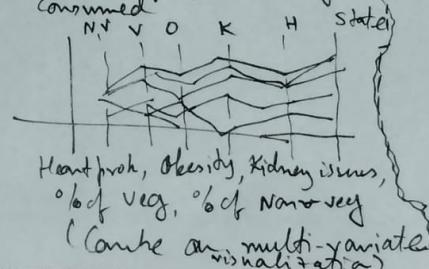


Combine & Refine



Interesting !!

Q3: Are people health with the kind of food being consumed



Raman S V brainstorm sheet

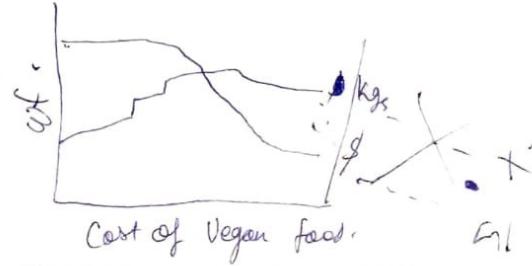
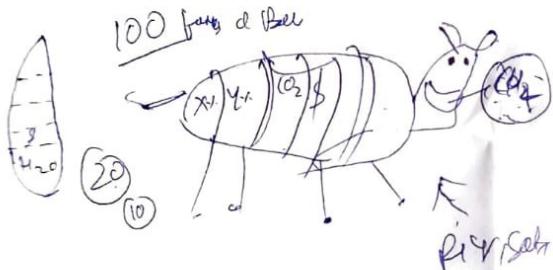
BRAINSTORM

CO_2 omission] greenhouse
cost of food
Trade facts.

Food, my food eats. 3 ~~Second order~~ derivative. The 3rd world burden?

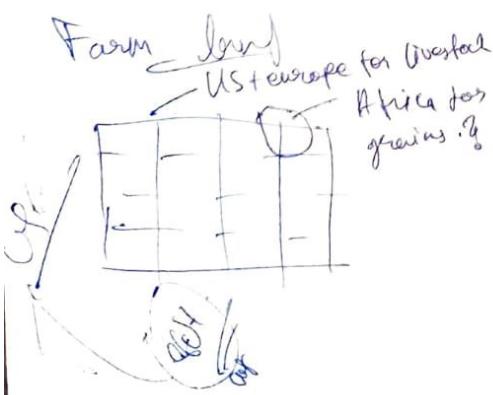
Where's the green? green foot
green money. — Is vegan costly

Time series analysis of Cost vs. availability of non-meat options.



US vs the World

Cost of Veg in India vs Us.



S. V. RAMAN

FILTER

Standardize visuals?

What's the question!

Affordability vs. Availability

The 3rd world burden?

derivative.

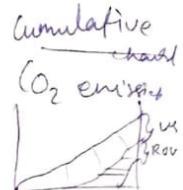
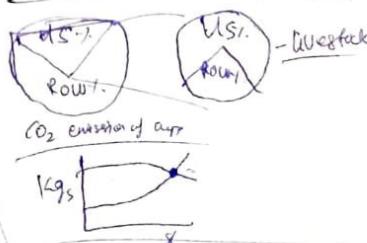
Categorize

