CAPSTONE PROJECT

SMART FARMING AGENT

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OUTLINE

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PROBLEM STATEMENT

AI Agent for Smart Farming Advice

Small-scale farmers often struggle with timely access to **accurate agricultural advice** related to crop planning, pest management, weather forecasts, and market prices. They rely on scattered sources or local agents, leading to **delays, low productivity, and financial losses**.

- **Proposed Solution:**
  An **AI-powered Smart Farming Agent** using **Retrieval-Augmented Generation (RAG)** and **IBM Granite models** that delivers **real-time, localized, and language-friendly farming advice** on weather, soil, crops, pest management, and mandi prices through a simple conversational interface.

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

This Agent will:

- Empower farmers with **real-time, localized agricultural advice**.
- Reduce dependency on multiple sources for farming information.
- Improve decision-making for **crop planning, pest control, and market sales**.

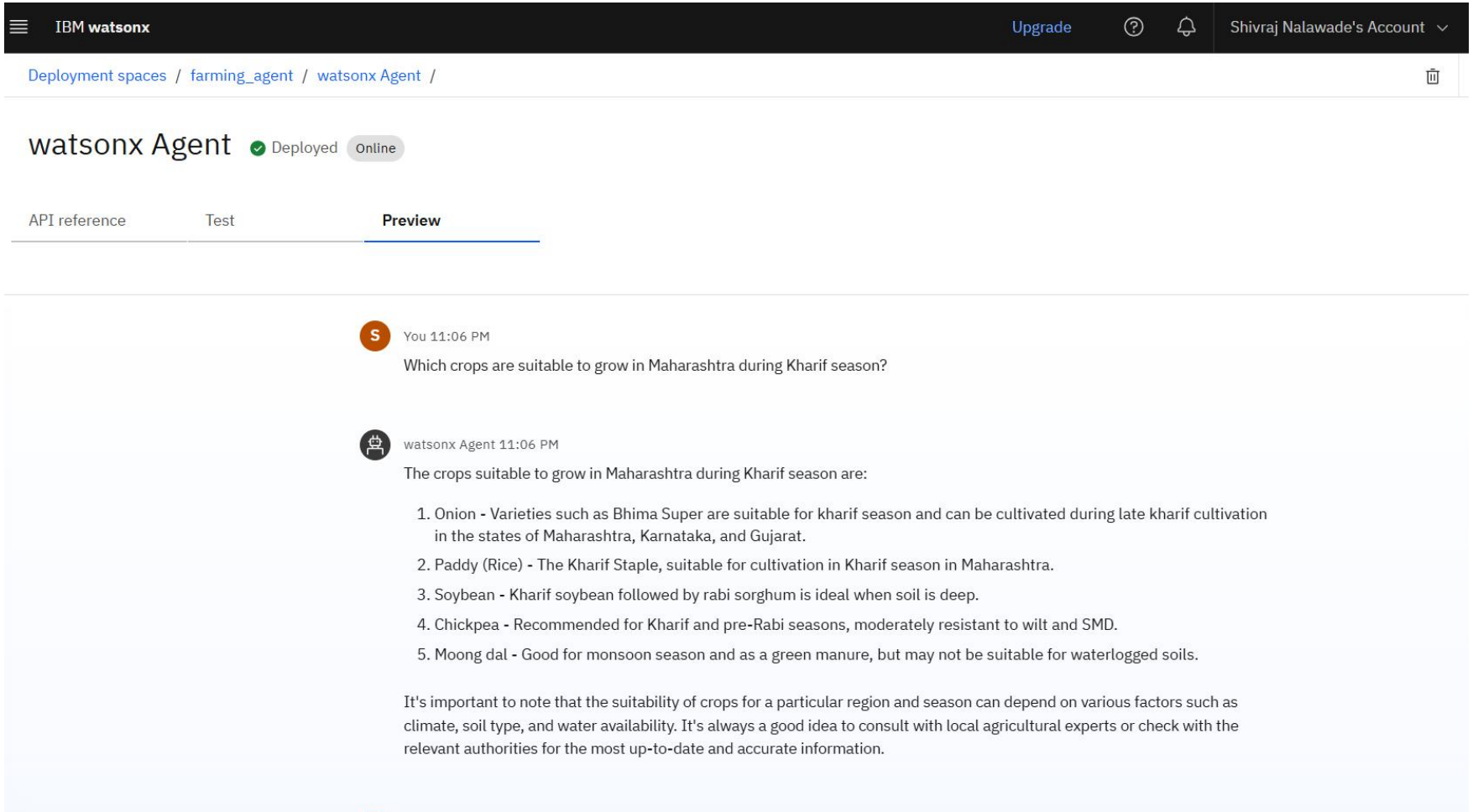
Unique features:

- **Natural language Q&A** on crops, soil, weather, pests, and mandi prices.
- **Personalized crop recommendations** based on season, region, and soil type.
- **Step-by-step pest and disease management** using ICAR guidelines.
- **Integrated weather and mandi price updates** for better planning and sales.
- **Simple, farmer-friendly conversational interface** for quick answers.

