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# CAPSTONE PROJECT

## AI AGENT FOR SMART FARMING ADVICE

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# OUTLINE

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

# PROBLEM STATEMENT

Small-scale farmers often lack access to real-time, localized agricultural knowledge.

Manual access to data on weather, soil, crop choices, pests, and market rates is inefficient.

Proposed Solution:

An AI Farming Agent that uses Natural Language Processing (NLP), Retrieval-Augmented Generation (RAG), to assist small-scale farmers by providing real-time, localized agricultural advice. It retrieves trusted data on weather forecasts, soil health, suitable crops, pest control, and mandi prices. Farmers can interact in their regional language to get instant guidance, leading to better crop decisions, risk reduction, and higher yield.

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# TECHNOLOGY USED

- IBM cloud lite services
- Natural Language Processing (NLP)
- Retrieval Augmented Generation (RAG)
- IBM Granite model

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## IBM CLOUD SERVICES USED

- IBM Cloud Watsonx.ai Studio
- IBM Cloud Watsonx.ai Runtime
- IBM Cloud AgentLab
- IBM Granite Foundation Model

# WOW FACTORS

- This agent will significantly reduce farming risks, improve crop yield, assist small-scale farmers in real-time decision-making, and promote data-driven, sustainable agriculture by making expert agricultural knowledge easily accessible in local languages.

## Unique features:

- Local language interaction through voice and text.
- Real-time weather and mandi price integration.
- Personalized crop and fertilizer recommendations.
- Pest and disease advisory from trusted sources.
- Region-specific crop suggestions based on soil and season.
- Multimodal input: voice, text, and possibly image recognition for plant health.

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## END USERS

- Small & Marginal Farmers
- Agricultural Officers
- Local NGOs & Agri-Startups
- Rural Development Agencies

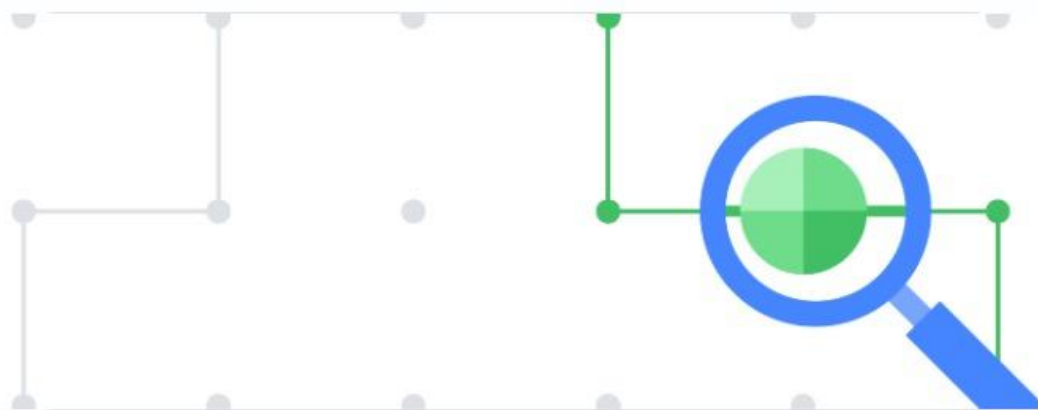
# RESULTS



AI Agent for Smart Farming Advice 08:03 PM

## Welcome to AI Agent for Smart Farming Advice

AI agent gives smart farming tips using IBM Granite—crop advice, pest control, and mandi rates



Type something...





# RESULTS

## Agent preview



You: 08:04 PM

What crops should I grow in September in Maharashtra?



AI Agent for Smart Farming Advice 08:04 PM

Hi there! In September, Maharashtra is in the tail end of the monsoon season. Here are a few crops that you might consider:

### Suggested Crops for September in Maharashtra:

- **Soybean:** This crop does well in the monsoon season and can be harvested by December.
- **Cotton:** It's a popular cash crop in Maharashtra. Planting in September can give you a good yield by December.
- **Pigeon Pea:** This legume is drought-tolerant and can be a good option if the monsoon is unpredictable.

### Simple Soil and Pest Management Tips:






- Ensure your soil is well-drained. Monsoon soils can get waterlogged, which isn't good for your crops.
- Keep an eye out for pests. Regularly check your plants for signs of infestation and use organic pesticides if necessary.

Remember, these are general suggestions. The best crop for you will


Type something...




# RESULTS

 Autosaved 8:04 PM  New agent + Deploy   

## Agent preview

 You: 08:04 PM

Is cotton suitable for black soil?

