



Capstone

- Prices of Healthy Food Categories
- Affordability and Cost of a Healthy Diet
- Food Insecurity around the World

Data Analysis Project
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Approach Overview

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Tableau: Visuals, Dashboard & Story

01

Frame

FRAME

Problem Statement: The problem is the rising cost of food, particularly the affordability of a healthy diet.



- As healthy food prices *historically rise*, there is increasing concern about access to nutritious foods, which is important for *lowering the risk of diet-related illnesses and keeping the general public healthy*.
- Objective: To examine trends in healthy food category prices, assess the cost of a healthy diet and the affordability of a healthy diet for different countries, and to hopefully advocate for policy recommendations to combat food insecurity and overall encourage a healthier diet amongst the population.
- Success Metric: For Governments, Countries, and Organizations to implement policies to help this issue and to eventually see a decrease in food insecurity over time.

02

Extract

Extract

Data Collection: Where is the data coming from?

The World Bank: International financial institution that provides loans/grants to the governments of low/middle-income countries for the purpose of pursuing capital projects

- *Food Prices for Nutrition dataset*



Food & Agriculture Organization of the United Nations - Statistical Database (FAOSTAT):

Specialized agency of the United Nations that leads international efforts to defeat hunger

- *Suite of Food Security Indicators dataset*
- *Cost & Affordability of Healthy Diet dataset*



03



Prepare



Prepare

Data Cleaning/Transformation

- Cleaned the collected data in Jupyter Notebooks using Python
- Handled Nulls, renamed columns, dropped rows/columns I didn't need, made new columns, checked for duplicates, altered data types, looked for any errors and outliers and made it overall usable for analysis.
- Merged the two FAO datasets (The Suite of Food Security Indicators & Cost/Affordability of Healthy Diet)
- Created calculated fields, dimensions, measures and parameters in Tableau
- Goal: Make data overall useable for analysis

04 Analyze

What is the data telling us?



\$3.27

Cost of a healthy diet per day in 2017.

37.42%

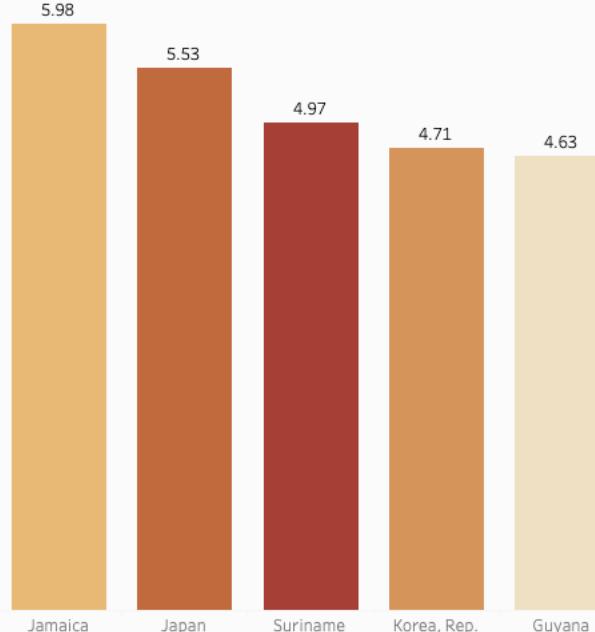
Percent of population could not afford a healthy diet in 2017.

802,100,100

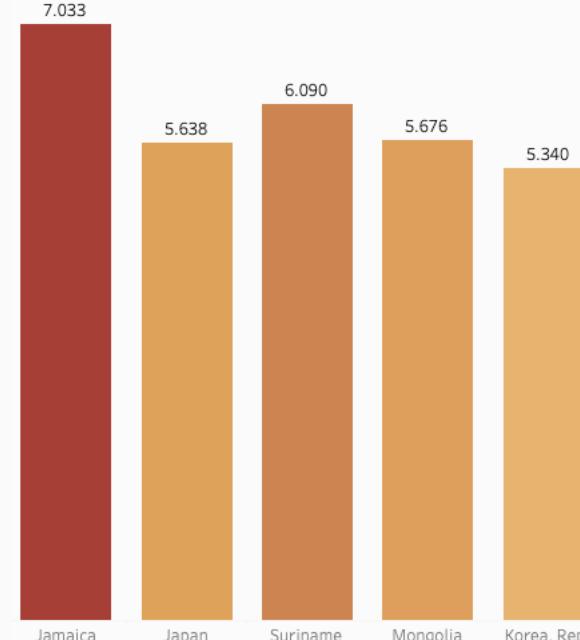
Millions of people who cannot afford healthy diet in 2017.

