**BAT 404 - Analytics Techniques and Tools**

Final Project Proposal Topic:   
EDA to Typhoon Mitigation and Response Framework (TMRF)

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**Abstract**

The Philippines' apparent vulnerability to natural disasters emerges from its geographic location within the Pacific Ring of Fire. The country is surrounded by large bodies of water and faces the Pacific Ocean, which produces 60% of the world's typhoons. Approximately twenty tropical cyclones pass through the Philippine area of responsibility each year, ten of which are typhoons and five of which are catastrophic (Brown, 2013). Due to a lack of preparedness and response, families in rural areas are more likely to be hit. According to the Weather Underground (n.d.), hurricanes are becoming a global threat as they solidify and more super tropical storms emerge. As a result, every municipality should have a high level of safety and security. However, government agencies and non-governmental organizations promote emergency preparedness, but they have yet to acquire the public's general attention. Preparedness is indeed the way of transforming a community's awareness of potential natural hazards into actions that strengthen its ability to respond to and recover from disasters. Proposals for preparedness must address the immediate response and all the longer-term recovery and rehabilitation.

The objective of this analysis is to construct an Exploratory Data Analysis to Typhoons from the year 2019 that prompted the most casualty rates in the country and data on the municipal governments that had the least number of affected families individuals per typhoon. Moreover, global datasets about hurricanes from the Centre for Research on the Epidemiology of Disasters' Emergency Events Database (EM-DAT) will be utilized in the same manner as mentioned in the Philippines Data set to know which Location in the United States had the most successful response and mitigation plan for typhoons. This information will be used to construct a Typhoon Mitigation and Response Plan that may help the Philippines deal with hurricanes. Integrating various programs from other countries will increase the likelihood of Filipinos' survival and recovery from typhoons.

**Reliability of the Organizations Where the Data sets Originated**

*Humanitarian Data Exchange Typhoon Data se 2019 t from the Philippines:*

The HDX or The Humanitarian Data Exchange is an open platform for exchanging data between humanitarian organizations and disasters. HDX, launched in July 2014, aims to make humanitarian data more accessible and usable for research (Sustainable Development Goals Helpdesk, n.d.). Users in over 200 nations and territories have accessed their increasing collection of datasets. HDX is administered by OCHA's Centre for Humanitarian Data in The Hague. It is a new data platform that will enable humanitarians to access and exchange credible, up-to-date data. There is widespread agreement that data saves lives. Data enables the humanitarian community to develop short- and long-term strategies for providing vulnerable people with the assistance they need to create meaningful actions and decisions for the present society problems.

Collecting and maintaining data involves a variety of obstacles, particularly during the outset of a humanitarian crisis. Responders end up gathering a large amount of data on the ground in a variety of different formats during an emergency. This form of rapid, responsive data collection is beneficial for meeting the immediate needs of the impacted people, but less so when data sets are combined to examine patterns overtime or provide detailed information of what is happening during a crisis. OCHA pioneered the creation of Humanitarian Data Exchange (HDX) following significant study. HDX is a new data-sharing platform that adheres to the highest data gathering standards, providing meaningful and reliable data access. HDX is a one-of-a-kind technology that will alter the role of data in humanitarian operations in the future, enabling organizations to give more focused help and adapt to changing requirements. As a result of these evidences, the organization's data sets are both reliable and suitable for data analysis purposes.

2019-2022 American EM-DAT from CRED

The second set of data comes from the CRED Center for Research on the Epidemiology of Disasters. In 1971, Professor Michel F. Lechat of the Université catholique de Louvain, an epidemiologist, launched a research program to examine health difficulties in crisis scenarios. Two years later, he founded CRED as a non-profit organization with international recognition. In 1980, the Centre was designated as a World Health Organization (WHO) Collaborating Centre (European Commission, n.d.). This organization fosters disaster research, education, and information transmission. Its objectives include increasing the efficacy of developing nations' disaster management capacities and supporting policy-oriented research using the Emergency Events Database (EM-DAT).

