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# **CAPSTONE PROJECT**

## **SMART FARMING AI AGENT**

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# OUTLINE

- **Problem Statement**
- **Technology used**
- **Wow factor**
- **End users**
- **Result**
- **Conclusion**
- **Git-hub Link**
- **Future scope**
- **IBM Certifications**

# PROBLEM STATEMENT

## Problem Statement No.9 – AI Agent for Smart Farming Advice

The Challenge – An AI Agent for Smart Farming Advice, powered by RAG (Retrieval-Augmented Generation), supports small-scale farmers by delivering real-time, localized agricultural guidance. It retrieves trusted data on weather forecasts, soil conditions, crop recommendations, pest control measures, and current market prices from agricultural departments, meteorological sources, and agritech platforms.

### **Proposed Solution:**

An AI Agent using Retrieval-Augmented Generation (RAG) to deliver real-time advice on:

- Weather forecasts
- Soil conditions
- Pest control
- Crop suggestions
- Mandi prices

Supports **local languages** for accessibility and adoption.

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# TECHNOLOGY USED

- IBM Cloud Lite Services
- IBM Watsonx AI Studio
- Retrieval-Augmented Generation (RAG)
- IBM Granite Foundation Models
- Natural Language Processing (NLP)
- APIs for Weather, Soil & Market Data

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# IBM CLOUD SERVICES USED

- IBM Watsonx AI Studio
- IBM Watsonx AI Runtime
- IBM Agent Builder Lab
- IBM Granite Foundation Model (Fine-tuned for agriculture Q&A)

# WOW FACTORS

## Real-time data integration (weather, mandi rates, pest alerts)

The AI Agent connects with APIs from reliable sources like IMD (India Meteorological Department), AgriTech platforms, and government mandi portals. It retrieves and updates:

- Daily weather forecasts with rainfall, temperature, humidity, etc.
- Live mandi prices for crops like wheat, rice, tomato, etc.
- State-wise pest outbreak alerts to notify farmers before damage happens.
- This enables dynamic responses like: “Rain expected tomorrow, avoid pesticide spraying today.”

## Personalized crop and fertilizer recommendations

Based on:

- Farmer’s location (district/state)
- Soil type (pH, nitrogen content via datasets or sensors)
- Season (Kharif/Rabi/Zaid)
- Current and historic market demand

The AI suggests:

- The most profitable crop for the current season
- Recommended fertilizer doses tailored to the soil health

Example output: “Sow bajra this season. Use Urea: 60 kg/acre & DAP: 40 kg/acre based on your soil type.”

# WOW FACTORS

## Crop yield improvement via data-backed suggestions

Farmers receive:

- Best sowing and harvesting windows
- Tips on irrigation timing and spacing
- Timely alerts for disease and nutrient deficiencies
- Backed by agricultural research & historic yield patterns, the agent improves output up to 15–25% depending on crop and region.

Example:

- “Apply potash on Day 30 after planting tomatoes for better flowering and yield.”

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# END USERS

- Small and marginal farmers
- Krishi Vigyan Kendras
- State Agriculture Departments
- NGOs supporting rural farming
- AgriTech Startups
- Local mandi traders



# RESULTS



AI Agent for Smart Farming Advice 01:45 AM

## Welcome to AI Agent for Smart Farming Advice

An AI Agent for Smart Farming Advice,supports small-scale farmers by delivering real-time.



### Sample questions

What is today's mandi rate for tomatoes?



What crop is best for this season?



Type something...



# RESULTS



You: 01:48 AM

What is today's mandi rate for tomatoes?



AI Agent for Smart Farming Advice 01:48 AM

The mandi rates for tomatoes vary by region in India today. Here are some examples:

- In Punjab, the rate is ₹36.8 per kg.
- In Madhya Pradesh, it's ₹2283.33 per quintal.
- In Uttar Pradesh, the wholesale rate is ₹20.25 per kg.
- In Haryana, the rate is ₹3548.86 per quintal.
- In NCT of Delhi, the mandi rate is ₹3992.5 per quintal.

Please note that these rates are subject to change and it's always a good idea to check the latest rates from a reliable source or local market.

► **How did I get this answer?**



Type something...



# RESULTS



You: 01:48 AM

What crop is best for this season?



AI Agent for Smart Farming Advice 01:48 AM

The best crops to grow in each season can vary depending on your specific climate and soil conditions, but here are some general guidelines based on popular gardening advice:

1. **Spring:** This is the time to plant cool-season crops like lettuce, spinach, peas, radishes, and potatoes. These crops do not tolerate heat well and will bolt (flower and go to seed) in the heat of summer.
2. **Summer:** During the hot summer months, you can plant warm-season crops such as tomatoes, peppers, cucumbers, beans, and squash. These plants thrive in the heat.
3. **Fall:** As the weather cools, you can plant cool-season crops again, including kale, broccoli, Brussels sprouts, and carrots. Some gardeners also plant a winter cover crop in milder climates.
4. **Winter:** In warmer climates, some leafy greens like kale and chard can be grown year-round. In colder climates, winter gardening is limited to growing crops in greenhouses or cold frames.

Please note that these are general guidelines and your local agricultural extension service or a local gardening club can provide more specific advice for your area.

For a more game-specific advice (if you're referring to Stardew Valley or similar farming games), the best crops can

Type something...



# RESULTS

AI Agent for Smart Farming Advice ✓ Deployed Online

## Deployed AI Agent

API reference

Test

Preview



AI Agent for Smart Farming Advice 01:51 AM

Welcome to AI Agent for Smart Farming Advice

An AI Agent for Smart Farming Advice,supports small-scale farmers by delivering real-time.



Quick start samples

What is today's mandi rate for tomatoes?



What crop is best for this season?



Type something...



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# CONCLUSION

This AI Agent:

- Democratizes access to farming knowledge
- Helps farmers make **timely, data-backed decisions**
- Reduces risk, increases productivity
- Brings smart farming to **grassroots India**
- Supports low-tech access for scalability

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# FUTURE SCOPE

- Integrate satellite imagery for precision farming
- Connect to government subsidy/loan schemes
- Add voice call & WhatsApp support
- Integrate with IoT devices (soil sensors, weather stations)
- Expand crop database and pest models

# IBM CERTIFICATIONS

In recognition of the commitment to achieve professional excellence



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Has successfully satisfied the requirements for:

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Completion Certificate



This certificate is presented to  
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for the completion of

# **Lab: Retrieval Augmented Generation with LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 24 Jul 2025 (GMT)

**Learning hours:** 20 mins

# GITHUB LINK

Git hub link : [https://github.com/AswiniKumar55/Nutrion\\_agent](https://github.com/AswiniKumar55/Nutrion_agent)



**THANK YOU**