Top 5 Countries: Highest \$ of a Healthy Diet

Cost of a Healthy Diet in 2017

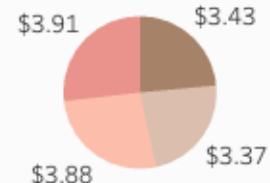
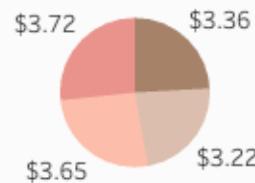
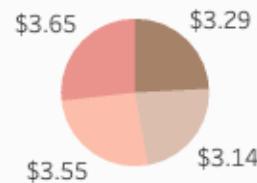
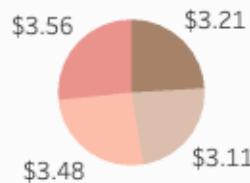


Cost of a Healthy Diet in 2021



Cost of Healthy Diet by Income Level

High income
Low income
Lower middle income
Upper middle income



2018

2019

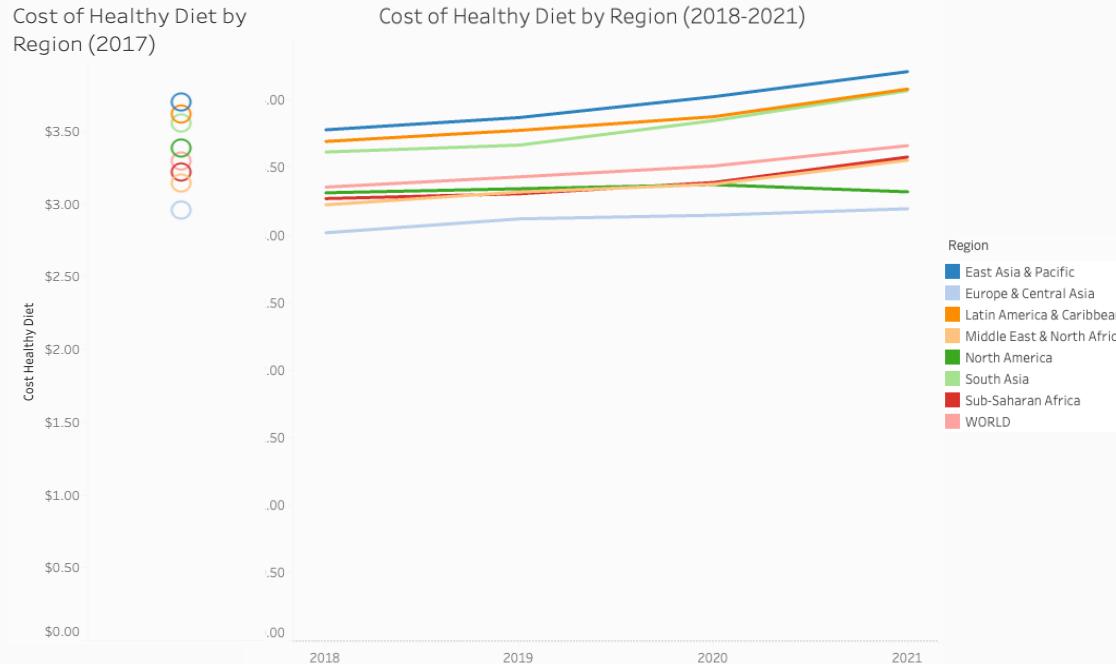
2020

2021

Both Upper Middle/Lower Middle Income Countries = most expensive
Low Income Countries = least expensive

2017-2021

Region: Cost of Healthy Diet (2017-2021)