Foot cost vs Feed's cost

CO_2 vs \$

in LF O PPO

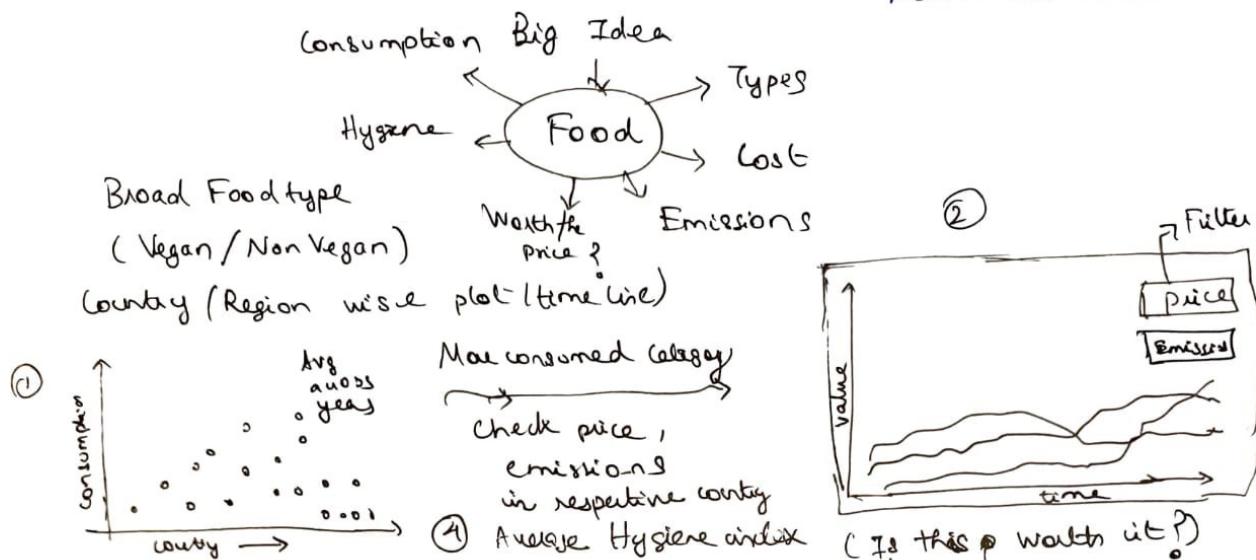
Combine & refine



Adithyaa V brainstorm sheet

Brainstorming

ADITHYAA VAASEN



FILTER:

↳ Country for Viz 2 (chart for Worthiness)

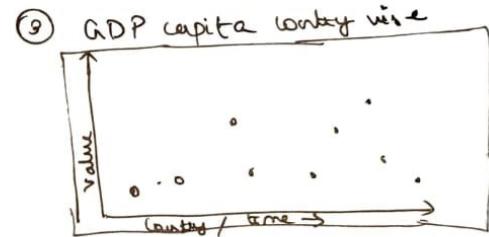
↳ Categories. ①. Built tip people?] ↳
②. Create awareness.

Categories

Consumption (chart ①) → Scatter plot / line chart (if country is swapped with timeline)

Worthiness (chart ②) → Line chart / Bar plot

GDP (chart ③) → Scatter / Line / bar



Combine & Refine

→ Built tip people showing Price Vs emission

→ Provide insights about "that food" (ideally highly
(that food is ideally filtered based on consumption))

→ Built tip + by showing GDP, poverty index etc.

Use chart ② + ③ combined.

FILTER → Country wise.

Sheet 1 Final

Sheet 1

1. Ideas

2. Filter

1. Affordability vs Availability
2. Greenhouse Emissions
3. Constituents of food
 - Calorific Value
 - Greenhouse Value
4. Combination of Diets – Analysis
5. "The 3rd World Burden?"

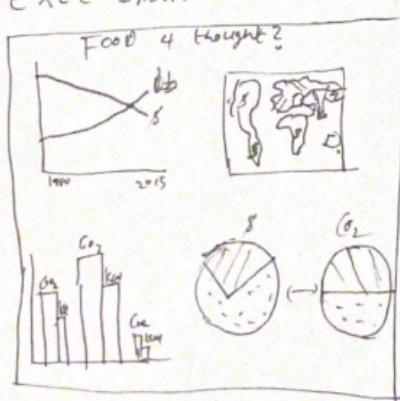
3. Categorize [Corresponds to the above points serially]

1. Time-series of Cost vs quantity
2. Heat Map of Countries
3. Bar Graph for comparison
4. 100% Stacked Bar Graph
5. Two Pie-charts

For data, we are looking at data sources from Kaggle, WHO and UNICEF data.

4. Combine and Refine

EXEC DASHBOARD



1) Define Regions for the dataset

- 2) Classify greenhouse emissions
- 3) Obtain cost and production metrics
- 4) Drill down from Executive dashboard to 3-4 views

5. Question

What are the diets, are they affordable, available and what's where is their impact?

