**Description of the Food Supply Chain Sustainability Dataset**

The Food Supply Chain Sustainability Dataset simulates a scenario where sustainability practices are integrated into the entire food supply chain. This dataset includes information on transportation methods, storage facility types, distribution network types, food waste metrics, crop types, soil texture, soil health indices, and supply chain sustainability indices. The objective is to assess the sustainability of the food supply chain, identify key factors influencing sustainability, and develop strategies for improving overall sustainability metrics.

## **Features**

1. Transportation\_Method: The method of transportation used in the food supply chain (e.g., Truck, Rail, Ship).
2. Storage\_Facility\_Type: The type of storage facility employed in the supply chain (e.g., Cold Storage, Dry Storage).
3. Distribution\_Network\_Type: The type of distribution network used for food delivery (e.g., Local, Regional, Global).
4. Food\_Waste\_Metrics: Metrics quantifying the amount of food wasted throughout the supply chain.
5. Crop\_Type: The type of crops involved in the food supply chain (e.g., 'Rice', 'Wheat', 'Maize',' Millet', 'Beans')
6. Soil\_Type: The classification of soil related to the agricultural production of the supplied food (e.g., 'Sand', 'Loamy sand', 'Sandy loam', 'Loam', 'Silt loam', 'Silt', 'Sandy clay loam', 'Clay loam', 'Silty clay loam', 'Sandy clay', 'Silty clay', 'Clayey').
7. Soil\_Health\_Index: An index representing the health and fertility of the soil associated with crop production.
8. Supply\_Chain\_Sustainability\_Index (target): An index indicating the overall sustainability of the food supply chain.

## **Possible research questions**

The following research questions aim to explore the complex interactions within the food supply chain and assess how different factors contribute to or detract from sustainability. Machine learning models can provide valuable insights into optimizing the supply chain for enhanced sustainability practices.

1. **Transportation methods and supply chain sustainability**

* How do different transportation methods impact the sustainability of the food supply chain, and can a model recommend optimal transportation strategies?

1. **Effect of storage facility type on food waste**

* What is the effect of storage facility types on food waste metrics, and can machine learning models predict the impact of storage choices on sustainability?

1. **Optimal distribution network for sustainability**

* Can a machine learning model identify the optimal distribution network type for maximizing overall sustainability in food supply chains?

1. **Food waste reduction strategies**

* How effective are different strategies in reducing food waste in the supply chain, and can machine learning models recommend tailored approaches for specific scenarios?

1. **Crop type and soil health impact**

* How does the type of crop and associated soil health impact the overall sustainability of the food supply chain, and can a model provide insights into crop selection?

1. **Sustainability indices across soil types**

* Is there a correlation between soil types, soil health indices, and overall supply chain sustainability, and how can this information guide sustainable agriculture practices?

1. **Interplay between transportation and soil health**

* What is the interplay between transportation methods, soil health, and overall sustainability, and can this relationship be leveraged for improved supply chain practices?

1. **Predicting supply chain sustainability indices**

* Can machine learning models accurately predict supply chain sustainability indices based on a combination of transportation, storage, and distribution factors?

1. **Environmental impact of global distribution**

* How does the global distribution of food impact the environmental sustainability of the supply chain, and can models assess the trade-offs between local and global distribution?

1. **Optimizing for multiple objectives**

* Can machine learning models optimize the food supply chain for multiple objectives, considering factors such as food waste reduction, soil health, and overall sustainability?