Pixel-

Zero Hunger

(SDG 2)

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Source: https://www.mailman.columbia.edu/sites/default/files/styles/hero_1500x632/public/jpeg/thankgsiving-hunger-1500x632-1.jpg.jpeg?itok=wZwuh4pC

Food for thought….

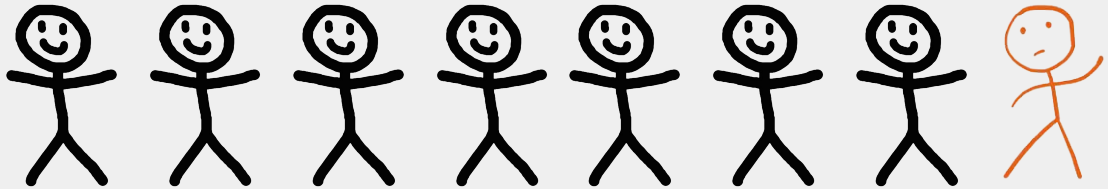
It is hard to learn if you are hungry. Imagine going to school with an empty stomach. Hunger makes it difficult to pay attention in class and remember things. Schools can provide free school dinners so children do not go hungry.

People help children in developing countries by building schools and training teachers. This means more children get the chance to learn. When children get an education, it is easier for them to get a better paid job and escape poverty when they grow up.

Source: https://images-na.ssl-images-amazon.com/images/I/91OuyEZmgJL.jpg

The BIG Picture :

The world produces enough to feed the entire population of 7 billion people.



Yet, 1 out of every 8 people on the planet goes to bed hungry each night.

Source: https://www.wfp.org/stories/what-causes-hunger

So, Why does hunger exist?

What Causes Hunger?

1. **Climate and Weather -** The global change in land temperatures affect the growth of crops and thus affect their production and quality.

2. **Population Growth -** With the current growth rate, it is expected to reach 8.5 billion by 2030, which is yet another factor for the increased hunger.

3. **Unemployment -** Due to lack of jobs and too little pay, hunger rates rise when national or local economy is in a slump.

4. **Poverty** - Poverty is the main cause of the hunger in the world when people couldn't even afford the basic amenities.

But why you should care?

Source: https://blog.worldvision.org/sites/default/files/wp-content/uploads/2011/06/Hunger.jpg

How is it related to SDGs ?

SUSTAINABLE DEVELOPMENT GOAL 2

End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Target 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.

Target 2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets of stunting.

Source: https://sustainabledevelopment.un.org/sdg2

About The Datasets

Food Balance Sheets

Compiled by FAO (Food & Agriculture Organization of United Nations)

Source: http://www.fao.org/faostat/en/#data/FBS

Size: 2.8 GB

No. of Variables: 12

No. of Observations: 22973785

Earth Surface Temperature

Climate Change Earth Surface Temperature Data

Source: https://www.kaggle.com/berkeleyearth/climate-change-earth-surface-temperature-data

Size: 600 MB

No. of Variables: 4

No. of Observations: 577463

World Population Data

Health and population metrics by US Census Bureau

Source: https://www.kaggle.com/census/international-data

Size: 1.83 GB

No. of Variables: 10

Global Hunger Index

Calculated each year by the International Food Policy Research Institute (IFPRI).

Source: http://www.ifpri.org/topic/global-hunger-index

Size: 25 KB

No. of Variables: 21

No. of Observations: 133

World Development Indicators

The primary World Bank collection of development indicators.

Source: https://data.worldbank.org/data-catalog/world-development-indicators

Size: 254 MB

No. of Variables: 59

No. of Observations: 409993

Poverty and Equity Dataset

Poverty and Inequality Indicators from International Sources

Source: https://www.kaggle.com/theworldbank/poverty-and-equity-database

Size: 7 MB

No. of Variables: 7

Food Balance Sheets

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Code

```
In [2]: import pandas as pd
        import csv
        df = pd.read_csv("FoodBalanceSheets_E_All_Data.csv", sep=',', encoding='latin-1')
```

```
In [12]: df
```

Out[12]:

	Area Code	Area	Item Code	Item	Element Code	Element	Year Code	Year	Unit	Value	Fl
0	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1961	1961	1000 persons	8954.00	N
1	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1961	1961	1000 persons	8954.00	N
2	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1962	1962	1000 persons	9142.00	N
3	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1962	1962	1000 persons	9142.00	N
4	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1963	1963	1000 persons	9340.00	N
5	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1963	1963	1000 persons	9340.00	N
6	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1964	1964	1000 persons	9547.00	N
7	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1964	1964	1000 persons	9547.00	N
8	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1965	1965	1000 persons	9765.00	N
9	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1965	1965	1000 persons	9765.00	N
10	2	Afghanistan	2501	Population	511	Total Population - Both sexes	1966	1966	1000 persons	9990.00	N