→ **East Asia & Pacific**

Most expensive every year:
\$3.70 - \$4.21

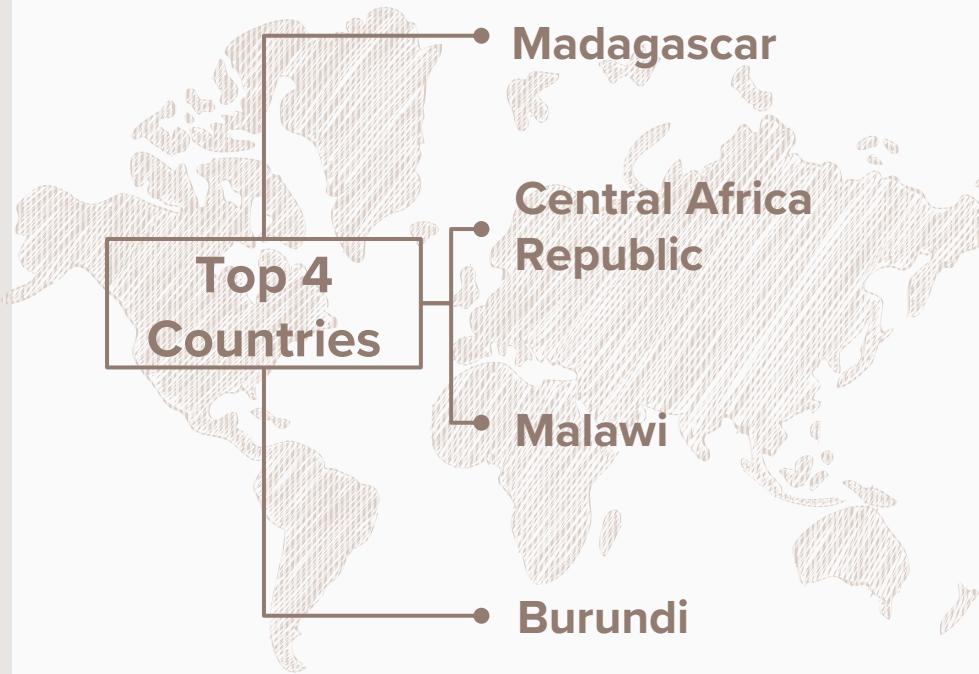
→ **North America**

2017 to 2018 dropped \$0.07
2020 to 2021 dropped \$0.05

→ **All other Regions**

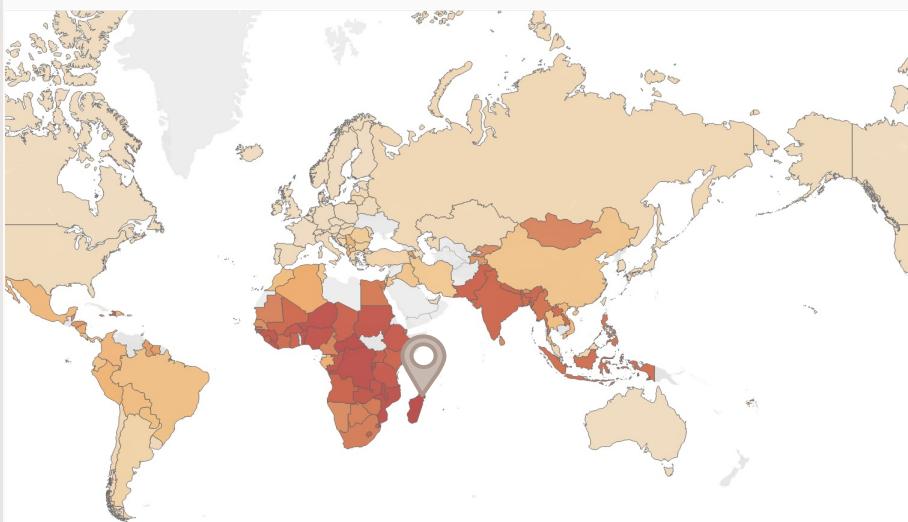
Increased every year

Population %: Cannot Afford a Healthy Diet



2017: 97.1%	2020: +0.3%
2018: +0.2%	2021: +0.2%
2019: -0.2%	
2017: 95.7%	2020: +0.1%
2018: -0.3%	2021: +0.1%
2019: 0%	
2017: 94.5%	2020: 0.3%
2018: +0.4%	2021: 0.2%
2019: -0.2%	
2017: 95.8%	2020: +0.4%
2018: +0.8%	2021: +0.3%
2019: 0%	

