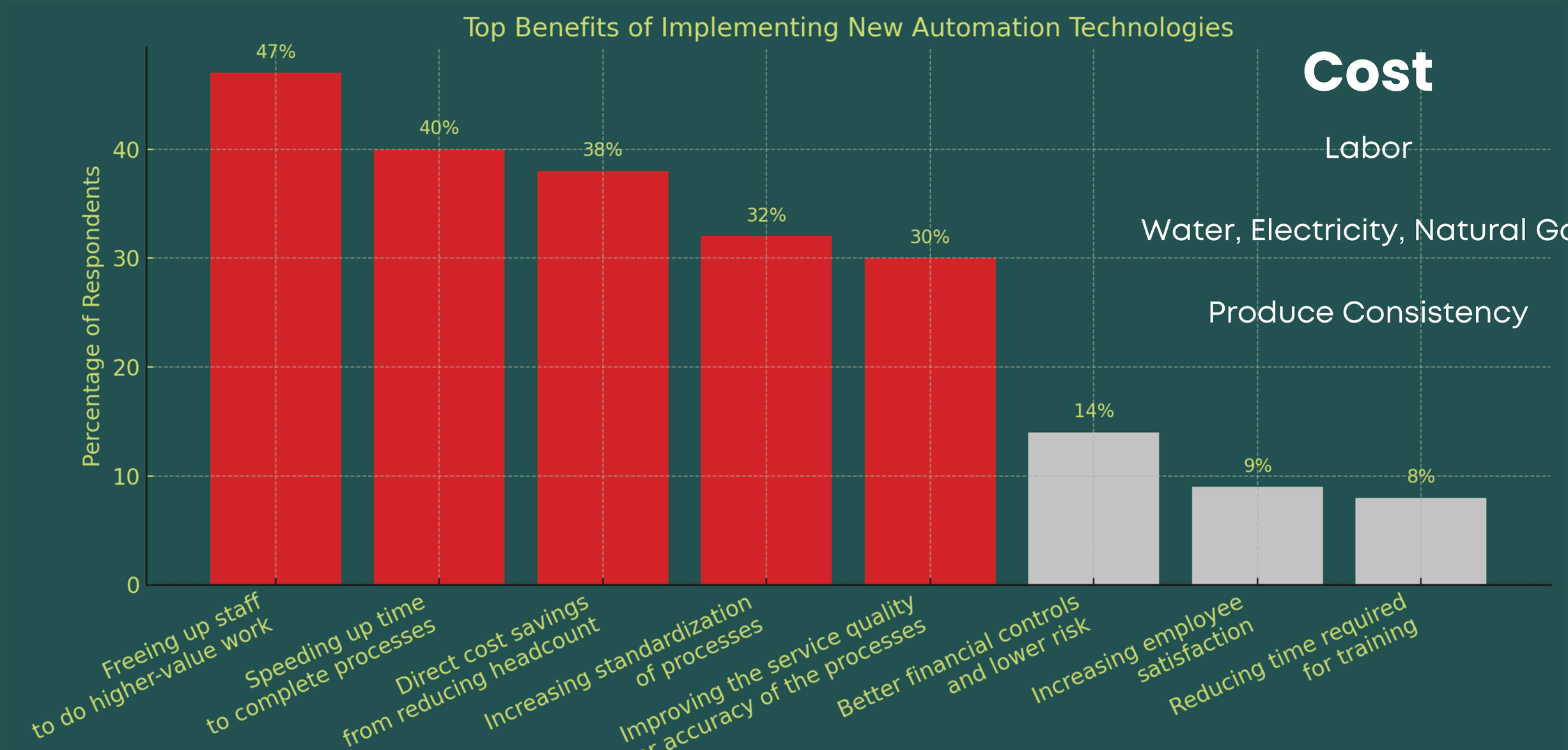
Why AI & Automation?