Sheet 2 Final

<p>Layout</p> <p>ANALYSIS OF DIETS</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONSUMPTION</p> <p>COW WHEAT PIG GOAT CHICKEN</p> </div> <div style="text-align: center;"> <p>CONSTITUENT %</p> <p>COW WHEAT PIG GOAT CHICKEN</p> </div> </div> <p>DIET CONSTITUENTS</p> <table border="1"> <thead> <tr> <th>Item</th> <th>CO₂ %</th> <th>CALORIES/kg</th> </tr> </thead> <tbody> <tr> <td>COW</td> <td>20%</td> <td>10%</td> </tr> <tr> <td>WHEAT</td> <td>30%</td> <td>20%</td> </tr> <tr> <td>PIG</td> <td>30%</td> <td>50%</td> </tr> <tr> <td>GOAT</td> <td>30%</td> <td>30%</td> </tr> <tr> <td>CHICKEN</td> <td>10%</td> <td>60%</td> </tr> </tbody> </table> <p>BALANCED DIET?</p> <div style="display: flex; align-items: center;"> <p>WHO</p> <p>\$4 \$6 \$10</p> <p>Protein Fat Carb Vitamins</p> </div> <div style="text-align: center;"> <p>NON VEG Meat Slider VEG</p> </div>	Item	CO ₂ %	CALORIES/kg	COW	20%	10%	WHEAT	30%	20%	PIG	30%	50%	GOAT	30%	30%	CHICKEN	10%	60%	<p>Title: Author: Date: Sheet 2 Task:</p> <p>Operations</p> <ol style="list-style-type: none"> The top two bookmarks for consumption & constituent % affects the visualization on the animals The balanced diet visual has a slider that affects the red highlighted bar based on the % of meat Selecting an item from diet constituents highlights the animal on top and sets the slider to 100% of the selection. 		
Item	CO ₂ %	CALORIES/kg																			
COW	20%	10%																			
WHEAT	30%	20%																			
PIG	30%	50%																			
GOAT	30%	30%																			
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<p>Focus</p> <table border="1"> <thead> <tr> <th>WHO</th> <th>\$4</th> <th>\$6</th> <th>\$10</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>F</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>C</td> <td>1</td> <td>1</td> <td>1</td> </tr> <tr> <td>V</td> <td>1</td> <td>1</td> <td>1</td> </tr> </tbody> </table> <p>MEAT PULSES MEAT PULSES MEAT PULSES</p> <p>The slider changes the focus and values for the 2nd bar graph dynamically.</p>	WHO	\$4	\$6	\$10	P	1	1	1	F	1	1	1	C	1	1	1	V	1	1	1	<p>Discussion</p> <ol style="list-style-type: none"> How to overlay % on animal figures – is it intuitive? Balanced diet – should we add more facets to the diet? Should we have a time-series aspect for the dashboard?
WHO	\$4	\$6	\$10																		
P	1	1	1																		
F	1	1	1																		
C	1	1	1																		
V	1	1	1																		

