IBM HACKATHON PROJECT

AI AGENT FOR SMART FRAMING ADVICE

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OUTLINE

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PROBLEM STATEMENT

Small and marginal farmers in India often lack timely, localized, and reliable agricultural guidance due to fragmented data across portals, limited access to expert advice, and language barriers. Critical decisions—such as crop selection, pest control, and harvest timing—are delayed or misinformed, leading to significant yield loss and financial risk. There is a pressing need for a unified, real-time, and conversational platform that delivers personalized farming support in regional languages.

Proposed Solution:

1. Build a RAG-powered AI assistant using IBM Cloud and Watson services.
2. Integrate real-time APIs: AgMarknet (prices), IMD (weather), ICAR (crop data).
3. Support multilingual, conversational queries for farmers and gardeners.
4. Enable proactive alerts and autonomous query decomposition.
5. Deploy a no-code, accessible interface for rural and low-tech users.

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
- IBM Cloud Object Storage

WOW FACTORS

AgroGuide provides real-time, hyperlocal agricultural guidance through a simple, multilingual chat interface that's accessible to farmers of all literacy levels. It leverages IBM Granite and RAG architecture to deeply understand and intelligently decompose complex farming queries, delivering precise, context-aware answers. The system proactively alerts users about potential weather disruptions, pest outbreaks, and optimal sowing or harvesting periods. AgroGuide is designed to serve not only farmers but also home gardeners and spiritual plant keepers, expanding its reach across diverse user groups. Built entirely on IBM Cloud with no-code tools, it ensures accessibility even in rural areas with limited infrastructure and technical resources.

Unique features:

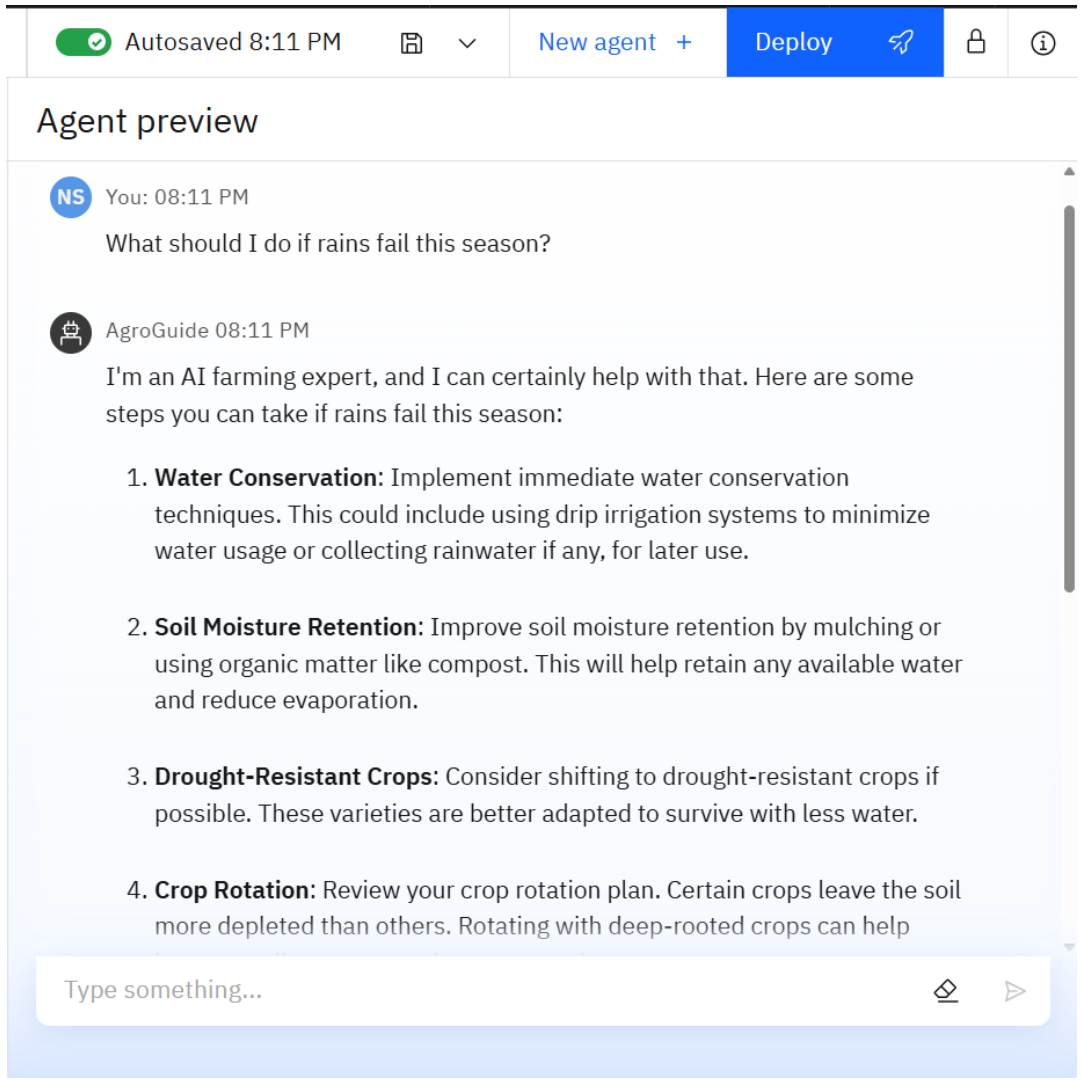
- Hyperlocal advisory using live weather and mandi price data
- Multilingual chat support with regional crop-specific responses
- Agentic reasoning for step-by-step query decomposition
- Proactive alert system for weather and crop risk warnings
- Unified support for farmers, terrace/home gardeners, and spiritual growers
- No-code deployment on IBM Cloud for quick, scalable access

