**Design Thinking Project Workbook**

**Team Name: Crop Recommendation System**

**Team Members:**

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1. **Problem/Opportunity Domain**

* **Domain of Interest:** Agriculture
* **Description:** The Crop Recommendation System is an AI-driven solution that analyzes soil conditions, weather patterns, and historical data to suggest the best crops for farmers, aiming to maximize yield and sustainability.
* **Why Chosen:** Farmers often face challenges due to unpredictable weather, soil degradation, and lack of access to expert advice, leading to suboptimal crop choices and financial losses.

1. **Problem/Opportunity Statement**

* **Problem Statement:** Farmers struggle to make informed crop choices due to limited access to real-time data and expert guidance, resulting in reduced productivity and financial instability.
* **Problem Description:**
  + Manual crop selection methods are outdated and unreliable.
  + Current systems lack integration with real-time weather and soil data.
  + Poor crop choices lead to low yields and financial losses.
* **Context:** Occurs when farmers plan planting seasons, especially in regions with unpredictable climates.
* **Alternatives:** Traditional farming knowledge, government advisories, or generic agricultural apps.
* **Customers:** Small-scale and large-scale farmers, agricultural cooperatives, agronomists.
* **Emotional Impact:** Farmers feel uncertain, frustrated, or financially strained due to poor harvests.
* **Quantifiable Impact:** Reduced crop yields, increased input costs, and lower income for farmers.
* **Alternative Shortcomings:** Traditional methods are not data-driven, advisories may not be localized, and generic apps lack precision.

1. **Addressing SDGs**

* **Relevant SDGs:** SDG 2 (Zero Hunger), SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action).
* **How Addressed:** Promotes sustainable farming, reduces waste, and helps farmers adapt to climate change.

1. **Stakeholders**

* **Key Stakeholders:** Farmers, agronomists, agricultural cooperatives, government agencies, AI developers, seed suppliers.
* **Roles:**
  + Farmers use the system for crop decisions.
  + Agronomists validate recommendations.
  + Government agencies provide policy support.
  + Developers build and maintain the system.
* **Interests/Concerns:**
  + Farmers want easy-to-use, accurate recommendations.
  + Agronomists seek scientifically validated data.
  + Government agencies focus on scalability and impact.

1. **Power Interest Matrix of Stakeholders**

**A diagram of a chart

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* **High Power, High Interest:**
  + Farmers (primary users).
  + Government agricultural departments.
* **High Power, Low Interest:**
  + Seed suppliers (funding potential).
* **Low Power, High Interest:**
  + Local farming communities.
* **Low Power, Low Interest:**
  + General public (indirect impact).

1. **Empathetic Interviews**

**Conducted interviews with 3 farmers and agronomists:**

| **User/Interviewee** | **Questions Asked** | **Insights Gained** |
| --- | --- | --- |
| Ramesh, Farmer | How do you decide which crops to plant? | Relies on traditional knowledge but faces losses due to unpredictable weather. |
| Priya, Agronomist | What challenges do farmers face? | Lack of localized data and real-time updates hinder optimal crop choices. |
| Suresh, Farmer | What tools do you use currently? | Uses government advisories but finds them generic and not tailored to his land. |

1. **Empathy Map**A map of a farmer's crop

   AI-generated content may be incorrect.

**Who is your Customer?**

* **Description:** Ramesh, a 45-year-old farmer from rural India.
* **Key Points:**
  + Struggles with low yields due to poor crop choices.
  + Needs a simple, data-driven tool to guide planting decisions.

**Who are we empathizing with?**

1. Farmers overwhelmed by climate unpredictability.
2. Those with limited access to expert advice.
3. Individuals frustrated with outdated methods.
4. **Persona of Stakeholders**

**Stakeholder Name:** Ramesh

* **Demographics:** 45 years old, small-scale farmer, rural area.
* **Goals:** Maximize crop yield, reduce input costs.
* **Challenges:** Unpredictable weather, soil degradation.
* **Aspiration:** To adopt technology for better farming outcomes.
* **Needs:** Real-time, localized crop recommendations.

**9. Common Themes, Behaviors, Needs, and Pain Points**

**Common Themes:**

* Need for data-driven decisions.
* Desire for localized and real-time insights.

**Common Behaviors:**

* Reliance on traditional methods.
* Willingness to adopt technology if proven effective.

**Common Needs:**

* Accurate crop recommendations.
* Integration with weather and soil data.

**Common Pain Points:**

* Lack of access to expert advice.
* High financial risk due to poor harvests.

**10. POV Statements**

| **POV Statement** | **Role-Based** | **Benefit** | **HMW Question** |
| --- | --- | --- | --- |
| A small-scale farmer needs accurate crop recommendations because unpredictable weather leads to financial losses. | **Farmer** | **Higher yields, reduced risk** | How might we provide hyper-localized crop advice? |

**11. How Might We (HMW) Questions**

1. How might we integrate real-time weather and soil data into crop recommendations?
2. How might we make the system accessible to farmers with limited tech literacy?

**12. Solution Concept**

**Problem Statement:** Farmers lack data-driven tools for optimal crop selection, leading to reduced productivity.  
**Target Audience:** Small-scale and large-scale farmers.  
**Solution Overview:** AI-driven system providing personalized crop recommendations.  
**Key Features:**

* Real-time soil and weather analysis.
* Personalized crop suggestions.
* User-friendly mobile interface.

**Benefits:**

* Increased crop yields.
* Reduced financial risk.

**13. Validation Plan**

| **Stakeholder** | **Feedback** | **Suggestions** |
| --- | --- | --- |
| Farmers | Ensure simplicity and offline access. | Add voice-based input for ease. |
| Agronomists | Validate scientific accuracy. | Include pest resistance data. |

**14. Ideation**

| **Idea** | **Solution** | **Challenges** |
| --- | --- | --- |
| AI-Driven Recommendations | Uses ML to analyze soil and weather. | Data quality and availability. |
| Mobile App with Offline Access | Works without internet. | Limited functionality offline. |

**15. Next Steps**

1. **Research:** Gather soil and weather datasets.
2. **Prototype:** Develop a basic recommendation engine.
3. **Test:** Pilot with a small group of farmers.
4. **Iterate:** Refine based on feedback.