END USERS

- Small and medium-scale farmers
- Agricultural extension officers
- Agri-tech startups
- State agriculture departments & cooperatives

RESULTS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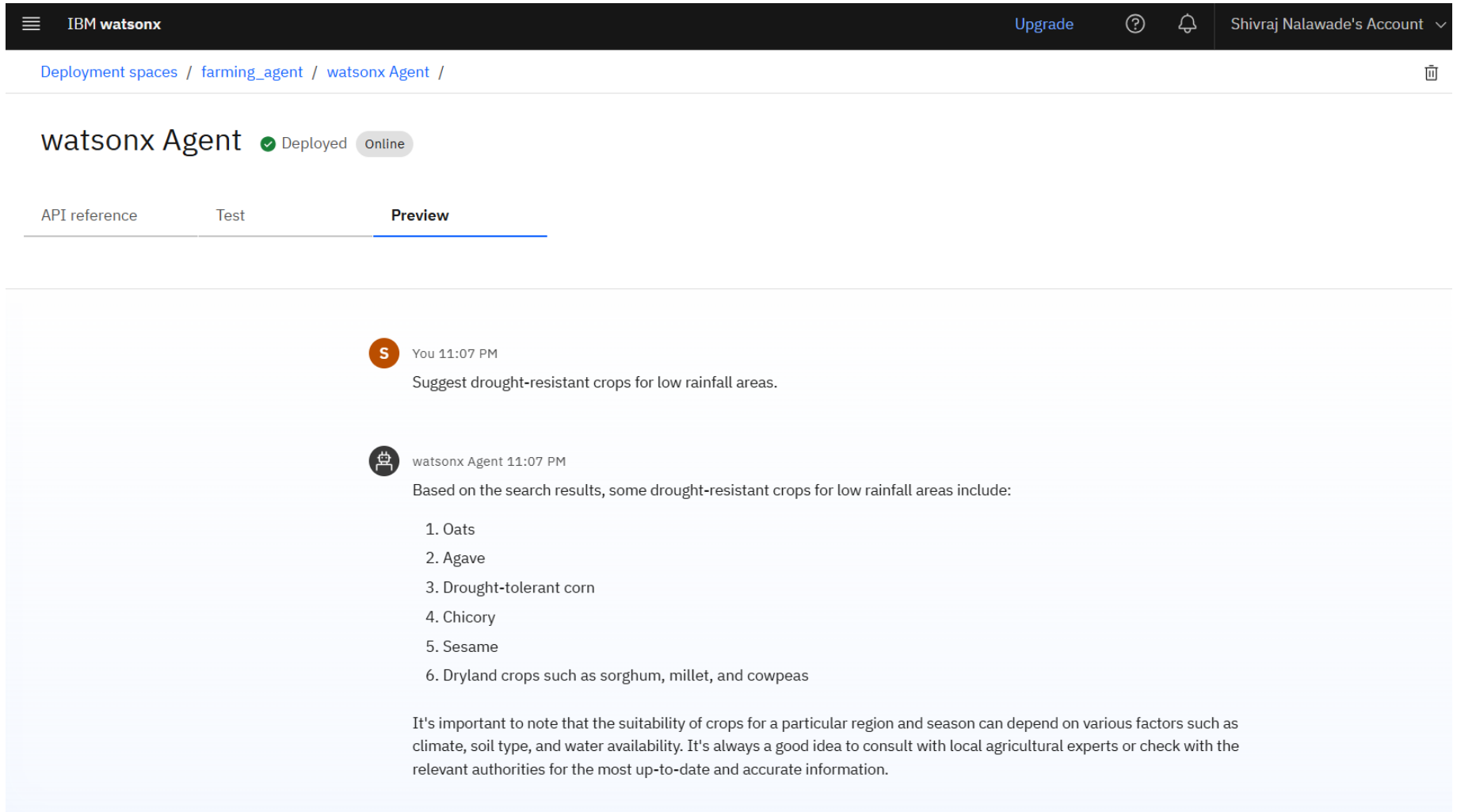
Preview
S
You 11:06 PM
Which crops are suitable to grow in Maharashtra during Kharif season?
watsonx Agent 11:06 PM
The crops suitable to grow in Maharashtra during Kharif season are:
1. Onion - Varieties such as Bhima Super are suitable for kharif season and can be cultivated during late kharif cultivation in the states of Maharashtra, Karnataka, and Gujarat.
2. Paddy (Rice) - The Kharif Staple, suitable for cultivation in Kharif season in Maharashtra.
3. Soybean - Kharif soybean followed by rabi sorghum is ideal when soil is deep.
4. Chickpea - Recommended for Kharif and pre-Rabi seasons, moderately resistant to wilt and SMD.
5. Moong dal - Good for monsoon season and as a green manure, but may not be suitable for waterlogged soils.
It's important to note that the suitability of crops for a particular region and season can depend on various factors such as climate, soil type, and water availability. It's always a good idea to consult with local agricultural experts or check with the relevant authorities for the most up-to-date and accurate information.