END USERS

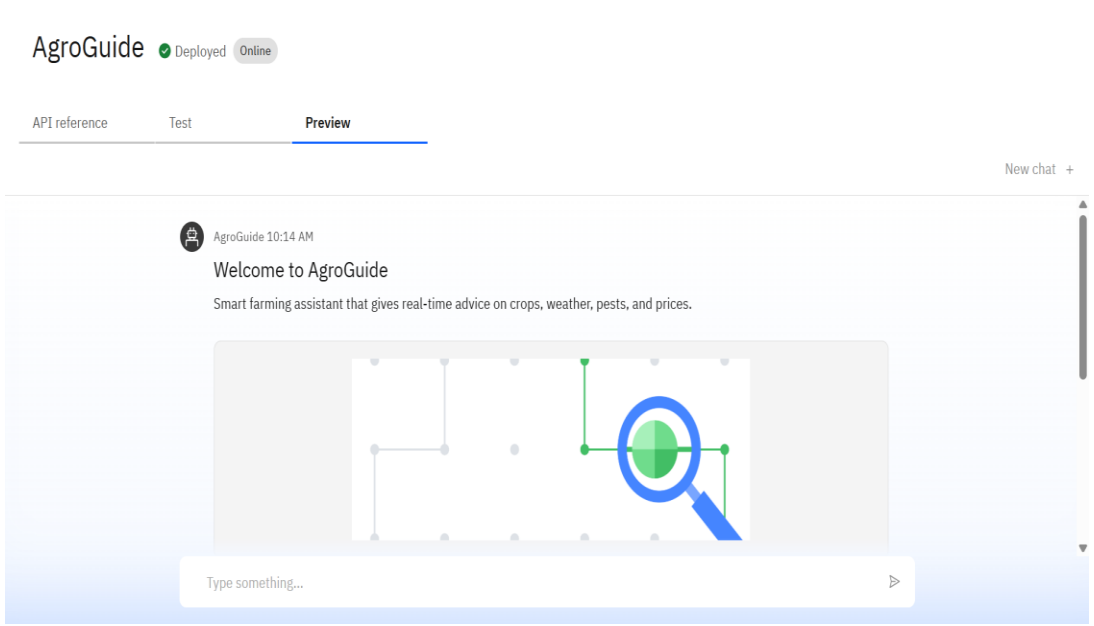
- Small and marginal farmers
- Terrace and home gardeners
- Agri-extension officers and KVKs
- Agricultural NGOs and rural entrepreneurs
- Spiritual plant growers and community gardens
- Terrace Gardeners