Population %: Cannot Afford a Healthy Diet



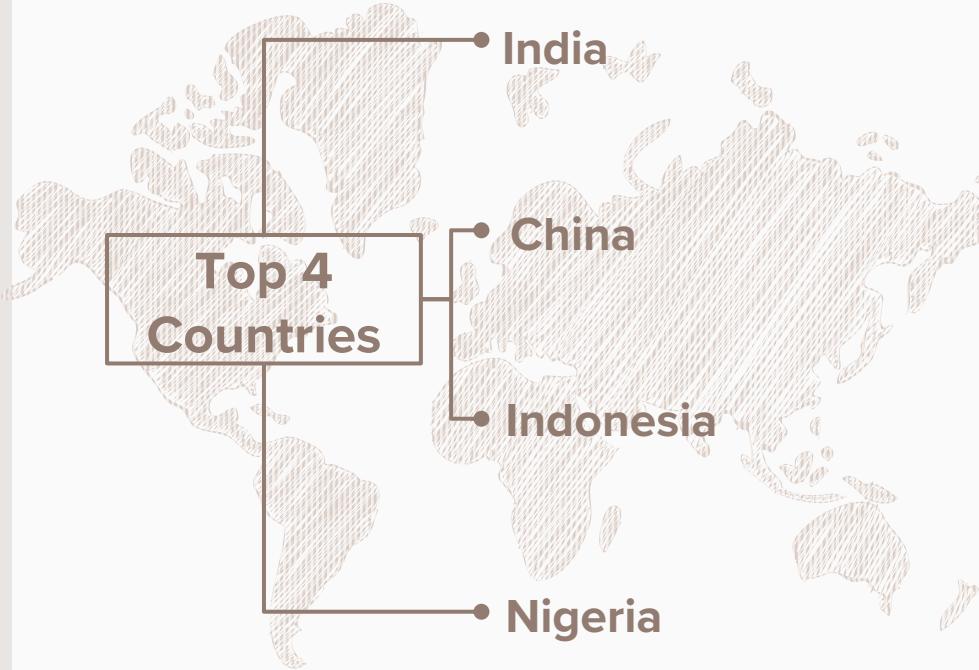
97.1%
Madagascar

0%
Switzerland
Iceland
Azerbaijan

Countries with more than 85.8% of their population who could not afford a healthy diet were all African countries.

- Year of data: **2017**
- Map values are shown as a percent (%) of the population
- Range: 0% to 97.1%

