
CAPSTONE PROJECT

WATSONFARM AI

Presented By:

**1. MALLEDA VENKATESH – WELFARE INSTITUTION OF
SCIENCE TECHNOLOGY AND MANAGEMENT**

PROBLEM STATEMENT

Small-scale farmers in India often lack access to timely, accurate, and localized agricultural information, such as suitable crops for the season, pest control measures, weather forecasts, and mandi prices. This information gap leads to uninformed decisions, reduced crop yield, and unstable income. There is a need for an accessible solution that can provide real-time, region-specific farming guidance in local languages.

PROPOSED SOLUTION

The proposed system, WatsonFarm AI, is an AI-powered farming assistant that uses IBM Watsonx Granite LLM and Retrieval-Augmented Generation (RAG) to deliver personalized agricultural advice. It enables farmers to ask queries in their native languages (e.g., Hindi, Telugu, Tamil) and get relevant, easy-to-understand responses. The system retrieves information from trusted sources such as government advisories, IMD weather data, crop guides, and mandi price APIs. It supports multi-language interaction, real-time data integration, and provides practical guidance for crop selection, pest control, soil treatment, and market awareness.

SYSTEM APPROACH

- IBM Cloud Lite Services: Watsonx.ai, Watson Discovery, Language Translator
- IBM Granite Foundation Models: for natural language understanding and generation
- Watson Discovery: for document retrieval (RAG)
- Watson Language Translator: for multilingual interaction
- APIs: IMD Weather, Agmarknet Mandi Price APIs
- Backend: Python (Flask)
- Optional Frontend

INSTRUCTION GIVEN TO AI AGENT

- You are an intelligent agricultural assistant designed to support small-scale farmers by providing accurate, timely, and localized farming advice. Use only trusted data sources such as government agricultural advisories, weather forecasts, soil reports, crop recommendations, pest control guidelines, and market prices. Answer user queries clearly and in simple language, considering their region, crop, season, and current conditions. Retrieve relevant context using a retrieval system (RAG) before generating responses. Support multiple Indian languages—translate queries into English and return answers in the user’s original language using the Watson Language Translator. If real-time data like weather or mandi prices is requested, fetch it from live APIs and include the date and location in your response. If relevant data is not available, politely inform the user and suggest consulting the local agricultural office. Always avoid making assumptions or giving unsupported recommendations. Be accurate, concise, and farmer-friendly in every response.

ALGORITHM & DEPLOYMENT

- - Retrieval-Augmented Generation (RAG): Combines document retrieval (Watson Discovery) with IBM Granite LLM for answer generation
- .- Language Translation: Watson Translator translates input/output to/from English and local languages.
- - Real-Time APIs: Integrated with IMD and Agmarknet APIs for live weather and price data
- .- Deployment: Hosted on IBM Cloud using Code Engine or Cloud Foundry, with scalable REST API endpoints

RESULT

The screenshot displays the IBM watsonx Agent web interface. The top navigation bar includes the IBM watsonx logo, an 'Upgrade' button, a user profile for 'MALLEDA VENKATESH's Ac...', and location settings for 'Dallas'. The main header shows the project path 'Projects / WatsonFarm AI / watsonx Agent' and a 'Share feedback' button. The interface is divided into two main panels: 'Build' on the left and 'Agent preview' on the right.

Build Panel:

- Model:** llama-3-3-70b-instruct
- Framework:** LangGraph
- Architecture:** ReAct
- Instructions:** control guidelines, and market prices. Answer user queries clearly and in simple language, considering their region, crop, season, and current conditions. Retrieve relevant context using a retrieval system (RAG) before generating responses. Support multiple Indian languages—translate queries into English and return answers in the user's original
- Knowledge:** (Section header visible)

Agent preview Panel:

- User Message (MV):** You: 06:44 PM
plateau,paddy,rainy, and dry land
- Agent Response:** watsonx Agent 06:44 PM
Based on the search results, it appears that the plateau, paddy, rainy, and dry land are related to agricultural practices and climate change. The search results provide information on the impact of climate change on dryland ecosystems, the effects of nitrogen fertilization on wheat in dryland areas, and the water use efficiency of dryland wheat in the Loess Plateau. Additionally, the results mention the importance of maize in helping farmers in Odisha, India, cope with climate change, and the responses of soil bacterial community structure and function to dry-wet cycles in maize and rice soils. Overall, the search results suggest that the plateau, paddy, rainy, and dry land are interconnected concepts that are relevant to understanding the impacts of climate change on agricultural practices and ecosystems.

The bottom of the image shows a Windows taskbar with various application icons, a search bar, and system clock showing 18:47 on 07-08-2025.