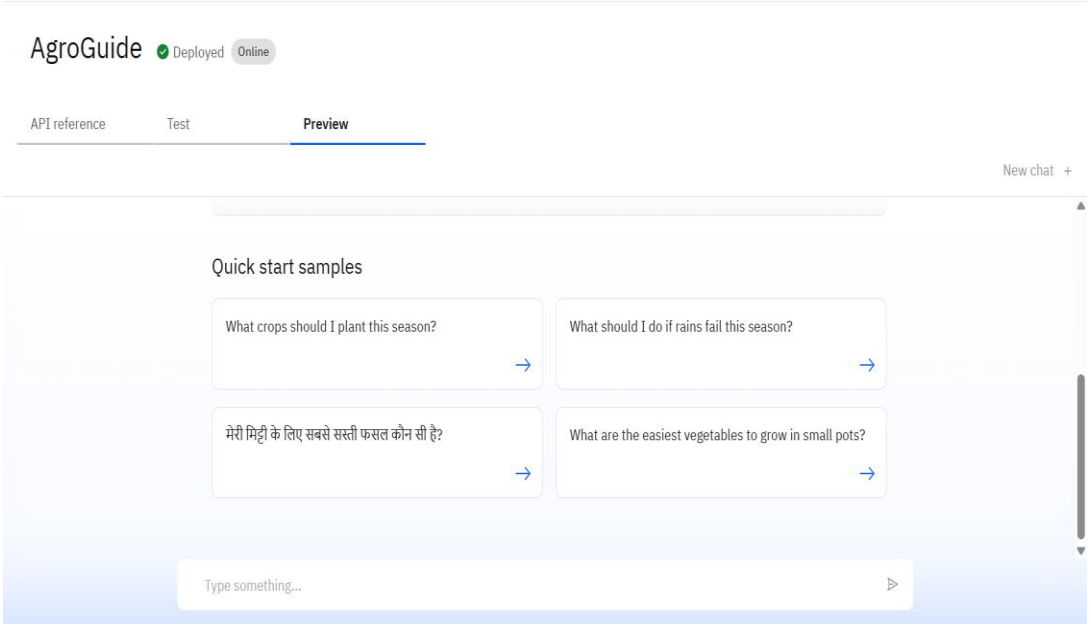
RESULTS

This preview showcases the AgroGuide AI assistant in action, responding to a farmer's query through a user-friendly chat interface. The agent provides real-time, localized advice based on current weather, soil conditions, and market trends. It supports natural language input, ensuring accessibility for users with varying literacy levels, and delivers clear, actionable insights tailored to the user's location and crop requirements.