The EM-primary DAT's mission is to support humanitarian action on national and international levels. The database provides critical core data on the incidence and consequences of more than 22,000 catastrophic disasters worldwide between 1900 and the present (Centre for Research on the Epidemiology of Disasters, n.d.). CRED has been involved in the domains of international disaster and conflict health research for more than 40 years, with programs spanning relief, rehabilitation, and development . The Centre fosters humanitarian emergency research, training, and technical skills, notably in public health and epidemiology. This indicates that the data sets they've supplied are the result of their years of research and skill. As a result, the second data set that will be used in this study is suitable for data analysis.

**Objectives:**

The Philippines is a tropical country that lies within the equator, which means that it is prone to disasters like typhoons. A data set from the Humanitarian Data Exchange (2019) encoded all typhoons which landed and gravely damaged the country on 2019. Another dataset will be of use on this data analysis is from the CRED's Emergency Events Database (EM-DAT). This project aims to evaluate this data sets and obtain knowledge that will help the researchers obtain the following outputs:

*Humanitarian Data Exchange Data set about Philippines*

1. Determine the typhoon(s) from 2019 that brought the greatest number of casualties to the municipality in the Philippines.

2.Acquire the data about the municipalities who had the greatest and least number of affected families, individuals per typhoon.

3. Get the information that shows the municipality(s) who were most affected by typhoons from the year 2019.

*The Centre for Research on the Epidemiology of Disasters' Data set about the America*

1. Determine the typhoon(s) from 2019-2022 that brought the greatest number of casualties to the different locations in America.

2. Acquire the data about the location(s) who had the greatest and least number of affected families, individuals per typhoon.

3. Get the information that shows the location(s) who were most affected by typhoons from the year 2019-2022.

The main objective of this analysis would be to obtain the data which will determine the municipality(s) from the Philippines and location(s) from America who had the most successful response and mitigation plan to typhoons. Their planning systems would be analyze by the researchers to find what things the current plans of the Philippine Government are lacking in terms of typhoon disasters response plans compare to that of America.

**The initial plan to obtain the main objective:**

The data set which the researchers obtained does not include the level of strength that a typhoon had. So, they have devised a plan that after listing the municipalities who have the highest number of casualties per typhoon, they will look into news articles online that will demonstrate the levels or strength of typhoons when they land on those specific municipalities and locations. The municipalities who suddenly lowered their casualties on the following typhoons and at the same time had a high level of typhoon strength, will then be considered as the one who had the most successful mitigation and response plan.

And lastly, the researchers will then research that municipality(s) disaster plans and incorporate them with one another to create a more effective plan.

Example:

| Municipality or Location | Typhoon name 1 and casualties | Typhoon name 2 and casualties | Typhoon name 3 and casualties | … | … | … |
| --- | --- | --- | --- | --- | --- | --- |
| Municip 1 | **Level 4**  **Casualties – 45 families affected and so on…** | **…Level 4** | **…** | **…** | **…** | **…** |
| Municip 2 | **…** | **…** | **…** | **…** | **…** | **…** |
| … | **…** | **…** | **…** | **…** | **…** | **…** |

**Reference Data Sets:**

Centre for Research on the Epidemiology of Disasters. (2022). 2019-2022 EM-DAT of America. Retrieved   
 March 2022, from Centre for Research on the Epidemiology of Disasters:   
 https://public.emdat.be/data

Human Data Exchange Organization. (2019). Philippines 2019 Events Data. Retrieved March 2022, from   
 Human Data Exchange Organization: https://data.humdata.

**Evaluation of the X variables inside the Data sets:***Humanitarian Data Exchange Typhoon Data se 2019 t from the Philippines*

| X Variable | Definition |
| --- | --- |
| Region |  |
| Region code |  |
| Province |  |
| Province code |  |
| City\_Mun |  |
| City\_Mun code |  |
| Year |  |
| Incident |  |
| Date Occurred |  |
| 2015 Population |  |
| Affected\_FAM |  |
| Affected\_PERs |  |
| Inside\_EC\_Fam\_Cum |  |
| Inside\_EC\_Fam\_Now |  |
| Inside\_EC\_Per\_Cum |  |
| Inside\_EC\_Per\_Now |  |
| Outside\_EC\_Fam\_Cum |  |
| Outside\_EC\_Fam\_Now |  |
| Outside\_EC\_Pers\_Cum |  |
| Outside\_EC\_Per\_Now |  |
| Totally damaged houses |  |
| Partially damaged houses |  |
| IDP\_Cum |  |

