Agri-Aid

Team Pratibimba

Aashu Chaudhary
Bigyan Nepali
Manash Baral
Shree Ram Neupane

WHY???

Overwatering → Root Rot

Also, Waterlogged plants are more susceptible to fungal diseases like *Pythium* and *Phytophthora*.

Underwatering → Wilting, Curling of Leaves

Temperature and Humidity

High Temp + High Humidity: Ideal for fungal and bacterial diseases.

High Temp + Low Humidity: Favors pests like spider mites and thrips.

Low Temp + High Humidity: Promotes fungal diseases like damping-off and mildew.

Low Temp + Low Humidity: Reduces disease risk but increases vulnerability to frost damage.

CO2 concentration

Positive Impacts: Enhanced photosynthesis, growth, yields, water use efficiency

Negative Impacts: Nutrient dilution, reduced protein content, increased weed competition, and potential ecosystem disruptions.

Nepal's Context On Disease

01 Field Loss

36% of crop production is lost annually due to plant diseases, pests, and weeds under field conditions

02 Disease Type

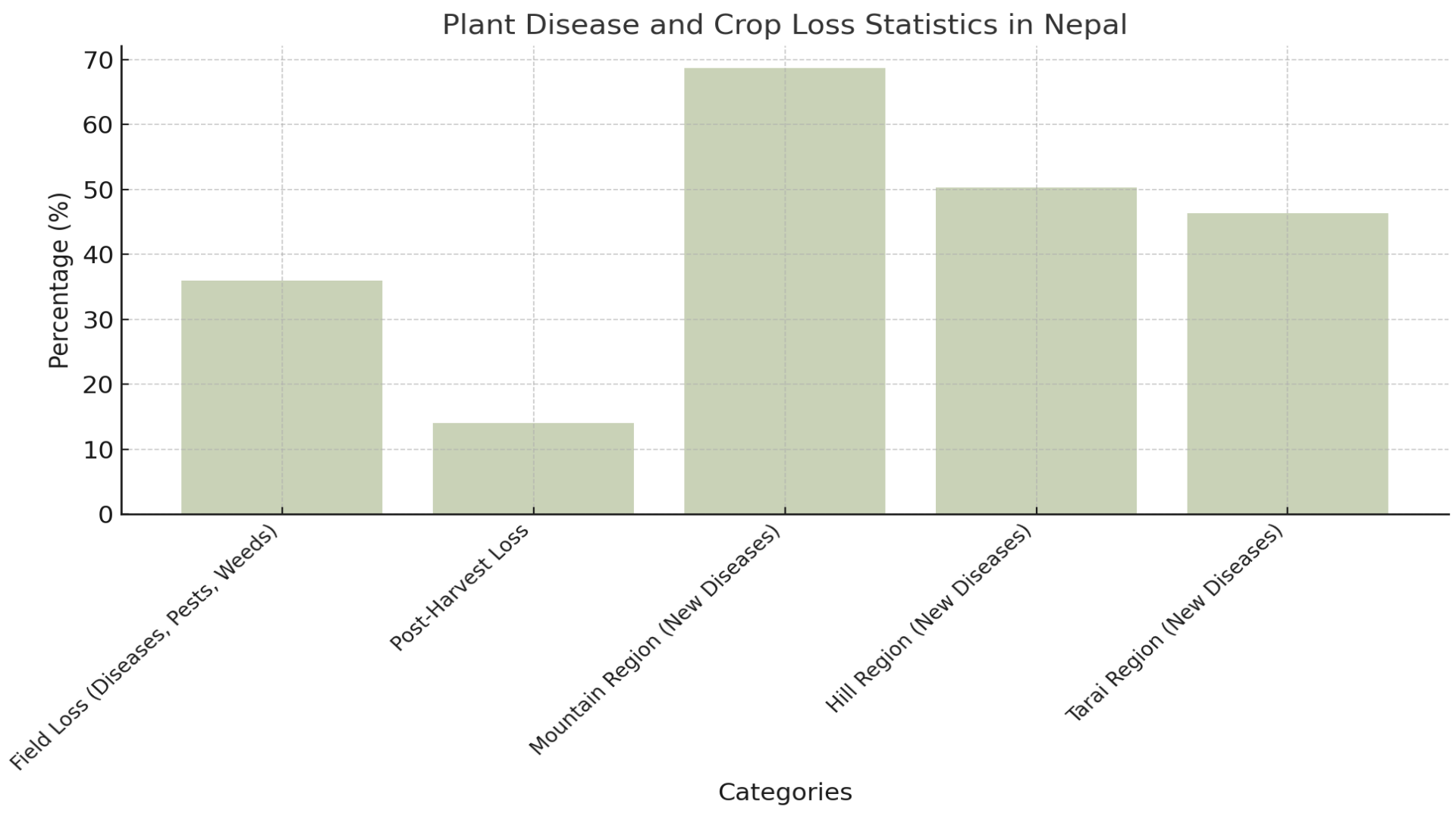
- Viral(major threat)
- Bacterial

03 Emergence of New Diseases (Regional Impact):

Mountain:68.7%
Hill:50.3%
Terai:46.3%

04 Climate Change Effect

50% of households have observed new crop diseases over 25 years.


