





AI-Based Greenhouse Plant Planning Recommendation System

relying on **historical data, weather data (public APIs), crop information, and market trends** — all powered by AI. No need for live sensors inside the greenhouse.

Data Type	Source
Weather Data	OpenWeather API, Myanmar Meteorology Dept.
Crop Data	Agriculture databases, Research papers (crop growth cycles, climate suitability)
Market Data	Historical market prices (from government reports, farmer cooperatives)
Greenhouse Parameters	Farmer's input (greenhouse size, location, preferred crops, available water & fertilizer)

✅ Step 2: AI Techniques for Each Task

Task	AI Technique	Explanation
Crop Recommendation	Multi-Criteria Decision Making (MCDM) + Classification (ML)	AI analyzes climate, location, and market data to rank crops.
Planting Date Suggestion	Time Series Forecasting	Predicts best planting time based on weather & demand trends.
Resource Planning	Regression Models	Estimates water, fertilizer, and labor needs for selected crops.
Market Price Prediction	Time Series Forecasting (Prophet, ARIMA, LSTM)	Forecasts prices to maximize profit.
Profit & Yield Prediction	Regression	Estimates expected profit after cost based on historical data.

- 1 Farmer selects **location** (e.g., Mandalay) and greenhouse size (e.g., 1000 sq.m).
- 2 AI collects **weather data (past 5 years)** from APIs + **market price data** from public records.
- 3 Farmer inputs:
 - Water availability (liters per day)
 - Fertilizer type (organic/chemical)
 - Preferred crops (optional)
- 4 AI analyzes all data and recommends:  Top 3 crops (climate + market matched)
 -  Best planting dates (based on forecasted climate & price)
 -  Expected yield (based on historical yield per sq.m)
 -  Expected profit (estimated selling price - cost of water, fertilizer, labor)

Example Output (Dashboard View)

Greenhouse Location: Mandalay

Size: 1000 sq.m

Recommended Crops:

- 1** **Lettuce** (High demand in summer, fast growth)
- 2** **Tomato** (Year-round demand, moderate profit)
- 3** **Chili Pepper** (Export potential, higher profit but longer cycle)

Planting Date: March 15, 2025

Estimated Yield:

- Lettuce: 800 kg
- Tomato: 600 kg
- Chili: 500 kg

Estimated Profit:

- Lettuce: \$3,000
- Tomato: \$2,500
- Chili: \$4,000

Step 3: AI Model Examples (Code Templates Available)

1. Crop Recommendation Model (Classification)

- Input: Location, Climate data, Market demand
- Output: Top crops (ranked by suitability + profit potential)
- Model: Random Forest, Decision Tree, or Neural Network

2. Planting Date Prediction (Time Series)

- Input: Historical weather & crop data
 - Output: Optimal planting window (e.g., March 10 - 20)
 - Model: Prophet or LSTM
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3. Price Prediction (Time Series)

- Input: Historical market prices for crops
- Output: Expected price during harvest period
- Model: ARIMA or Prophet



4. Yield Prediction (Regression)

- Input: Crop type, greenhouse size, climate
 - Output: Expected yield (kg per sq.m)
 - Model: Linear Regression, XGBoost
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5. Profit Prediction (Regression)

- Input: Expected yield, forecasted price, cost of water/fertilizer/labor
- Output: Expected profit
- Model: Linear Regression, Random Forest

✅ Optional Add-on: Chatbot

- User can chat in **Myanmar language** to ask questions like:
 - "What to grow in Mandalay this month?"
 - "Which crop has highest profit in summer?"
- AI chatbot responds using the recommendation model.

✅ Suggested Tech Stack

Component	Suggested Tool
Data Collection	Weather API (OpenWeather), Market Data (CSV or Scraped)
AI Models	Python (scikit-learn, TensorFlow, Prophet)
Dashboard	Flask/Django (Web) or Streamlit (Fast Dashboard)
Chatbot (optional)	Rasa, Hugging Face Transformers
Database	MySQL, SQLite