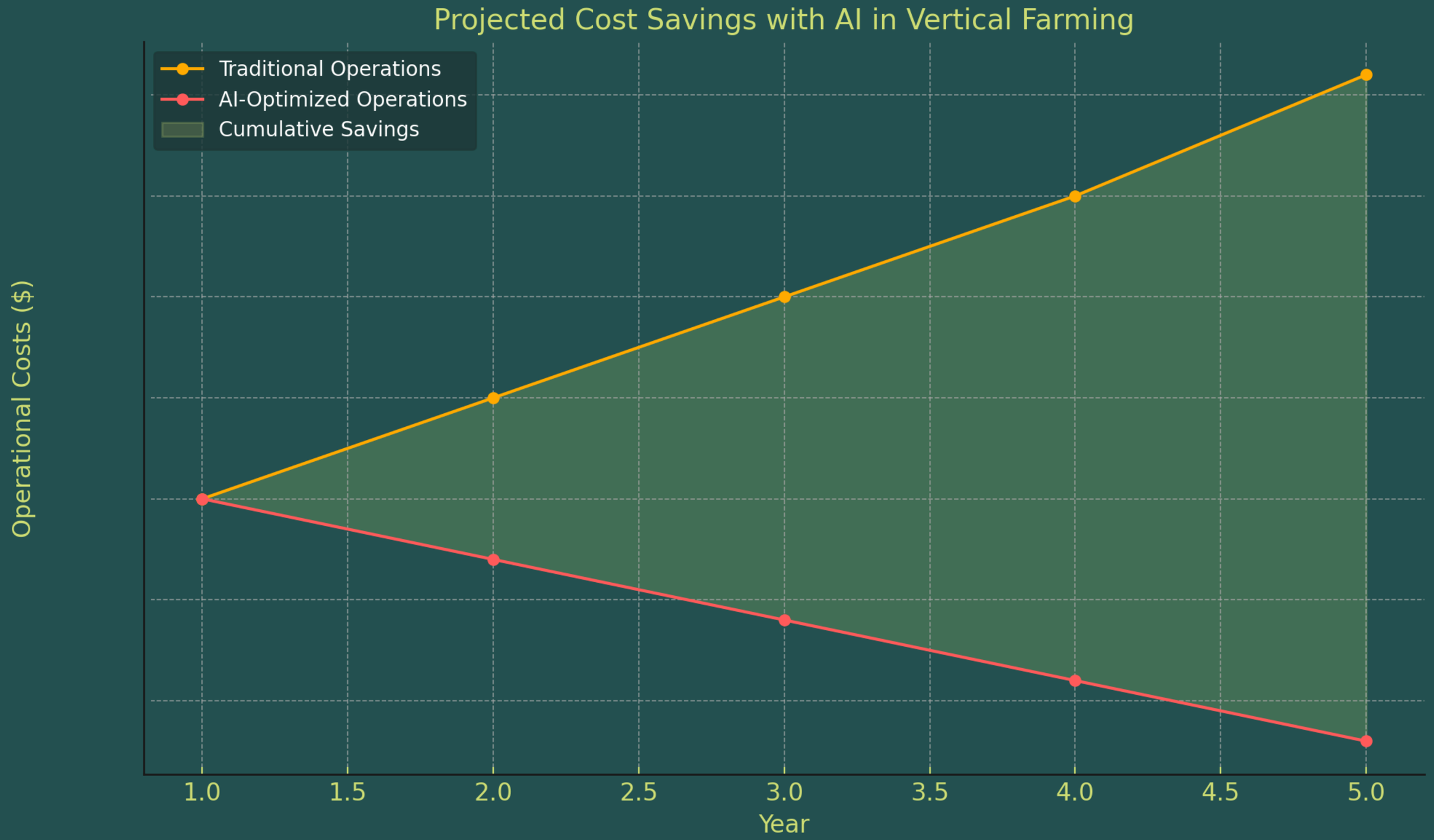
Cost

Labor

Water, Electricity, Natural Gas

Produce Consistency

Source: Bain Automation Pathfinder Survey 2022 (n=906)


Projected Cost Savings with AI in Vertical Farming
Traditional Operations
AI-Optimized Operations
Cumulative Savings
Operational Costs ($)
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Year