Millions: Cannot Afford a Healthy Diet



— ● 2017: 1066.8 million
2018: -64.9%
2019: -3.2%

— ● 2017: 232.4 million
2018: -41.6%
2019: -9.9%

— ● 2017: 192.5 million
2018: -2.9%
2019: -1.2%

— ● 2017: 174.6 million
2018: +6%
2019: +3.4%

2020: +1.8%
2021: +0.4%

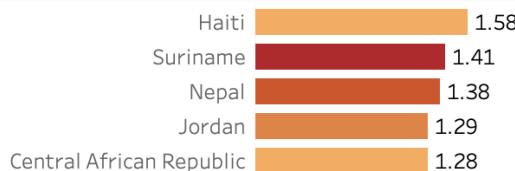
2020: -0.4%
2021: -12.3%

2020: +0.3%
2021: +0.7%

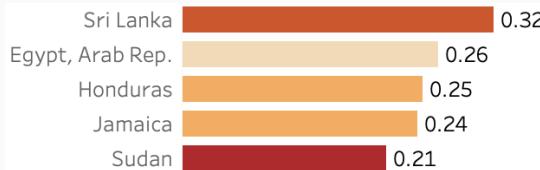
2020: +3.7%
2021: +3.4%

Top 5 Countries: Highest \$ Food Categories

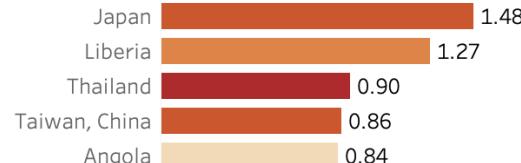
Cost of Animal-Source Foods



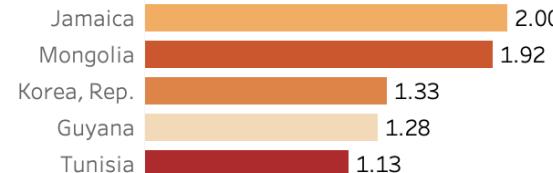
Cost of Oils & Fats



Cost of Starchy Staples



Cost of Fruits



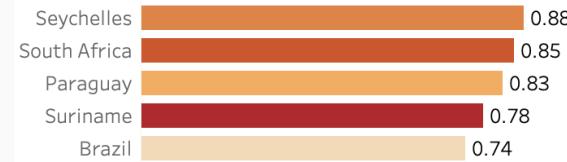
2017

\$/person/day

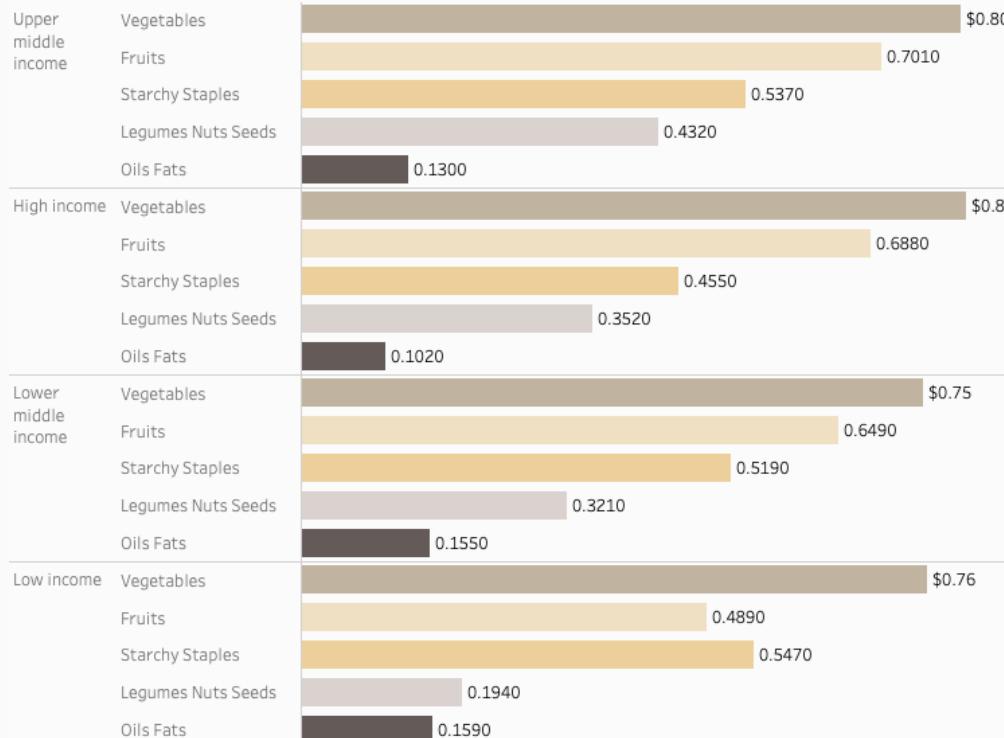
Cost of Vegetables



Cost of Legumes, Nuts, Seeds



Cost of Healthy Food Categories by Income



Starchy Staples:
highest cost for
Low Income
Countries

2017

Lowest Cost:
Oils & Fats all
incomes

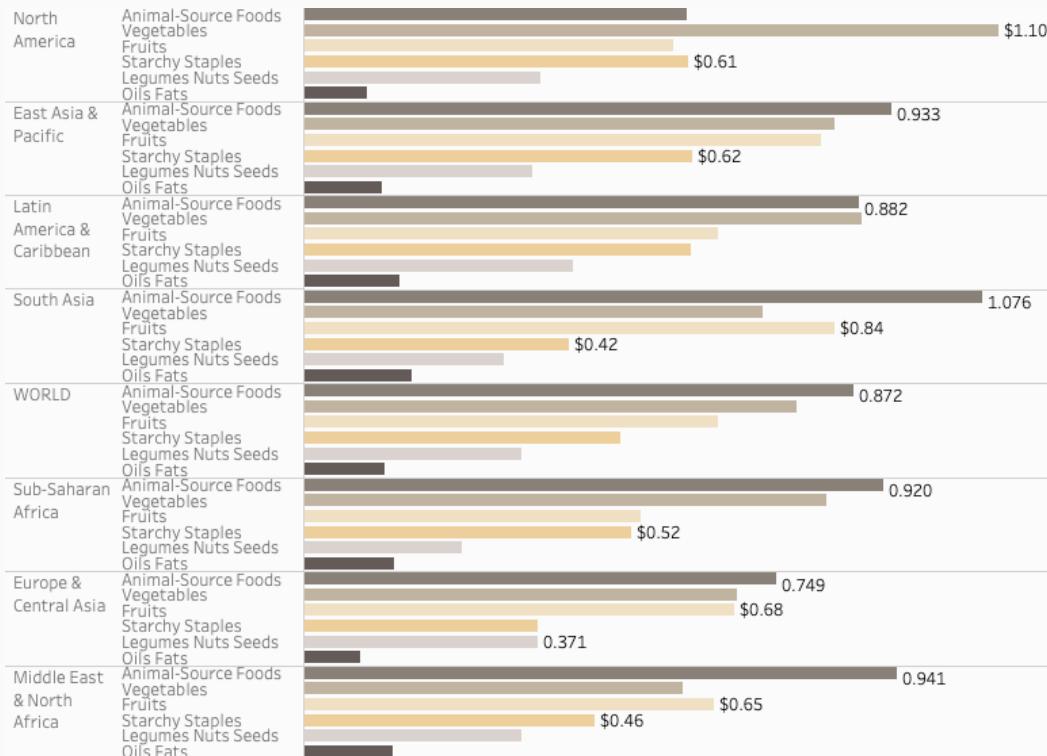
Highest Cost:
Vegetables,
for all income
levels

Oils & Fats:
highest cost
for High
Income

Cost of Healthy Food Categories by Region

2017

\$/person/day



→ Most Expensive Regions:

- Vegetables: USA
- Animal-Source, Oils/Fats, Fruits: South Asia
- Starchy Staples: East Asia & Pacific
- Legumes/Nuts/Seeds: Latin America & Caribbean

→ Least Expensive Regions:

