

CAPSTONE PROJECT

PROBLEM STATEMENT NO.9 – AI AGENT FOR SMART FARMING ADVICE

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OUTLINE

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PROBLEM STATEMENT

Small-scale farmers often lack timely access to localized, accurate agricultural information such as crop recommendations, weather forecasts, pest control measures, soil guidance, and mandi prices — leading to low yield, high risk, and income instability.

Proposed Solution : I propose an AI-powered Smart Farming Assistant using Retrieval-Augmented Generation (RAG) and IBM Cloud Lite. It provides real-time, region-specific farming advice in the farmer's local language — covering crops, weather, soil, pest alerts, and mandi rates — enabling smarter decisions and higher productivity.

TECHNOLOGY USED

IBM Cloud Lite Services

Natural Language Processing (NLP)

Retrieval Augmented Generation (RAG)

IBM Granite Model

IBM CLOUD SERVICES USED

- IBM Cloud Watsonx AI Studio
- IBM Cloud Watsonx AI runtime
- IBM Cloud Agent Lab
- IBM Granite foundation model

WOW FACTORS

Our AI Agent delivers real-time, location-specific farming advice using Retrieval-Augmented Generation (RAG) powered by IBM Cloud Lite and IBM Granite. It supports interaction in local languages, making it farmer-friendly and highly accessible

Unique Features :

Seasonal crop and soil recommendations

Live weather forecasts and mandi prices

Pest and disease alerts with solutions

Simple interface for low-tech users

END USERS

- Small and marginal farmers
- Rural agricultural workers
- Agri-extension officers
- Farmer Producer Organizations (FPOs)
- Local Agri-tech startups and NGOs
- State agriculture departments

RESULTS

 You: 02:11 AM

What fertilizer is best for wheat?

 Farming - Agent 02:11 AM

For wheat, a balanced fertilizer with equal proportions of nitrogen, phosphorus, and potassium (often labeled as 10-10-10 or 15-15-15) is typically recommended. However, soil testing can provide a more precise recommendation based on your soil's specific needs.

If you want to know more about fertilizers suitable for your soil type, I can help you with that. Please provide details about your soil type.

► How did I get this answer?

 You: 02:12 AM


How can I increase rice yield?

 Farming - Agent 02:12 AM


Here are a few tips to potentially increase your rice yield:

1. **Proper Irrigation:** Rice is a water-intensive crop. Ensure you provide adequate water, especially during critical growth stages. However, avoid waterlogging as it can harm the plants.
2. **Nutrient Management:** Use a balanced fertilizer, preferably based on soil test results, to ensure your rice plants get the necessary nutrients.
3. **Weed Control:** Regularly manage weeds as they compete with rice plants for nutrients, water, and sunlight.
4. **Pest and Disease Management:** Keep an eye out for pests and diseases. Timely intervention can prevent significant yield loss.
5. **Planting Material:** Use high-yielding varieties (HYVs) of rice seeds.
6. **Optimal Planting Time:** Plant rice at the right time to make the most of the monsoon season.

RESULTS

 You: 02:14 AM

What are the benefits of the Crop Insurance Scheme?

 Farming - Agent 02:14 AM

Crop insurance schemes offer several benefits to farmers:

1. **Risk Mitigation:** They protect farmers from losses due to natural calamities like floods, droughts, or unseasonal rain/hail, which are beyond their control.
2. **Financial Security:** In case of crop failure, insurance provides a financial safety net, helping farmers to recover and reinvest in the next season.
3. **Access to Credit:** Having crop insurance can make it easier for farmers to secure loans from banks and financial institutions, as it reduces the lender's risk.
4. **Encourages Agricultural Investment:** With the assurance of insurance, farmers might be more inclined to adopt improved technologies, high-yielding varieties, and better farming practices.
5. **Promotes Sustainable Practices:** Some schemes encourage sustainable practices by offering discounts or additional coverage, promoting long-term soil health and environmental sustainability.

 You: 02:13 AM

What are the benefits of drip irrigation?

 Farming - Agent 02:13 AM

Drip irrigation offers several benefits:

1. **Water Conservation:** It delivers water directly to the plant roots, reducing evaporation and runoff, thus saving water.
2. **Nutrient Efficiency:** You can apply fertilizers along with the water, which gets directly absorbed by the roots, minimizing nutrient loss.
3. **Weed Control:** Since water is applied directly to the root zone, areas between crops rows remain dry, discouraging weed growth.
4. **Improved Crop Health:** Consistent moisture levels around roots can lead to healthier plants and potentially higher yields.
5. **Labor Savings:** Once installed, drip systems require less manual labor for watering compared to traditional methods.
6. **Flexibility:** It's suitable for various terrains and can be used for a wide range of crops.

