**Description of the Agroforestry Impact Dataset**

The Agroforestry Impact Dataset simulates a scenario where agroforestry practices are implemented, combining agricultural cultivation with the cultivation of trees. This dataset includes information on agroforestry impact measures, tree species, crop types, soil types, soil health indices, and economic indicators. The objective is to assess the impact of agroforestry on agricultural and environmental outcomes, explore the interaction between trees and crops, and develop strategies for sustainable agroforestry practices.

## **Features**

1. Agroforestry\_Impact\_Measures: Measures representing the impact of agroforestry practices on agricultural and environmental outcomes.
2. Tree\_Species: The species of trees cultivated within the agroforestry system.
3. Crop\_Type: The type of crops cultivated alongside trees in the agroforestry system.
4. Soil\_Type: The classification of soil associated with the agroforestry system (e.g., Sandy, Loamy, Clayey).
5. Soil\_Health\_Index: An index representing the health and fertility of the soil in the agroforestry system.
6. Economic\_Indicators: Indicators representing the economic conditions associated with the agroforestry system.

## **Possible research questions to explore with dataset**

These research questions serve as a guide to explore the multifaceted impacts of agroforestry practices on agriculture, soil health, economics, and the environment. Machine learning models can provide valuable insights into optimizing agroforestry systems for sustainable and resilient outcomes.

1. Impact of tree species on agroforestry: How do different tree species impact the overall agroforestry system, and can machine learning models predict optimal combinations for specific agricultural and environmental outcomes?
2. Crop diversity in agroforestry: What is the effect of agroforestry on crop diversity, and can models recommend tree-crop combinations that enhance overall system resilience?
3. Soil health in agroforestry systems: How does agroforestry impact soil health, and can models identify practices that promote soil fertility and sustainability?
4. Economic resilience in agroforestry: How does agroforestry contribute to economic resilience, and can machine learning models predict economic indicators based on specific agroforestry practices?
5. Optimal soil-tree-crop interactions: Can machine learning models optimize soil-tree-crop interactions within the agroforestry system to achieve multiple objectives, including enhanced soil health and economic performance?
6. Environmental impact of agroforestry: How does agroforestry contribute to environmental sustainability, and can models assess the environmental impact of different agroforestry configurations?
7. Tree-crop interaction patterns: Are there discernible patterns in the interactions between trees and crops within the agroforestry system, and how can these patterns inform management practices?
8. Agroforestry impact on water management: How does agroforestry impact water management in terms of conservation and utilization, and can models recommend practices for optimizing water resources?
9. Influence of agroforestry on biodiversity: What is the influence of agroforestry on biodiversity, and can machine learning models predict biodiversity outcomes based on specific agroforestry interventions?
10. Economic trade-offs in agroforestry: Can models analyze economic trade-offs associated with different agroforestry practices and identify strategies that balance economic benefits with environmental sustainability?