Global Hunger Index

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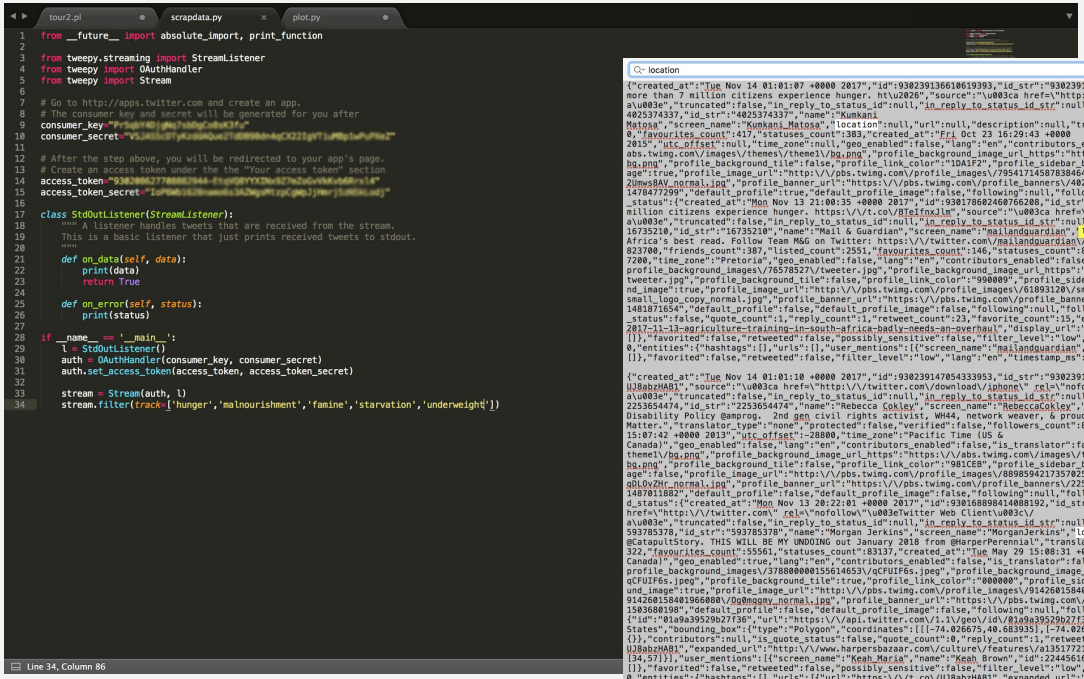
A1 Country