RESULTS

HK You: 02:14 AM

How to apply for the Kisan Credit Card?

 Farming - Agent 02:14 AM

To apply for a Kisan Credit Card (KCC) in India, follow these general steps:

1. **Eligibility Check:** Ensure you meet the eligibility criteria which typically include being an Indian citizen engaged in agricultural activities, having a valid Kisan Credit Linkage Area (KCLA) card, and having a bank account.
2. **Choose a Bank:** KCCs are issued by various banks including State Bank of India, Punjab National Bank, Union Bank of India, and many regional banks. Choose one that suits your needs.
3. **Application Form:** Obtain the KCC application form from your chosen bank. This can often be downloaded from the bank's official website or obtained directly from a bank branch.
4. **Fill the Form:** Accurately fill in the required details including personal information, agricultural land details, and crop information.
5. **Submit Necessary Documents:** Along with the form, submit the required documents which usually include identity proof, address proof, land records (like mutation certificate or sale deed), and KCLA card.
6. **Submission:** Submit the filled form and documents to the bank. This can be done in person, or some banks may accept submissions via post or online portals.

RESULTS

Deployed AI Agent

← → ↻ 🌐 dataplatform.cloud.ibm.com/ml-runtime/deployments/d7673899-14af-454c-a5e3-1160e28df191/chat?space_id=f5303252-2b95-4805-b9ea-8774f9c8b3f3&co... ☆ 🌐 ⋮

🗄️ | 📧 Gmail | 📺 YouTube | 📰 News | 📍 Maps | 🗣️ Translate

☰ IBM watsonx Upgrade ⓘ 🔔 HARSH KUMAR's Account ▾ Dallas ▾ HK

[Deployment spaces](#) / [Farming - Agent](#) / [Farming - Agent](#) /

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Farming - Agent ✅ Deployed Online

API reference

Test

Preview

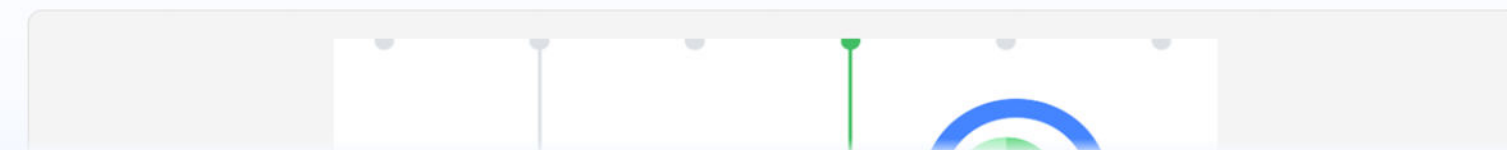
New chat +



Farming - Agent 02:55 AM

Welcome to Farming - Agent

Smart AI guide for crops, weather, mandi rates & more — in your local language!



Type something...



CONCLUSION

- Our AI-powered Smart Farming Assistant bridges the gap between technology and grassroots agriculture.
- By offering real-time, localized, and easy-to-understand guidance in regional languages, it empowers farmers to make smarter decisions, increase yield, reduce losses, and improve their livelihoods .
- This solution is a step toward making smart farming accessible, scalable, and sustainable for every farmer.

FUTURE SCOPE

- Integration with IoT devices for soil moisture, weather, and crop monitoring.
- Mobile app deployment for wider accessibility.
- Advanced AI training using real-time farmer feedback.
- Satellite data integration for precision agriculture.
- Support for more regional languages and dialects.
- Data analytics dashboard for farmer insights and government use.

IBM CERTIFICATIONS

In recognition of the commitment to achieve
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Harsh Kumar

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



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Completion Certificate



This certificate is presented to

Harsh Kumar

for the completion of

**Lab: Retrieval Augmented Generation with
LangChain**

(ALM-COURSE_3824998)

According to the Adobe Learning Manager system of record

Completion date: 25 Jul 2025 (GMT)

Learning hours: 20 mins

GITHUB LINK

- GITHUB LINK : <https://github.com/harshjha56/Smart-Farming---Agent.git>



THANK YOU