- Animal-Source: USA
- Vegetables: Middle East & North Africa
- Fruits: Sub-Saharan Africa
- Starchy Staples: Europe & Central Asia
- Legumes/Nuts/Seeds: Sub-Saharan Africa
- Oils/Fats: Europe & Central Asia

Severe Food Insecurity by Region

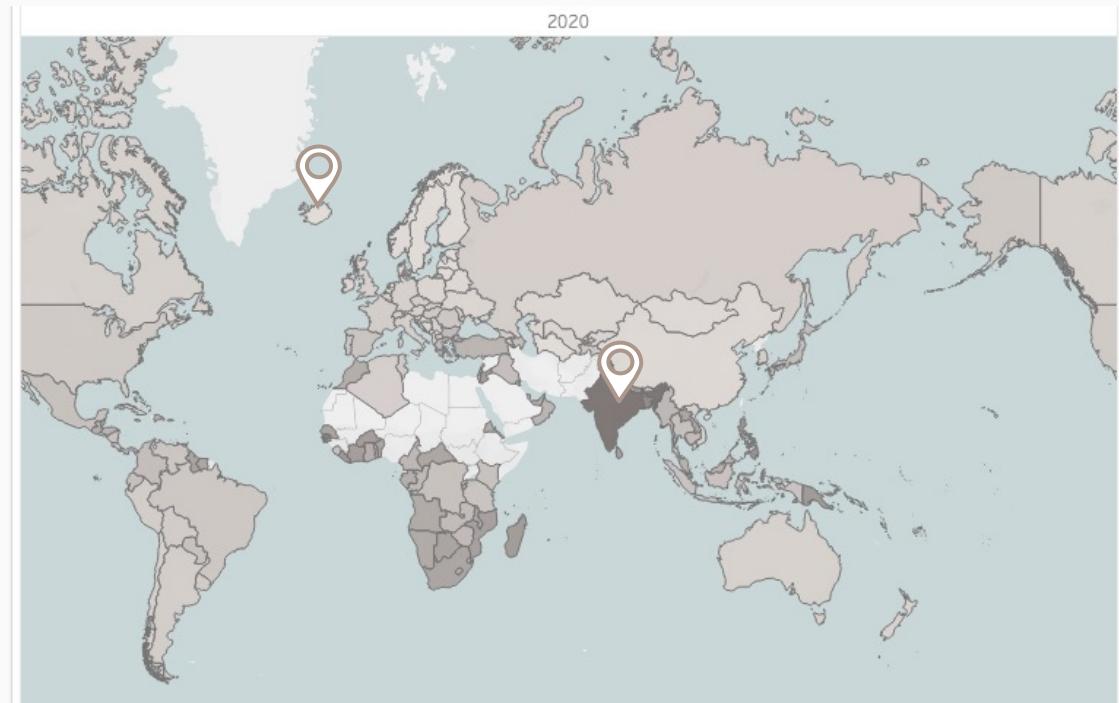
Prevalence of Severe Food Insecurity in Total Population by Region (Annual %)

	Northern America	Western Europe	Northern America ..	Eastern Asia	Eastern Europe	Europe	Eastern Asia and S..	Northern Europe	Southern Europe	South-eastern Asia	Central Asia	Australia and New..	Oceania	Central America	Asia	Southern Asia (ex..	Northern Africa (e..	World	South America	Western Asia	Western Asia and ..	Southern Africa	Northern Africa	Latin America and ..	Central Asia and S..	Southern Asia	Western Africa	Africa	Sub-Saharan Afric..	Sub-Saharan Africa	Eastern Africa	Caribbean	Middle Africa
2014	1	1	1	1	1	2	1	2	2	2	2	3	3	7	7	7	10	8	5	8	9	9	10	8	14	14	10	17	18	18	22		
2015	1	1	1	1	1	2	2	1	2	2	2	1	3	3	7	7	7	8	8	5	9	9	9	9	7	13	13	11	17	19	19	22	
2016	1	1	1	1	1	1	2	2	2	2	2	3	3	6	6	6	7	10	8	8	9	10	9	10	9	12	12	13	19	21	21	26	
2017	1	1	1	2	1	1	2	2	2	2	3	4	4	6	7	6	9	8	9	10	10	9	11	10	12	12	14	20	22	22	26		
2018	1	1	1	2	1	1	2	1	2	2	2	4	4	7	8	7	8	9	8	9	9	9	9	9	15	15	15	19	21	22	24		
2019	1	1	1	1	1	1	1	1	1	2	2	2	4	4	7	8	7	7	9	9	9	9	9	10	16	16	17	20	23	23	25		
2020	1	1	1	2	1	1	2	1	2	2	5	3	3	7	10	11	8	11	13	10	10	11	10	13	18	19	20	22	25	25	36		
2021	1	2	2	1	2	2	1	2	3	3	5	4	5	8	10	13	10	12	15	10	11	11	11	14	20	21	22	24	26	27	38		
2022	1	2	2	1	2	2	1	2	2	3	5	3	3	9	10	13	11	11	13	10	11	13	12	13	19	19	22	24	26	27	39		