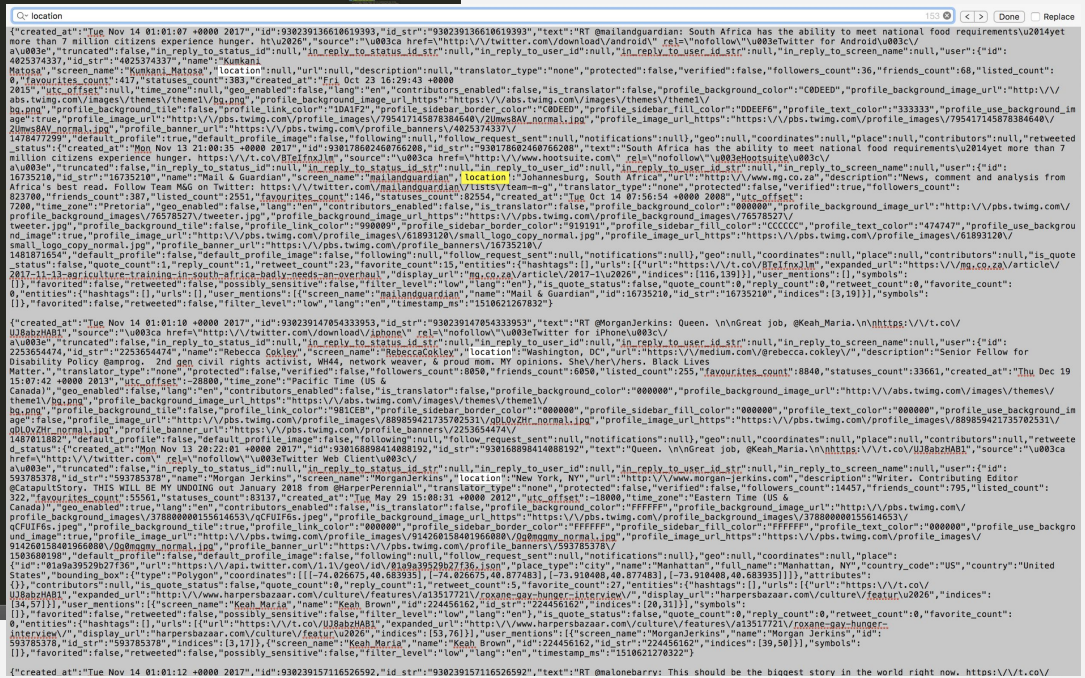
	A	B	C	D	E
1	Country	GHI1992	GHI2000	GHI2008	GHI2017
2	Afghanistan	50.2	52.7	37.9	33.3
3	Albania	20.8	21.6	16.5	11.1
4	Algeria	17.5	15.6	11.3	9.5
5	Angola	65.8	57.5	39.7	32.5
6	Argentina	7	6.6	5.8	5.4
7	Armenia	-	18.4	11.4	7.7
8	Azerbaijan	-	27.5	15.3	9.6
9	Bahrain	-	-	-	-
10	Bangladesh	53.6	37.6	32.2	26.5
11	Belarus	-	<5	<5	<5
12	Benin	44.5	37.5	31.7	24.4
13	Bhutan	-	-	-	-
14	Bolivia	36.7	30.3	23.9	17.2
15	Bosnia & Her	-	9.8	7	<5
16	Botswana	33.8	33	30.7	24.4
17	Brazil	15.9	11.7	5.4	5.4
18	Bulgaria	7.9	8.2	7.6	5.4
19	Burkina Faso	47	47.9	36.4	27.6
20	Burundi	-	-	-	-
21	Cambodia	45.8	43.6	27.1	22.2
22	Cameroon	40	39.6	29.5	22.1
23	Central Africa	52.2	50.9	47	50.9
24	Chad	62.5	51.9	50.9	43.5
25	Chile	5.9	<5	<5	<5
26	China	25.9	15.8	11.2	7.5
27	Colombia	14.6	11.3	9.4	8
28	Comoros	-	-	-	-
29	Congo, Dem.	-	-	-	-
30	Congo, Rep.	39.1	36	31.6	25.6
31	Costa Rica	7.5	6.2	5	5.3
32	CÃ´te d'Ivoire	32.9	32.6	35.1	26.5
33	Croatia	-	6.2	<5	<5
34	Cuba	10.5	5.3	<5	<5
35	Djibouti	60.3	46.7	35.1	31.4
36	Dominican R	23.8	18.4	15.4	11.6

002_AppendixD

Ready

and we don’t stop there! We have also scraped around 2.5 GB twitter data using a python script and will be using the tweet’s locations to have a better understanding of the problem’s severity.





Specific Experiments/ Analysis

1. Twitter Data Analysis
    - Mining Twitter Data using python tweepy library to get the location field of each tweet and the location mentioned via tokenization
    - Analysing the graph between the number of tweets v/s location.

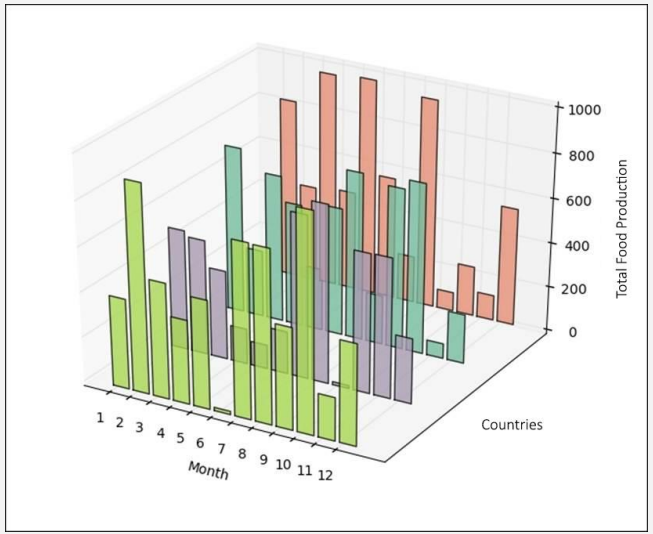
The graph will provide an insight on locations with hunger as a major concern.