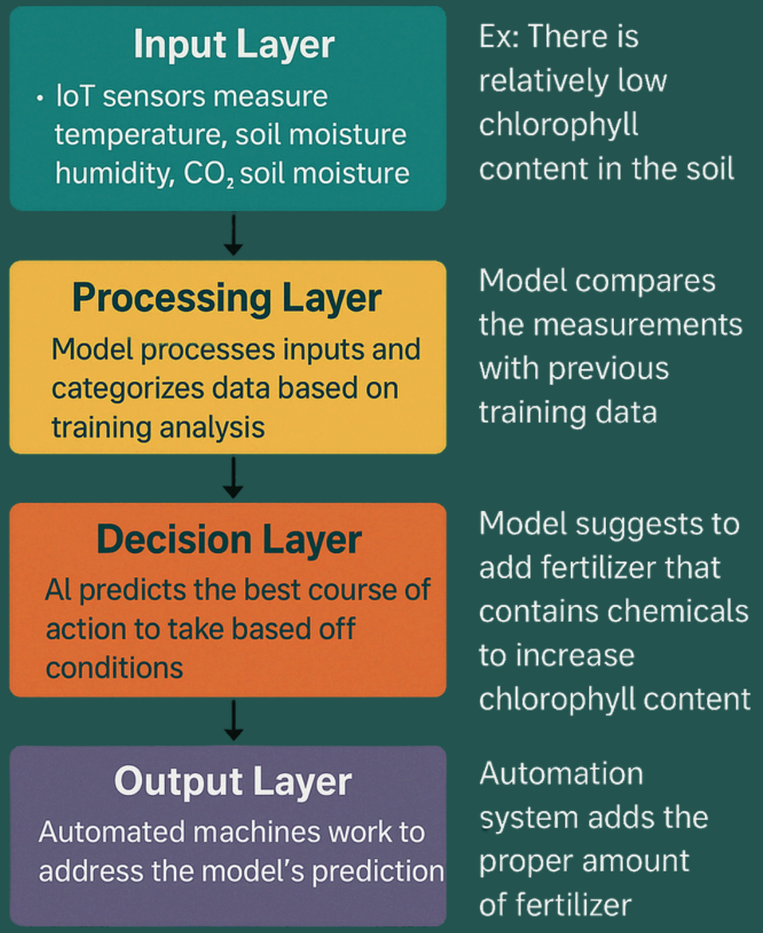
How it Works

Our model analyzes sensor data to predict plant health in real time.

Based on these predictions, it automatically adjusts water, light, and nutrients—keeping crops healthy while minimizing waste.

```
# Predict action based on new environmental conditions

new_conditions = np.array([[30, 27, 24, 60, 220, 6.5, 30, 20, 18, 45,
0.85]])  # Example values

predicted_health = model.predict(new_conditions)

# output tree

print(f"Predicted Plant Health Status: {predicted_health[0]}")
```

AI Decision-Making for Vertical Farming



Training Data & Model

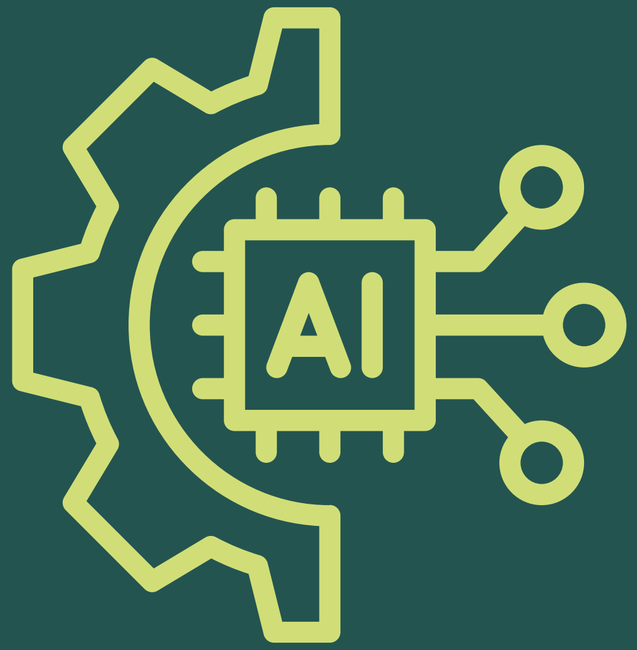
Plant_ID	Soil_Moisture	Ambient_Temperature	Soil_Temperature	Humidity	Light_Intensity	Soil_pH
1.0	27.52110877	22.24024536	21.90043536	55.2919039	566.1728051	5.581954516
1.0	14.83565615	21.70676328	18.68089194	63.94918051	596.1367212	7.135704906
1.0	17.08636197	21.18094556	15.39293913	67.83795649	591.1246268	5.656852249
1.0	15.33615608	22.59330194	22.7783935	58.19081101	241.4124764	5.584522687
1.0	39.82221603	28.92900108	18.10093728	63.77203577	444.4938296	5.919706876
1.0	29.20834842	24.36420869	22.5515083	46.39281145	496.2330398	6.157930728
1.0	16.35140495	23.02284948	17.95034782	56.90621179	454.6392144	7.075570016
1.0	33.30769696	20.19918572	16.29822055	56.32621966	455.6989746	6.105038904
1.0	12.72272609	25.46764547	16.6930635	47.54417466	635.0570337	6.487871877
1.0	13.24464144	27.63686533	23.62016942	65.6157854	393.2477085	5.580117097
1.0	24.99896013	25.3906236	22.67841216	56.8243402	482.2509998	6.564245676
1.0	31.60661098	23.99464808	16.14826725	58.53127733	763.5381969	6.278609362
1.0	23.52604561	19.00049156	22.38466908	57.75413529	436.3746794	7.323472975
1.0	21.53529606	19.7396999	19.52594533	47.50486028	724.1481607	6.73844159
1.0	23.78048558	26.4907316	17.82397397	45.87979095	561.1187449	5.832179314

Full Data Set

Machine Learning Model

Also on pages 11 and 12 of notebook

AI and Automation



Real-Time IoT Monitoring

Tracks moisture, nutrients, temperature, and light levels across all grow zones

Automated Irrigation & Fertilization

Delivers precise water and nutrients to each plant based on live data

Staff-Friendly Dashboard Interface

Allows manual sensor input and provides AI-driven growing suggestions

Dynamic Climate Control

Adjusts lighting, humidity, and energy use to reduce waste and boost yield