RESULTS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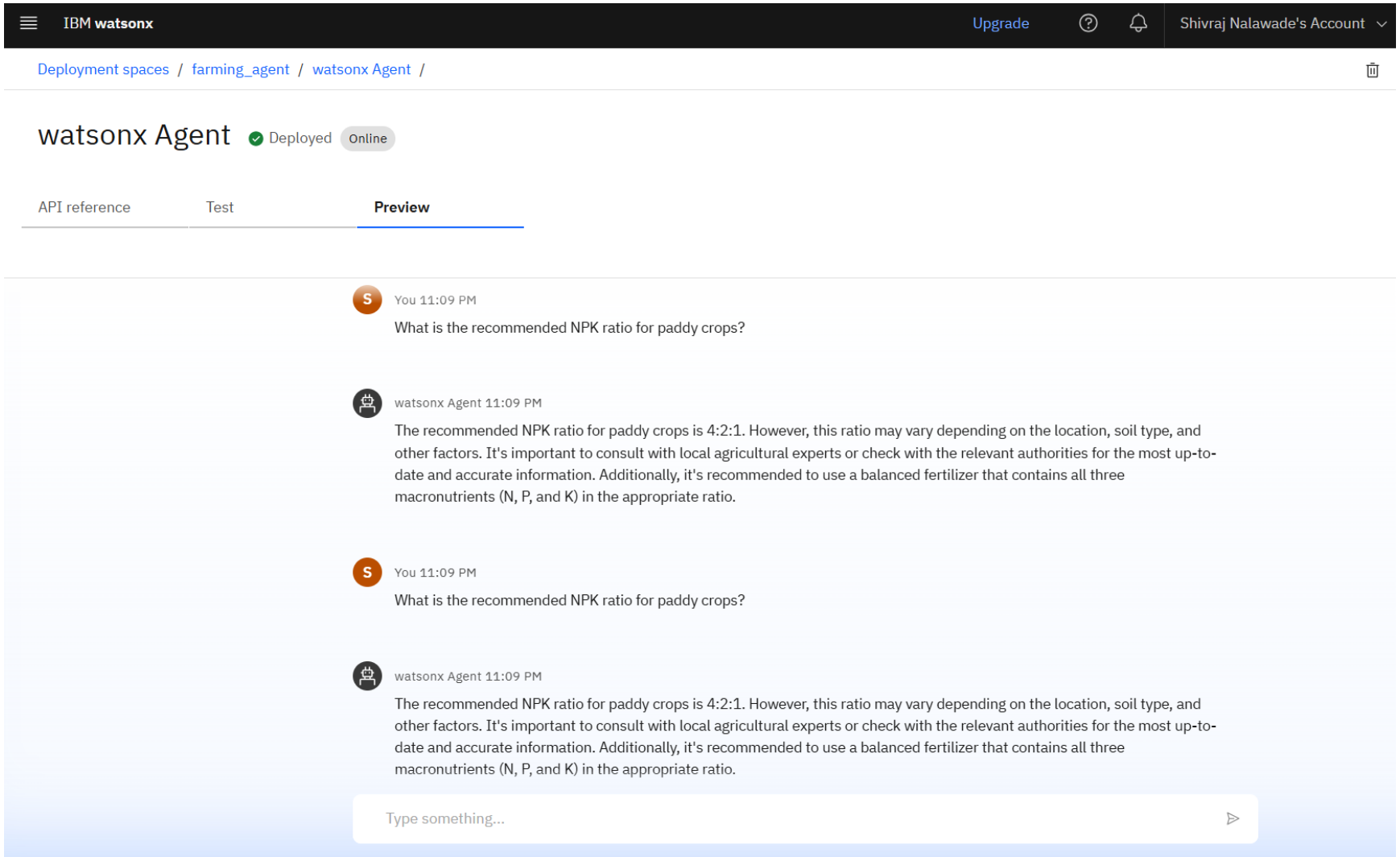
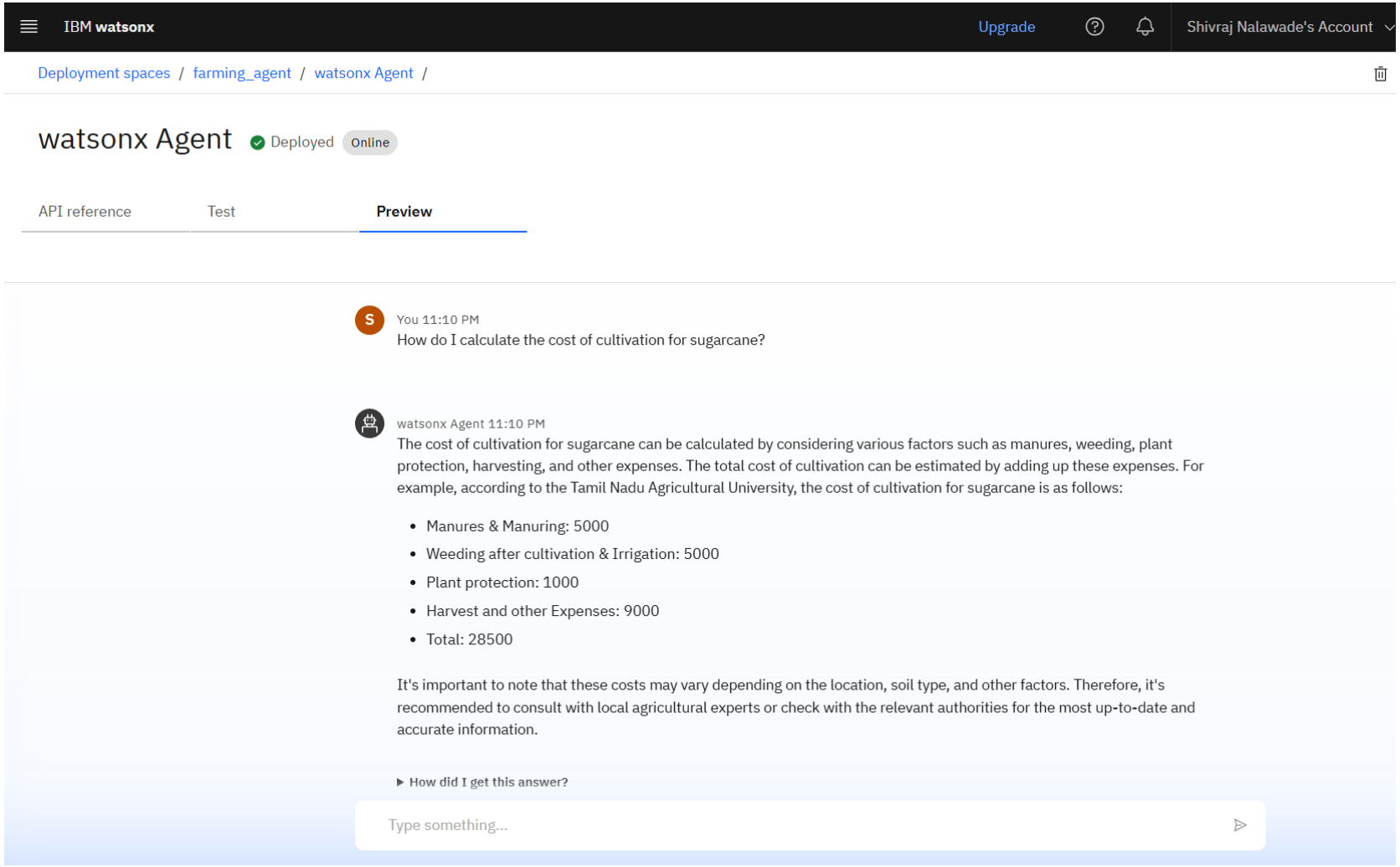
You 11:07 PM
Suggest drought-resistant crops for low rainfall areas.
watsonx Agent 11:07 PM
Based on the search results, some drought-resistant crops for low rainfall areas include:
1. Oats
2. Agave
3. Drought-tolerant corn
4. Chicory
5. Sesame
6. Dryland crops such as sorghum, millet, and cowpeas
It's important to note that the suitability of crops for a particular region and season can depend on various factors such as climate, soil type, and water availability. It's always a good idea to consult with local agricultural experts or check with the relevant authorities for the most up-to-date and accurate information.