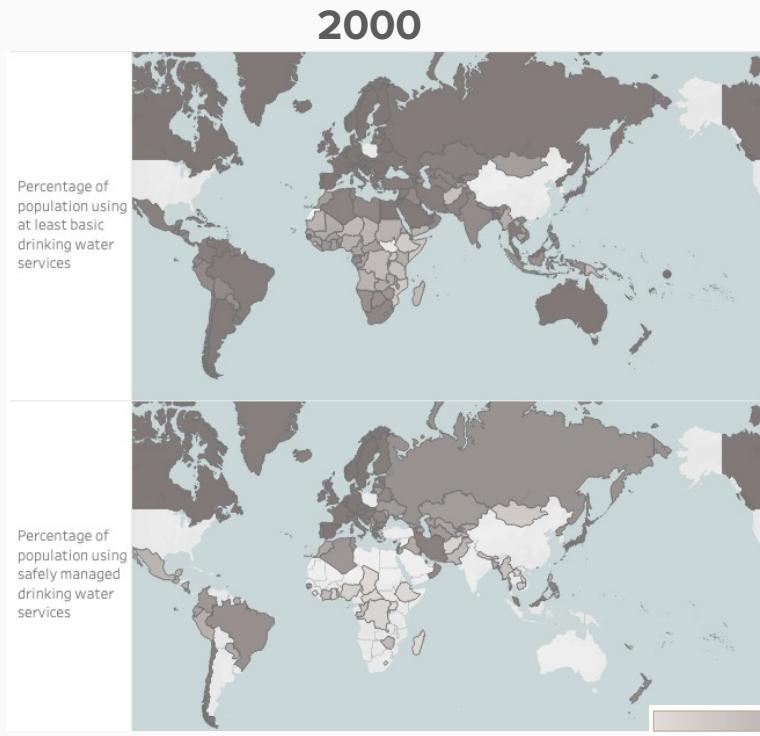
- Years with data: 2014-2022
- Prevalence of Severe Food Insecurity by region, annually ranges: 1% to 39%
- Middle Africa & Caribbean had it the worst from 2020-2022
- USA, Europe, Oceania, and some regions of Asia have the least (all years)

Prevalence of Low Birthweight

- Latest data was recorded in 2020
- Range: 3.6% - 32.5%
- India = highest low birthweights
 - Followed by:
 - Comoros 23%
 - Philippines 21.1%
 - Liberia 19.9%
 - Nepal 19.7%
 - Madagascar 18.7%
- Iceland = lowest low birthweights



Population: Basic vs. Safe Drinking Water





36.6%



The *average* percentage of the population that could not afford a healthy diet in **2021**.



Global Scale Averages per year

Cost of Healthy Diet

2018: \$3.33

2019: \$3.39

2020: \$3.48

2021: \$3.62



Rises every
year

Percent of Population Who Can't Afford a Healthy Diet

2018: 36.51%



2019

2019: 36.10%



2020

2020: 36.92%



2021

2021: 36.62%

Millions of People Who can't Afford a Healthy Diet

2018: 79.12



2019

2019: 78.36



2020 & 2021

2020: 81.74

2021: 82.01

Affordability of a Healthy Diet: Ratio of Cost to Food Poverty Line

2018: 3.05



Rises every
year

2019: 3.11

2020: 3.2

2021: 3.23

Conclusions: Patterns/Insights

- In more than half of the regions, severe food insecurity grows annually, instead of getting better
- India = most severe prevalence of low birth weights

Cost of Healthy Food Categories in 2017:

- Cost (high to low) for ALL countries: Fruits, Vegetables, Animal-Source, Starchy Staples, Legumes/Nuts/Seeds, and Oils/Fat
- Upper Middle Income Countries paid majority of highest costs
- No specific region stood out with having the highest costs for all categories
- Jamaica = #1 most expensive Oils/Fats, Fruits and Vegetables

Recap



African Countries = Countries > 85.8% population who could not afford healthy diet.