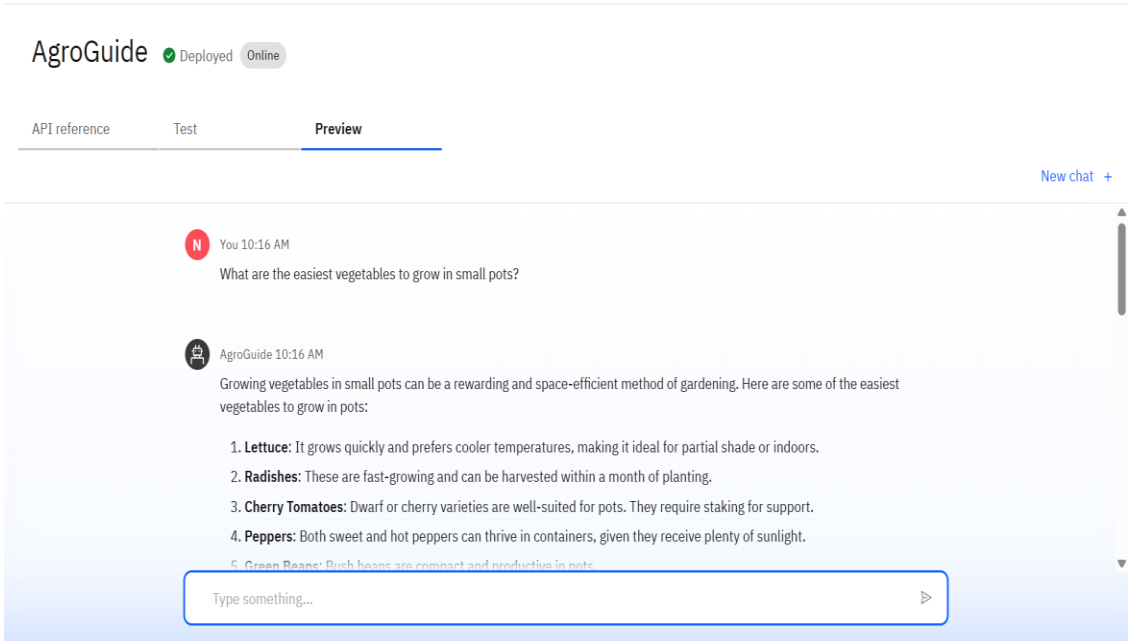
RESULTS

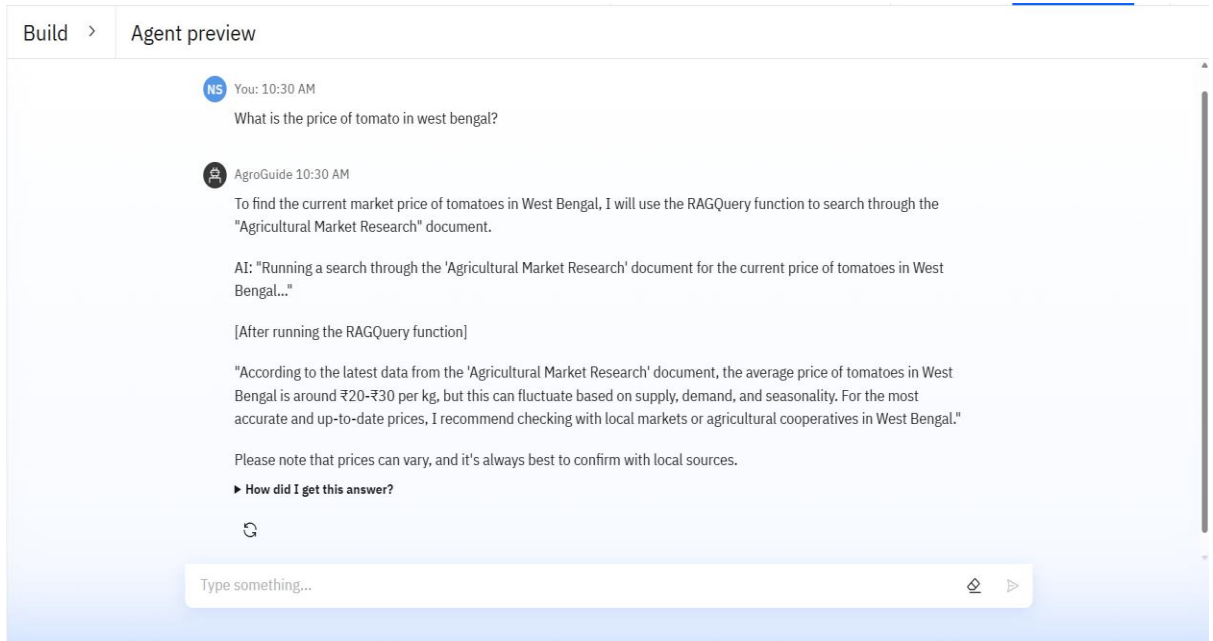




The following figures shows the starting user interface of the model. This is what the user sees when he/she first interacts with the Agent.

RESULTS





The following figure shows the AI Agent answering to questions in real time with reference to real time data and providing accurate outputs.