RESULTS



RESULTS

Deployed AI Agent



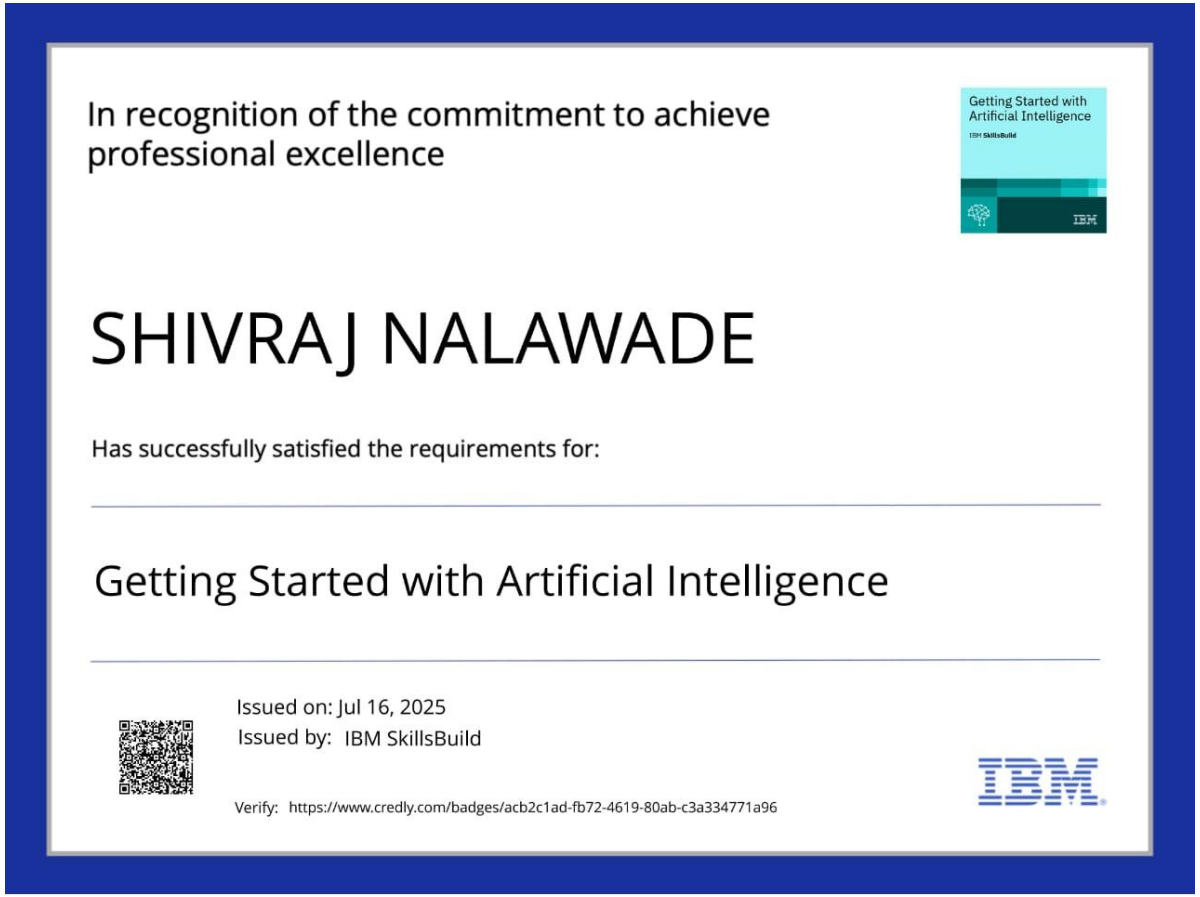
CONCLUSION

- **Bridges the knowledge gap:** Provides farmers with **real-time, reliable, and localized agricultural advice** on crops, weather, pests, and market prices.
- **Empowers decision-making:** Helps farmers **plan better, reduce risks, and improve productivity** through actionable, AI-driven insights.
- **Enhances accessibility:** Offers **multilingual, easy-to-use interaction**, making advanced agricultural guidance accessible even to grassroots farmers.

FUTURE SCOPE

- **Voice-based interaction** for illiterate farmers
- **Integration with IoT (soil sensors, weather stations)**
- **Mobile app deployment** for easy accessibility
- **Expanded multilingual support** (regional dialects)
- **Partnership with agri-markets for live trading prices**

IBM CERTIFICATIONS



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IBM **SkillsBuild**

Completion Certificate

This certificate is presented to

SHIVRAJ NALAWADE

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

- https://github.com/shivraj-nalawade/smart-farming-agent.git

THANK YOU

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