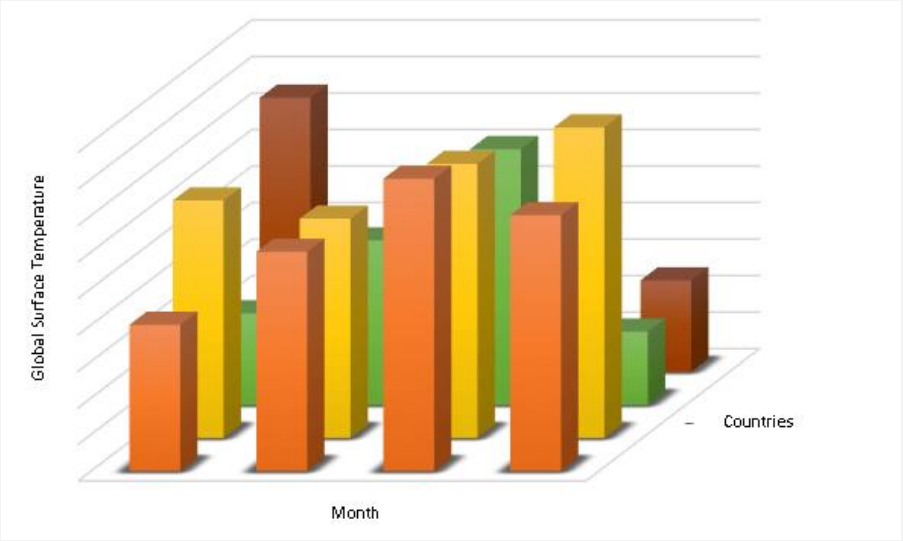
2. Food Balance Sheet Dataset
    - Data cleaning and normalization
    - Different regression models such as linear, lasso, rigid
    - Error Estimation

3. Graphical analysis of datasets from various factors(climate,population,unemployment and poverty) and its cross validation from the Global Hunger Index.

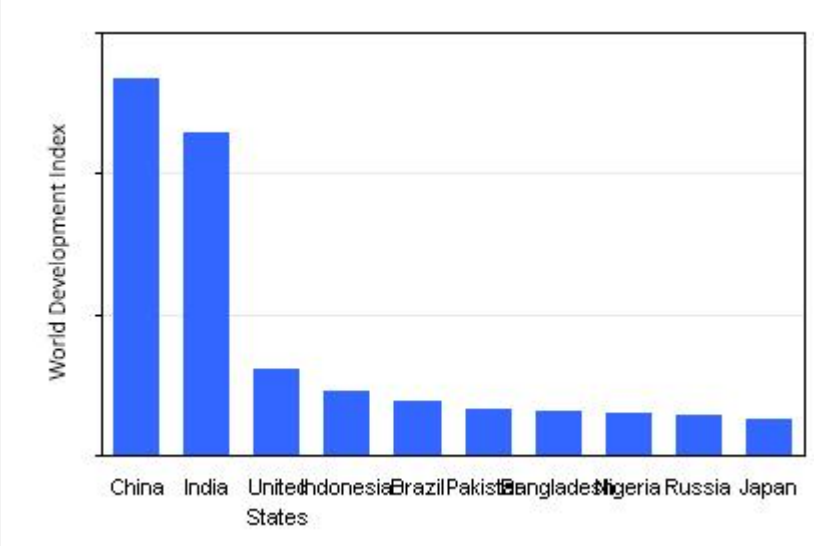
Preliminary a.k.a Mock-Up Results

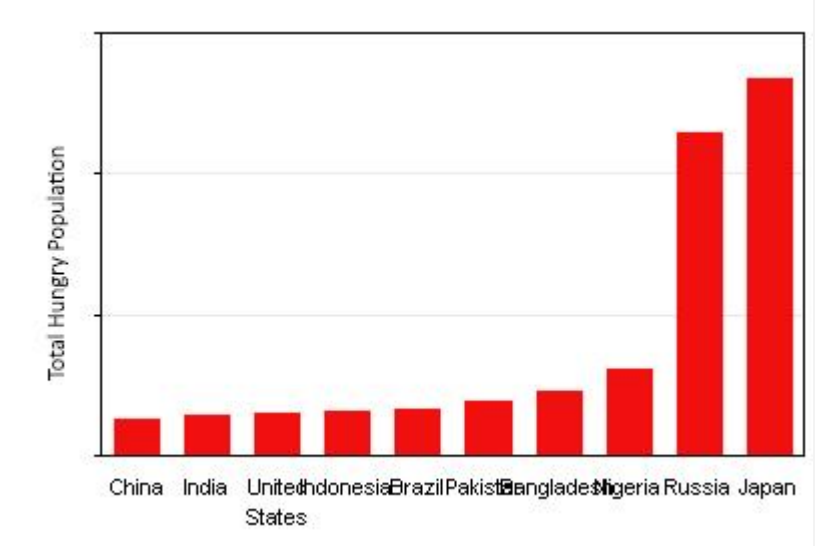
1. Relation between Global Surface Temperatures and the total food production of each country.