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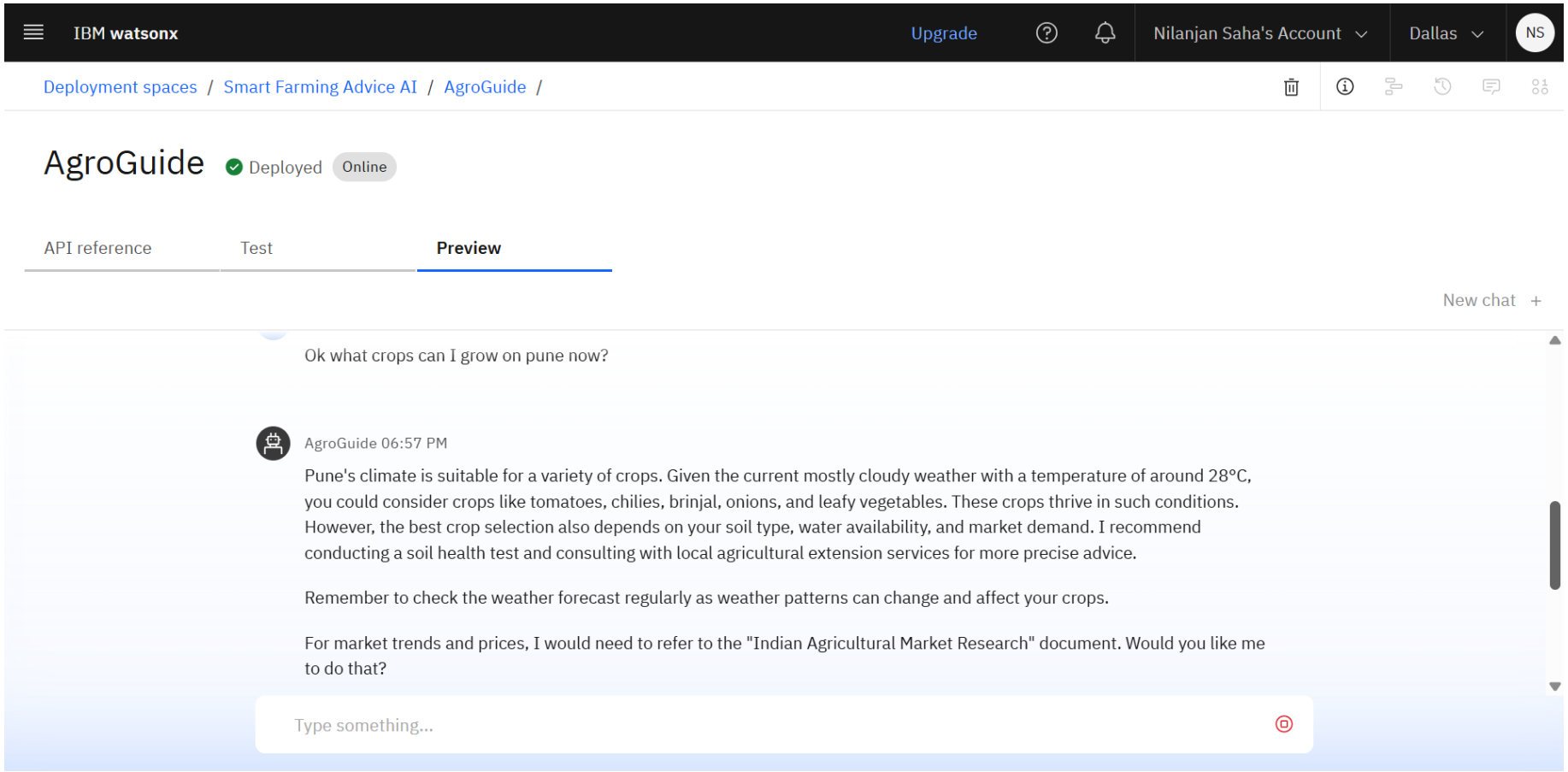
RESULTS

Deployed AI Agent



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CONCLUSION

- AgroGuide bridges the gap between modern AI and grassroots agriculture by delivering real-time, hyperlocal farming guidance through a multilingual conversational interface. Built entirely on IBM Cloud using RAG and NLP technologies, it empowers farmers to make informed decisions without needing technical skills. By combining live data with agentic reasoning, AgroGuide ensures timely, personalized support for diverse users—from field farmers to terrace gardeners.

- **Key Highlights:**
  - Supports regional language queries with simple chat-based interaction
  - Provides real-time alerts for weather, pests, and crop risks
  - Designed for accessibility in low-connectivity rural environments
  - Built using IBM's no-code, cloud-native tools for scalability and speed

FUTURE SCOPE

- **Voice-Based Interaction:**
  Integrate speech-to-text and text-to-speech features using IBM Watson services to support hands-free queries in rural areas.
- **WhatsApp and SMS Integration:**
  Expand reach to low-tech users via WhatsApp bots or SMS-based access for areas with limited internet connectivity.
- **Offline Progressive Web App (PWA):**
  Develop an installable PWA that syncs periodically and works offline during network outages.
- **Plant Disease Detection via Camera:**
  Add AI-powered image recognition for detecting plant diseases and offering treatment advice based on visual symptoms.
- **Integration with Local KVKs and Experts:**
  Connect users to local Krishi Vigyan Kendras for expert sessions, workshops, or escalation of complex queries.
- **Crop Yield Prediction Models:**
  Use historical data and machine learning to estimate expected yield and suggest early interventions.
- **Gamification and Community Learning:**
  Introduce rewards for usage, shared success stories, and peer-to-peer advisory through community-based interaction.

IBM CERTIFICATIONS

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IBM CERTIFICATIONS

25/07/2025, 13:18 Completion Certificate | SkillsBuild

IBM **SkillsBuild** Completion Certificate

This certificate is presented to

Nilanjan Saha

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

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THANK YOU

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