*Events Database (EM-DAT) in America 2019-2022*

| X Variable | Definition |
| --- | --- |
| *Dis No* |  |
| Year |  |
| Seq |  |
| Glide |  |
| Disaster Group |  |
| Disaster Subgroup |  |
| Disaster Type |  |
| Disaster Subtype |  |
| Disaster Subsubtype |  |
| Event Name |  |
| Country |  |
| ISO |  |
| Region |  |
| *Continent* |  |
| *Location* |  |
| *Origin* |  |
| *Associated Dis* |  |
| *Associated Dis2* |  |
| *OFDA Response* |  |
| *Appeal* |  |
| *Declaration* |  |
| *Aid Contribution* |  |
| *Dis Mag Value* |  |
| *Dis Mag Scale* |  |
| *Latitude* |  |
| *Longitude* |  |
| *Local Time* |  |
| *River Basin* |  |
| *Start Year* |  |
| *Start Month* |  |
| *Start Day* |  |
| *End Year* |  |
| *End Day* |  |
| *Total Deaths* |  |
| *No Injured* |  |
| *No Affected* |  |
| *No Homeless* |  |
| *Total Affected* |  |
| *Reconstruction Costs ('000 US$)* |  |
| *Reconstruction Costs, Adjusted ('000 US$)* |  |
| *Insured Damages ('000 US$)* |  |
| *Insured Damages, Adjusted ('000 US$)* |  |
| *Total Damages ('000 US$)* |  |
| *Total Damages, Adjusted ('000 US$)* |  |
| *CPI* |  |
| *Adm Level* |  |
| *Admin1 Code* |  |
| *Admin2 Code* |  |
| *Geo Locations* |  |

# **References**

Brown, S. (2013, November 11). *The Philippines Is the Most Storm-Exposed Country on Earth*. Retrieved March 2022, from world.time.com: https://world.time.com/2013/11/11/the-philippines-is-the-most-storm-exposed-country-on-earth/?fbclid=IwAR1xfQgQHZkgjZck\_X9EBg\_Jvj76wm7EL-I8OHJebNGkpLxIsEgHLxqPcrU

Centre for Research on the Epidemiology of Disasters. (2022). *2019-2022 EM-DAT of America*. Retrieved March 2022, from Centre for Research on the Epidemiology of Disasters: https://public.emdat.be/data

Centre for Research on the Epidemiology of Disasters. (n.d.). *Welcome to the EM-DAT website*. Retrieved March 2022, from Centre for Research on the Epidemiology of Disasters: https://www.emdat.be/

European Commission. (n.d.). *CRED - Centre for Research on the Epidemiology of Disasters*. Retrieved March 2022, from knowledge4policy.ec.europa.eu: https://knowledge4policy.ec.europa.eu/organisation/cred-centre-research-epidemiology-disasters\_en

Human Data Exchange Organization. (2019). *Philippines 2019 Events Data*. Retrieved March 2022, from Human Data Exchange Organization: https://data.humdata.

Sustainable Development Goals Helpdesk. (n.d.). *The Humanitarian Data Exchange (HDX)*. Retrieved March 2022, from Sustainable Development Goals Helpdesk: https://sdghelpdesk.unescap.org/node/1086#:~:text=The%20Humanitarian%20Data%20Exchange%20(HDX)%20is%20an%20open%20platform%20for,over%20200%20countries%20and%20territories.

Weather Underground. (n.d.). *Prepare for a Hurricane or Typhoon*. Retrieved March 2022, from wunderground.com: https://www.wunderground.com/prepare/hurricane-typhoon?fbclid=IwAR33lsq6x66YI-9NFX94Ofy8jgC2TwH9gT\_\_W9AItLA8P2pWyBJmnoYTM1w