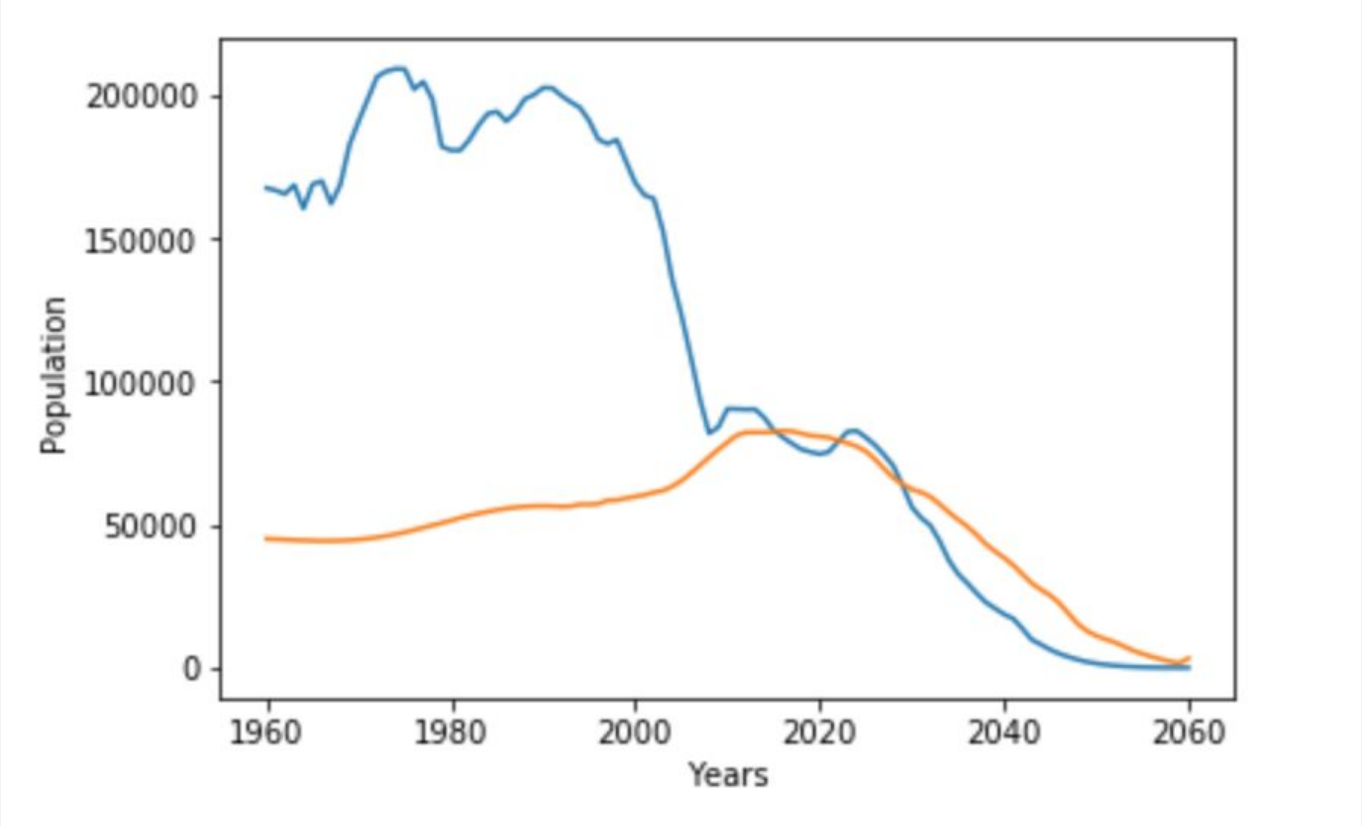
2. World Development Indicator of Countries with the total hungry population that country has.