Pattern revealed with **Africa having the lowest population who did not have:**

- Safely managed & at least basic drinking water services
- Safely managed & at least basic sanitation services

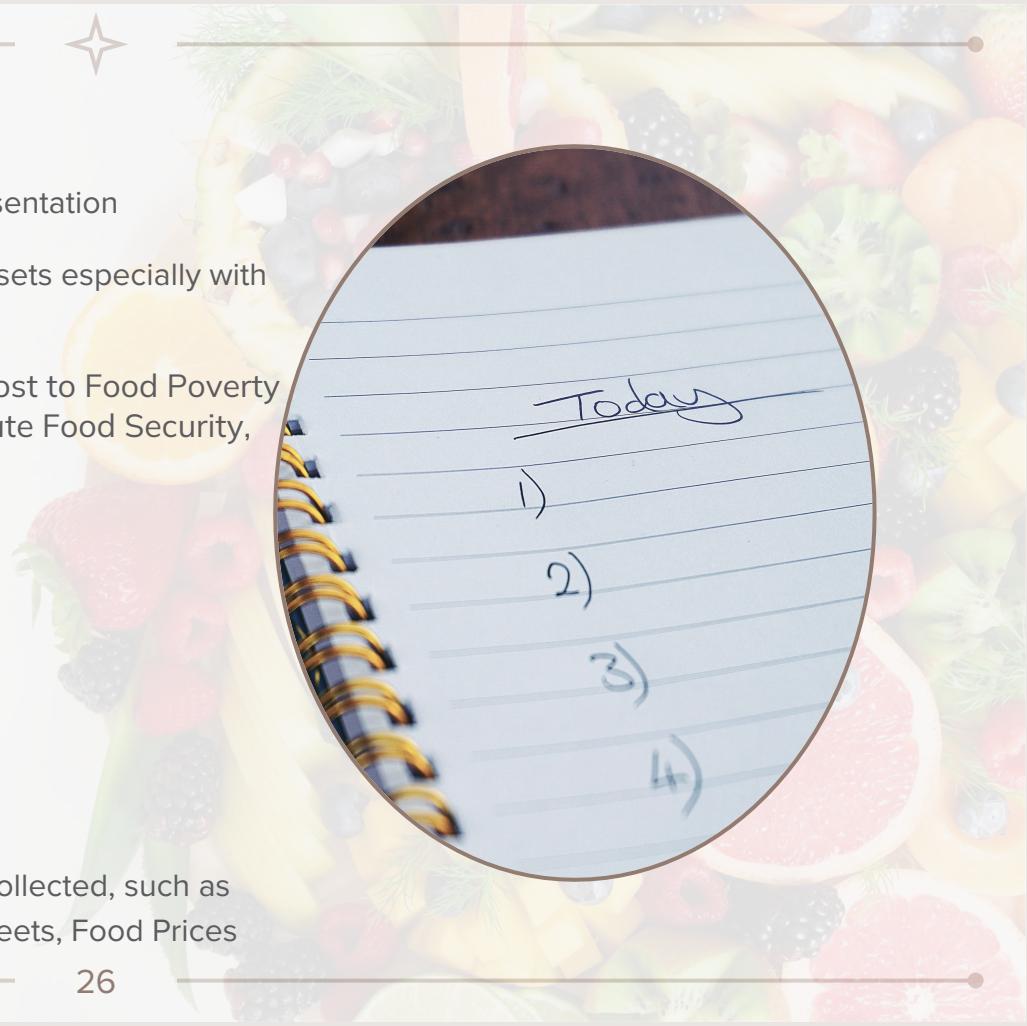


Cost of a Healthy Diet 2017-2021:

- East Asia & Pacific had the highest cost of a healthy diet
- All regions except North America, saw an increase YOY
- Jamaica = most expensive; Japan 2nd most expensive diet
- % of the population who cannot afford a healthy diet did not improve much each year

Next Steps

- Didn't include all of my visuals/analysis in this presentation
- Do more EDA & add visuals from my current datasets especially with the FAO dataset:
 - Affordability of a Healthy Diet Ratio of Cost to Food Poverty Line, Obesity, Undernourishment, Moderate Food Security, etc.
- Spruce up visuals in Tableau
- Create a Story in Tableau
- Predictive Model
- Come up with Recommendations
- Post on Medium/Tableau Public
- Data Clean/EDA on the other relevant datasets I collected, such as FAO's: Consumer Price Indices, Food Balance Sheets, Food Prices



Sources

- Food Prices for Nutrition: <https://databank.worldbank.org/source/food-prices-for-nutrition>
- Suite of Food Security Indicators dataset: <https://www.fao.org/faostat/en/#data/FS>
- Cost & Affordability of Healthy Diet (CoAHD) dataset: <https://www.fao.org/faostat/en/#data/CAHD>
- FAO glossary: <https://www.fao.org/faostat/en/#definitions>
- Pictures from: <https://www.pexels.com/>
- <https://www.worldbank.org/en/programs/icp/brief/foodpricesfornutrition>
- <https://sites.tufts.edu/foodpricesfornutrition/>

Thanks!

Questions?

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