RESULT

IBM watsonx Upgrade MALLEDA VENKATESH's Ac... Dallas MV

Projects / WatsonFarm AI / watsonx Agent Share feedback Autosaved 6:44 PM New agent Deploy

Build AI Model: llama-3-3-70b-instruct **Model parameters**

Added tools (4)

- Google search**
Retrieve information from the internet with the Google search engine.
- DuckDuckGo search**
Retrieve information from the internet with the DuckDuckGo search engine.
- Wikipedia search**
Retrieve information from Wikipedia articles.
- Weather**
Retrieve the weather of a city.

Agent preview

MV You: 06:44 PM
plateau,paddy,rainy, and dry land

watsonx Agent 06:44 PM
Based on the search results, it appears that the plateau, paddy, rainy, and dry land are related to agricultural practices and climate change. The search results provide information on the impact of climate change on dryland ecosystems, the effects of nitrogen fertilization on wheat in dryland areas, and the water use efficiency of dryland wheat in the Loess Plateau. Additionally, the results mention the importance of maize in helping farmers in Odisha, India, cope with climate change, and the responses of soil bacterial community structure and function to dry-wet cycles in maize and rice soils. Overall, the search results suggest that the plateau, paddy, rainy, and dry land are interconnected concepts that are relevant to understanding the impacts of climate change on agricultural practices and ecosystems.

Type something...

7 Search hp .67 ENG IN 18:47 07-08-2025

RESULT

The screenshot displays the IBM watsonx Agent web interface. The browser address bar shows the URL: https://datapatform.cloud.ibm.com/wx/agents/0c0cea63-9342-444a-a518-d9c46c78dec7?project_id=e7181bcd-a662-4eb9-a05b-b118b52.... The interface includes a top navigation bar with the IBM watsonx logo, an 'Upgrade' button, and user information for 'MALLEDA VENKATESH's Ac...'. Below this is a breadcrumb trail: 'Projects / WatsonFarm AI / watsonx Agent'. The main content area is titled 'Agent preview' and shows a chat history. The user's input is 'provide me best condidions for grow mirchi'. The agent's response, timestamped '06:48 PM', provides detailed growing conditions for mirchi (chilli peppers) in a bulleted list. At the bottom, there is a text input field with the placeholder 'Type something...' and a 'Send' button.

IBM watsonx Upgrade ? MALLEDA VENKATESH's Ac... Dallas MV

Projects / WatsonFarm AI / watsonx Agent Share feedback Autosaved 6:48 PM New agent + Deploy

Build > Agent preview

provide me best condidions for grow mirchi

watsonx Agent 06:48 PM

The best conditions for growing mirchi (chilli peppers) include:

- Temperature: Between 27 and 32 degrees C (81-90°F) with minimal fluctuation
- Soil: Neutral to slightly acidic pH, well-fertilized
- Watering: Consistent moisture, but not waterlogged
- Sunlight: Full sun, at least 6 hours of direct sunlight
- Planting time: Late spring to early summer, after the last frost
- Soil temperature: Consistently warm, around 70°F (21°C)

It's also important to note that chilli plants can be grown indoors, but they require a sunny window sill or conservatory, and the soil should not be allowed to dry out. Additionally, chilli plants can be sensitive to extreme temperatures, so it's best to avoid exposing them to temperatures below 55°F (13°C) or above 90°F (32°C).

► How did I get this answer?

Type something...

CONCLUSION

- WatsonFarm AI successfully bridges the information gap in rural agriculture by delivering accurate and real-time farming guidance in the local language of the user. By integrating IBM's powerful AI tools and trusted data sources, the system enables better crop planning, pest control, and market awareness—leading to increased productivity and income for farmers.

FUTURE SCOPE

- - Add image-based crop disease detection using IBM Visual Recognition
- - Expand voice interface for IVR-based query handling
- - Integrate farmer profiles with history-based recommendations
- - Scale across multiple Indian states with dialect-specific support
- - Implement offline support with SMS-based queries

REFERENCES

- - IBM Watsonx & Granite Documentation
- - IMD API for weather data
- - Agmarknet API for mandi rates
- - ICAR Guidelines and Krishi Vigyan Kendra publications
- - Government Agri-Advisorie

IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Malleda Venkatesh

Has successfully satisfied the requirements for:

Getting Started with Artificial Intelligence



Issued on: Jul 24, 2025
Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/1828022f-0d7c-47fe-a8b6-d59c655c5d60>



IBM CERTIFICATIONS

In recognition of the commitment to achieve
professional excellence



Malleda Venkatesh

Has successfully satisfied the requirements for:

Journey to Cloud: Envisioning Your Solution



Issued on: Jul 24, 2025
Issued by: IBM SkillsBuild

Verify: <https://www.credly.com/badges/dde21543-d2c0-42f8-8acd-3b1c4904c8a8>



IBM CERTIFICATIONS

IBM **SkillsBuild**

Completion Certificate



This certificate is presented to

Malleda Venkatesh

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



THANK YOU