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1. INTRODUCTION

1.1 Overview

In India, agriculture is one of the major sectors that helps boost economy of the nation, makes it self-reliant for food and provide millions of farmers with livelihood. Though we are gradually making improvement for the betterment of agriculture, there is still inconsistency in managing our production of different types of crops and use of Irrigation resources. Lack of awareness is leading to farmers producing limited types of crops, wastage of fertile land and sometimes surplus harvest. To solve these problems, we will try to provide effective solutions and strategies with the help of past data and assist farmer in making informed decisions for better yield, production and efficient use of water resources.

1.2 Purpose

The primary objective of this project is to reach out our hardworking farmers and provide support in their daily agricultural activities. In a country like India, where farming is the backbone, this project will guide farmers to utilize their land and resources effectively to generate profits. Educating farmers about optimal crop selection and management is much needed. It's all about helping them succeed, ensuring our nation's self-sufficiency in agriculture and improving their livelihood.

2. LITEARATURE SURVEY

2.1 Existing Solution

The current solution tackles this issue by offering crop recommendations to farmers by considering multiple factors such as soil pH, nitrogen, phosphorus, potassium levels, rainfall, and humidity. These data points are fed into a machine learning algorithm, which then recommends a crop.

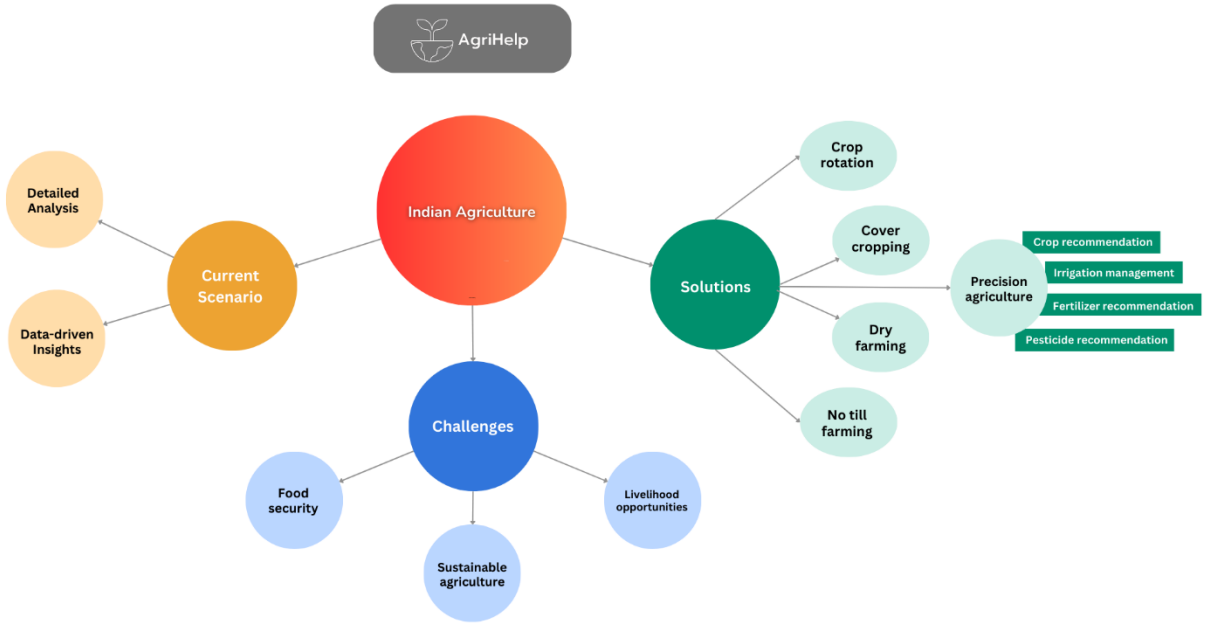
2.2 Proposed Solution

We propose a comprehensive solution aimed at improving agricultural decision-making for farmers with limited soil knowledge. Our Crop Recommendation System considers factors like land type, water availability and season to provide recommended crops. Alongside these recommendations, we offer the necessary capital, machinery and NPK (Nitrogen, Phosphorus and Potassium) values, allowing farmers to make informed decisions. Additionally, we've implemented an Irrigation Scheduler, allowing farmer's to efficiently plan their irrigation. Furthermore, our system also recommends fertilizers and pesticides which provide the cure on the click of an image, by which can assist farmers in

managing crop health. This solution not only simplifies crop selection but also aids in optimizing farming practices and resource allocation.

3. THEORITICAL ANALYSIS

3.1 Block Diagram



3.2 Hardware/Software Designing

RAM: Any device with 2GB. A desktop is recommended.

Processor: Minimum 1GHz, 2GHz is recommended.

Internet: With a connection of Wi-Fi or LAN.