Plant Disease and Crop Loss Statistics in Nepal
Percentage (%)
0
10
20
30
40
50
60
70
Field Loss (Diseases, Pests, Weeds)
Post-Harvest Loss
Mountain Region (New Diseases)
Hill Region (New Diseases)
Tarai Region (New Diseases)
Categories

Effect on Crops

Major Crops Affected Rice: Yellow stem borer (YSB) causes 10–60% yield loss; blast and bacterial leaf blight are also major issues.

Wheat: Rust diseases (stem, leaf, stripe) cause 10–40% yield loss; powdery mildew is another concern.

Maize: Stalk rot and gray leaf spot reduce yields, especially in Terai and hill regions. can these disease be mitigated if found early

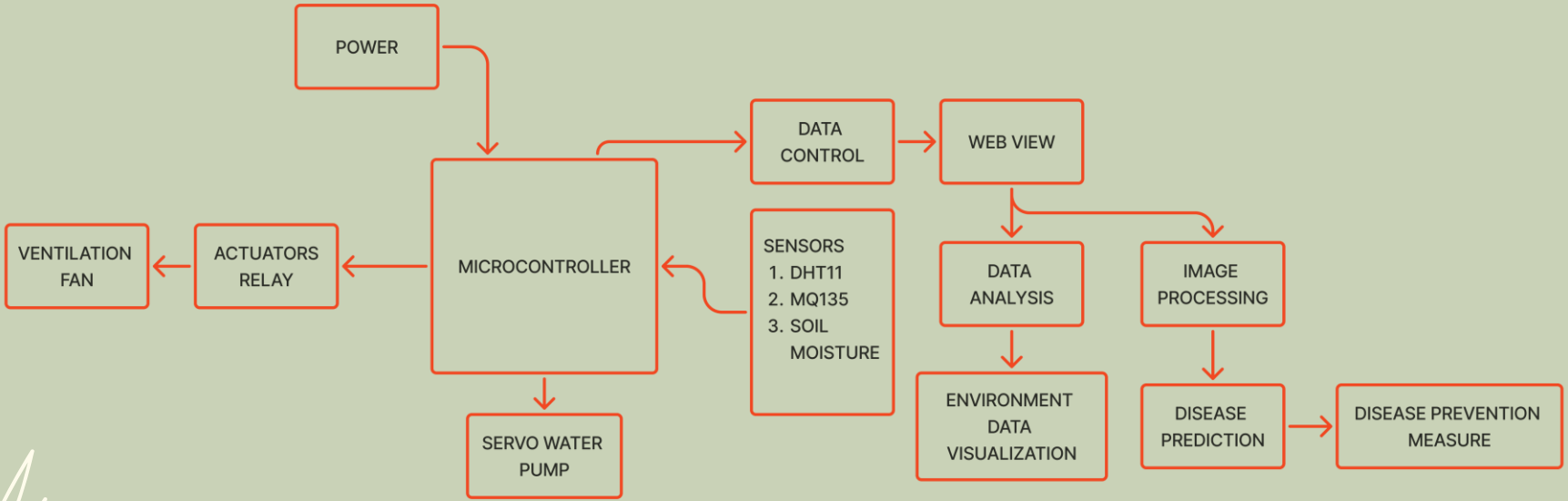
Source: https://horticulture.ucdavis.edu/blog/nepal-when-greenhouses-become-tents

AND YESS

many of these diseases and pests can be mitigated if detected early

The solution is Agri-Aid

Block diagram



Highlights:

Automated Watering System

Real-Time Environmental Monitoring

Early Disease Detection Using Machine Learning

What we did?

Greenhouse Environment Simulation and control

- Simulate Greenhouse Environment
- Collect Sensor Data
- Automate Actions Based on Sensors data
  - Automatic Watering
  - Ventilation Control
  - Environmental Monitoring

Tomato plant Disease Detection

- Provide 24hr plant monitoring
- Train machine learning model
- Detect Disease
- Interface on website build

What we missed???

- Multi Plant Support
- Advanced Data Analytics
- Energy Optimization
- Self-learning disease detection
- Pest Detection and Control
- Historical data Storage

References

- https://www.researchgate.net/publication/326077603_Viral_Diseases_of_Crops_in_Nepal
- https://www.researchgate.net/publication/327600922_Bacterial_Diseases_of_Plants_in_Nepal_A_Review
- MedCrave Online Journal of Agriculture
- Kathmandu Post Article on Agriculture and Climate Threats