Problem statement:

Alarmed by a potential rise in food insecurity during the COVID-19 pandemic, many countries and organizations are mounting special efforts to keep agriculture safely running as an essential business, markets well supplied in affordable and nutritious food, and consumers still able to access and purchase food despite movement restrictions and income losses.

Proposed solution:

- As the problem statement suggests, we can build a machine learning model, first for categorizing the necessary food items on the basis of their necessity and demand, so that the supply can be channelized in the required direction.

- Secondly, due to the effects of post lockdown/ extended lockdown, there is a variation in the prices of certain items. We can predict these variations within some tolerance margin through our machine learning model so that the alarming situations of sudden price hike can be tackled.

- The behavior of the model would be such that it can categorize the food items into their respective subcategories, which would become easier for users to analyze the behavior of other items of that category on the basis of any characteristic variations shown by one item.

Novelty/Uniqueness:

- By predicting the demand and supply of the necessary items during this nation-wide lockdown, we can get an overview of the supply chain management for a given area.
- We can detect the black market of food items done by warehouse owners or bulk suppliers.
- We can track the amount stored and dispatched from the bulk retailers.
- As the number of distributors registered in our platform increase over time, we can take their data on a real-time basis and by feeding this data to our model we can accurately predict the demand and supply gaps. This dynamic nature of our solution helps in improving the accuracy of predicting the supply-demand gap.

Business/Social impact:

- Our solution can accurately predict the demand and supply scenario as the data fed to the system is collected locally from the distributors.
- As it will be based on the ECR(Efficient Consumer Response) strategy, so we can increase the level of services to the consumers through close cooperation among retailers and distributors.
- Through our project, some possible measures can also be suggested for further implementation to ensure food security for all.
- It will provide transparency to the system by analyzing the data regarding the supply chain and presenting it in a manner that is both accessible and understandable for all.

Technology Stack:

- **Machine Learning Using Python:** To create a model for supply-demand gap prediction.
- **Frontend: HTML, CSS, JS:** Development of web app UI
- **Backend: Django Framework:** Development of web app functionalities.
- **IBM Cloud**
- **IBM Watson Studio**

Scope of work:

To begin the work, we have thought of focusing on a local scale for studying the demand and supply of food items for a selected locality. Then we would add the names of other localities in the dropbox option for further data collection and visualization. Now for demonstration purposes, we would present a model for prediction and study analysis. Our solution provides a platform for the aggregation of distributors and retailers. The actual optimized model with better security facilities can be expected in 3 months. The end product can be expected as a complete supply chain management system that consists of our own interface that has the bulk dealers registered through it so that we can study the actual demand-supply variations.

Process Flow :