Thus, the economy of a country is a huge factor in deciding the hungry population of a country. (As per our expectations.)

3. Hunger Population decline over the years



Methods That We'll be Using

Data Pipelines (Frameworks):

- Spark
- Streaming Algorithms

Analytics:

- Clustering and Dimensionality Reduction
- Linear Modeling/Regression
- Social Media Text Analysis

Division of Team-Work

1. Scraping data from twitter & analysing it : Rohit
2. Applying Streaming Algorithms : Abhinav, Rohit
3. Cleaning up of the datasets : Abhinav
4. Finding the correlation between variables and applying Dimensionality Reduction : Shubham
5. Applying Linear Models and perform clustering on the data to gather more information : Rohit, Shubham
6. Applying and analysing different plots to find dependency between different datasets and commenting on their relation: Abhinav, Shubham

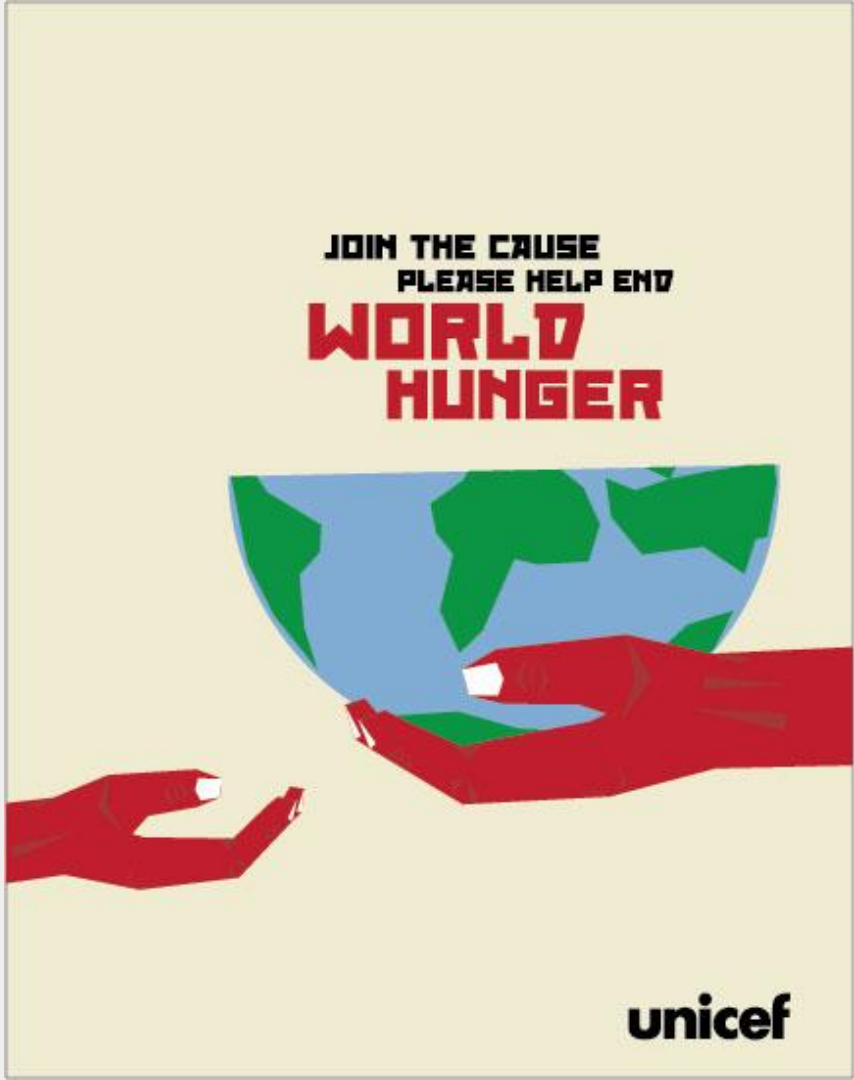
Summary: In Brief

Why ?	• Worldwide, the number of hungry people has decreased over the past two decades but still over 800 billion people continue to struggle every day.
How ?	• Big Data Analysis can increase crop yields by helping farmers make better decisions about when to plant, manage and harvest their crops.
Course Concepts Used	• We will be using Streaming Algorithms and various techniques like Social Media Text Analysis, Linear Modelling etc. to have a better grasp of the concepts practically.

Conclusion:
Our Contribution

1. Aim to decrease the current hunger rate further by significant levels.

2. Studying & Measuring different causes of hunger to provide some useful insights.



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