 AI Agent for Smart Farming Advice 08:04 PM


Absolutely, cotton thrives in black soil, also known as regur soil, which is quite common in parts of Maharashtra. This soil type is rich in nutrients and has good water-holding capacity, which is perfect for cotton cultivation.



**Here are a few tips for growing cotton in black soil:**

- **Soil Preparation:** Black soil can be a bit heavy, so ensure it's well-tilled and mixed with organic matter to improve drainage and fertility.
- **Irrigation:** Cotton prefers moderate watering. Avoid waterlogging as black soil drains slowly.
- **Nutrient Management:** Use a balanced mix of fertilizers. Cotton benefits from nitrogen-rich fertilizers, but be careful not to overdo it.

Just keep in mind that while cotton loves black soil, its success also depends on other factors like your local climate, access to markets, and your own resources. Good luck with your cotton farming!

► How did I get this answer?



# RESULTS

## Deployed AI Agent

The screenshot displays the IBM watsonx user interface for a deployed AI agent. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, and user account information for 'Aditya Sonakanalli's Account' in 'Dallas'. The breadcrumb trail shows the path: 'Deployment spaces / AI Agent for Smart Farming Advice / AI Agent for Smart Farming Advice /'. The main header for the agent is 'AI Agent for Smart Farming Advice', which is marked as 'Deployed' and 'Online'. Below this, there are tabs for 'API reference', 'Test', 'Evaluations', and 'Preview', with 'Preview' being the active tab. A 'New chat +' button is located to the right of the tabs. The chat interface shows a conversation where the user asks for short-duration crop suggestions, and the AI agent responds with a list of crops: Maize, Cotton, Sorghum, and Pearl Millet. On the right side, a sidebar titled 'About this deployment' provides details about the agent, including its name, description, deployment ID, serving name, software and hardware specifications, and tags.

IBM watsonx Upgrade ? ⓘ Aditya Sonakanalli's Account Dallas AS

Deployment spaces / AI Agent for Smart Farming Advice / AI Agent for Smart Farming Advice /

AI Agent for Smart Farming Advice ✓ Deployed Online

API reference Test Evaluations **Preview**

New chat +

**A** You 08:00 PM  
Suggest short-duration crops for the current season.

**AI Agent for Smart Farming Advice** 08:00 PM  
Hi, I'm your Smart Farming Assistant. Ask me anything about crops, seasons, soil, weather, or prices!

For suggesting short-duration crops, I need to know your location and the current season. However, assuming it's the Kharif season in central India, here are some options:

**Suggested Short-Duration Crops:**

- **Maize:** Grows quickly, suitable for intercropping.
- **Cotton:** Fast-growing, but needs adequate water.
- **Sorghum:** Drought-tolerant, good for dry spells.
- **Pearl Millet:** Very resilient, adapts to poor soil.

Type something...

**About this deployment**

**Name**  
AI Agent for Smart Farming Advice

**Description**  
AI agent gives smart farming tips using IBM Granite—crop advice, pest control, and mandi rates

**Deployment Details**  
Deployment ID: 7846730e-15ec-49...  
Serving name:  
No serving name.  
Software specification:  
runtime-24.1-py3.11  
Hardware specification:  
Extra extra small: 1 CPU and 2 GB RAM  
Copies:  
1

**Tags**  
wx-agent

**Associated asset**  
AI Agent for Smart Farming Advice  
c2999772-60a7-4c63-b132-c28ebde178b2

# CONCLUSION

- Provides real-time, localized farming advice using AI and RAG
- Helps farmers make informed decisions, reducing risk and improving yield
- Enables interaction in local languages for greater accessibility
- Bridges the knowledge gap using trusted agricultural and weather data
- Boosts income and promotes sustainable farming practices

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# FUTURE SCOPE

- Satellite-based pest alert integration
- Integration with government schemes
- Crop disease detection via images
- Advanced predictive models using AI/ML
- Offline mode for remote villages

# IBM CERTIFICATIONS



IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Aditya Sonakanalli

for the completion of

**Lab: Retrieval Augmented Generation with  
LangChain**

(ALM-COURSE\_3824998)

According to the Adobe Learning Manager system of record

**Completion date:** 04 Aug 2025 (GMT)

**Learning hours:** 20 mins

Git hub link : <https://github.com/202301070175-ops/AI-Agent-for-Smart-Farming-Advice>





**THANK YOU**