Sheet 3 Final

<p>Layout</p> <p><u>Graph 1:</u> Historical Emission of CO₂</p> <p><u>Graph 2:</u> Most consumed product (3) and % of import of this product</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Region</th> <th>Product</th> <th>% of Import</th> </tr> </thead> <tbody> <tr> <td>US</td> <td>Cow</td> <td>10%</td> </tr> <tr> <td>CHN</td> <td>Chicken</td> <td>10%</td> </tr> <tr> <td>EUR</td> <td>Pork</td> <td>10%</td> </tr> <tr> <td>IND</td> <td>Rice</td> <td>10%</td> </tr> </tbody> </table> <p><u>Graph 3:</u> Farmland emissions, have filters for country / region</p> <p>This is a farm CO₂ emission by Crop type and Country</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Country</th> <th>Rice (%)</th> <th>Wheat (%)</th> <th>Soy (%)</th> <th>Almond (%)</th> <th>Others (%)</th> </tr> </thead> <tbody> <tr> <td>US</td> <td>50</td> <td>20</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>CHN</td> <td>50</td> <td>20</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>IND</td> <td>50</td> <td>20</td> <td>10</td> <td>10</td> <td>10</td> </tr> <tr> <td>EUR</td> <td>50</td> <td>20</td> <td>10</td> <td>10</td> <td>10</td> </tr> </tbody> </table> <p><u>Graph 4:</u> Emission from food vs overall emission</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Region</th> <th>% food</th> </tr> </thead> <tbody> <tr> <td>US</td> <td>50%</td> </tr> <tr> <td>CHN</td> <td>50%</td> </tr> <tr> <td>IND</td> <td>50%</td> </tr> <tr> <td>EUR</td> <td>50%</td> </tr> </tbody> </table>	Region	Product	% of Import	US	Cow	10%	CHN	Chicken	10%	EUR	Pork	10%	IND	Rice	10%	Country	Rice (%)	Wheat (%)	Soy (%)	Almond (%)	Others (%)	US	50	20	10	10	10	CHN	50	20	10	10	10	IND	50	20	10	10	10	EUR	50	20	10	10	10	Region	% food	US	50%	CHN	50%	IND	50%	EUR	50%	<p>Title: Author: Date: Sheet: 3 Task:</p> <p>Operations</p> <ol style="list-style-type: none"> 1) This is a simple dashboard with little interaction 2) We allow highlights by clicking on a region and this will filter or highlight the value in other charts corresponding to this country or region.
Region	Product	% of Import																																																						
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<p>Focus</p> <p>Selecting one country name from any graph [for example graph 2], will filter country in graph 3 and 4. This country will be highlighted in graph 1 & 4.</p> <p>Example:</p> <p>Graph 1: Line graph showing CO2 emissions over time. A vertical line marks the selected country's data, which is then highlighted in Graph 3 and Graph 4.</p> <p>Graph 3: Bar chart showing CO2 emissions by crop type for the selected country. The bars for the selected country are highlighted.</p> <p>Graph 4: Bar chart showing the percentage of overall emission from food for the selected country. The bar for the selected country is highlighted.</p>	<p>Discussion</p> <ol style="list-style-type: none"> 1) How effective are simple visuals in conveying the message? 2) Should we include filters & bookmark? 3) Do we have sufficient data for farmland emissions by country? 4) What time period do we focus on for graphs 2, 3 and 4? 																																																							

Sheet 4 Final

<p><u>Layout</u></p> <p><u>DASHBOARD</u></p> <p>% Emissions worldwide by sector - 2015</p> <p>Worldwide emission from Agriculture - 2015</p> <p>2015</p>	<p>Title:</p> <p>Author:</p> <p>Date:</p> <p>Sheet: 4</p> <p>Task:</p> <p>Operations</p> <ol style="list-style-type: none"> 1) The graph has a drop down for selecting a country. This affects the 3rd visual and helps compare Agriculture emissions from a country & compare to some famous other sources of emission like Crypto mining, private jets. 2) Potentially include slideout to include other events to compare.
<p><u>Focus</u></p> <p>SUDAN - 2015</p> <p>INDIA - 2015</p>	<p>Discussion</p> <ol style="list-style-type: none"> 1) How to source emission data for particular cases like private jets and crypto mining. 2) Selecting a time period for comparison or compare two points in time.

Sheet 5 Final

Layout

% Emissions worldwide by sector - 2015

FIGURE 1

This is a button

Worldwide emission from Agriculture - 2015

FIGURE 2

This is a button

Average values for all countries - 2015

FIGURE 3

This is a button

Title:
Author:
Date:
Sheet: 5
Task:

Operations

- In Tab 1, selecting countries from the map view will highlight the countries on the time-series chart.
- Clicking on a dropdown to filtering the country which filters the constituents %, farmland emission % and diet constituent % for that country.
- Filtering countries based on GDP [high, medium, low] and comparing them
- Pressing the **BACK** button will take us back to the starting static page.

FOCUS From **FIGURE 1** →

TAB-1

Historical Emission of CO₂

CO₂

Time → (in years) 2016

This is a button

BACK

From Figure-2

TAB-2

Diet Constituents	Cow	Wheat	Pig	Goat	Chicken
Calories/kg	20	30	30	20	20
CO ₂ %	20%	30%	30%	20%	20%

constituent %

TAB-3

From Figure-3

GDP FILTER

COUNTRY-1	COUNTRY-2
Agri	Agri
NBA + NFL	NBA + NFL
Private Jet	Private Jet

Emission in Tonnes

BACK

Detail

- The dashboard's layout is split into 4 different parts. The 1st is a static main layout. From this main menu the user can navigate to 3 different detailed layouts.
- The transition between layout is highly dependent on the visualization tool that we are using.
- Planning to cluster similar countries to make visualization legible using popular clustering algorithms.
- For visualization tools we will be using Python with Tableau or Power-BI.