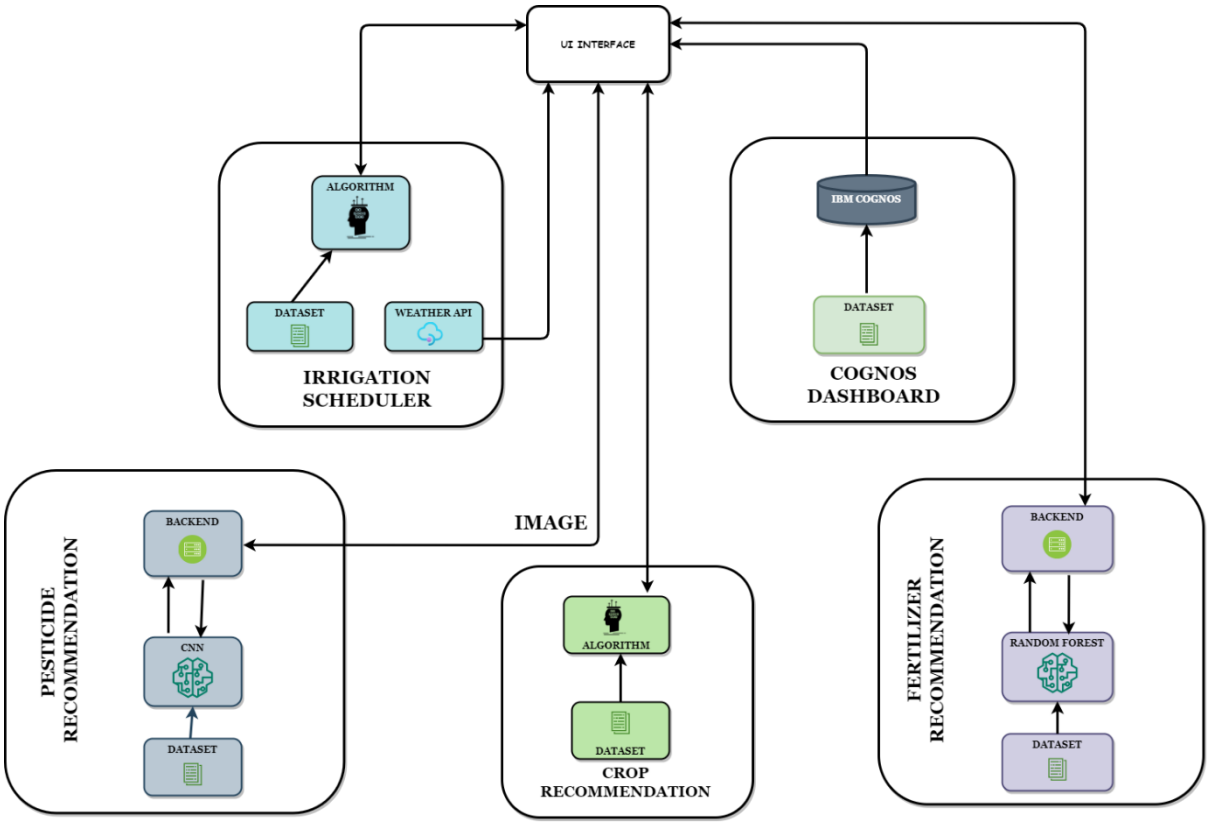
Application: Browser. Chrome is recommended.

4. EXPERIMENTAL INVESTIGATION

Extensive research was done to develop the solutions in the project. We've discovered that India, while being self-reliant in agriculture faces a sheer contrast in terms of farmers' conditions. This disparity is largely due to the lack of information available to farmers about their own lands and resources. India's diverse crop production potential remains largely untapped. Numerous farming practices, such as informed crop production, crop rotation, irrigation scheduling, dry farming, crop management, cover cropping, no-tillage farming and regenerative farming offer substantial benefits. Unfortunately, many farmers rely on limited knowledge or hearsay, risking crop damage, wasted efforts and resources, soil degradation. Our solutions, including crop, pesticide and fertilizer recommender, along with irrigation scheduler, which were developed based on high volume

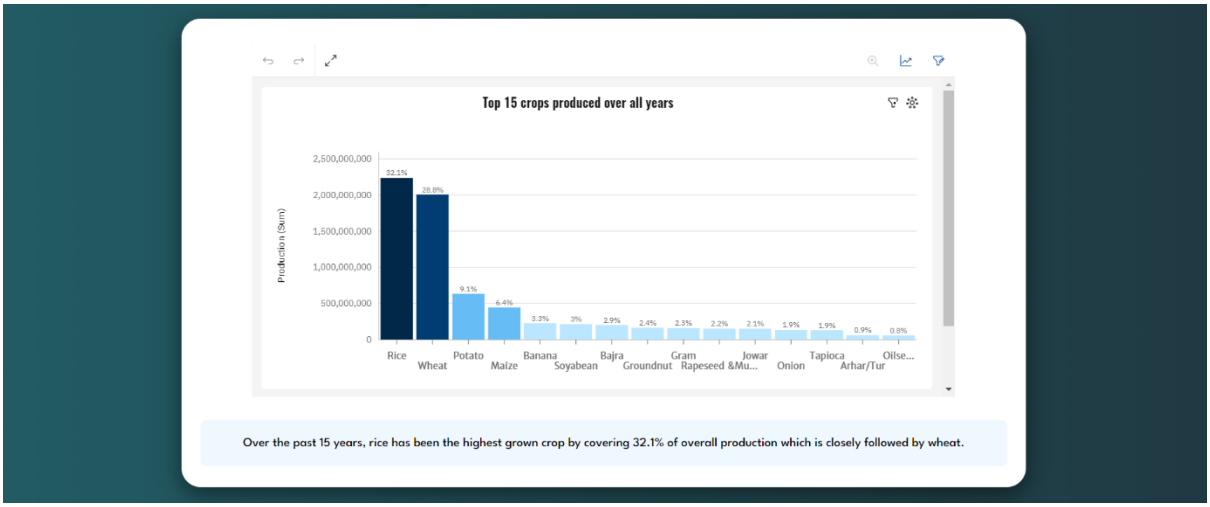
of data and research will bridge the gaps and empower farmer in sustainable agricultural practices.

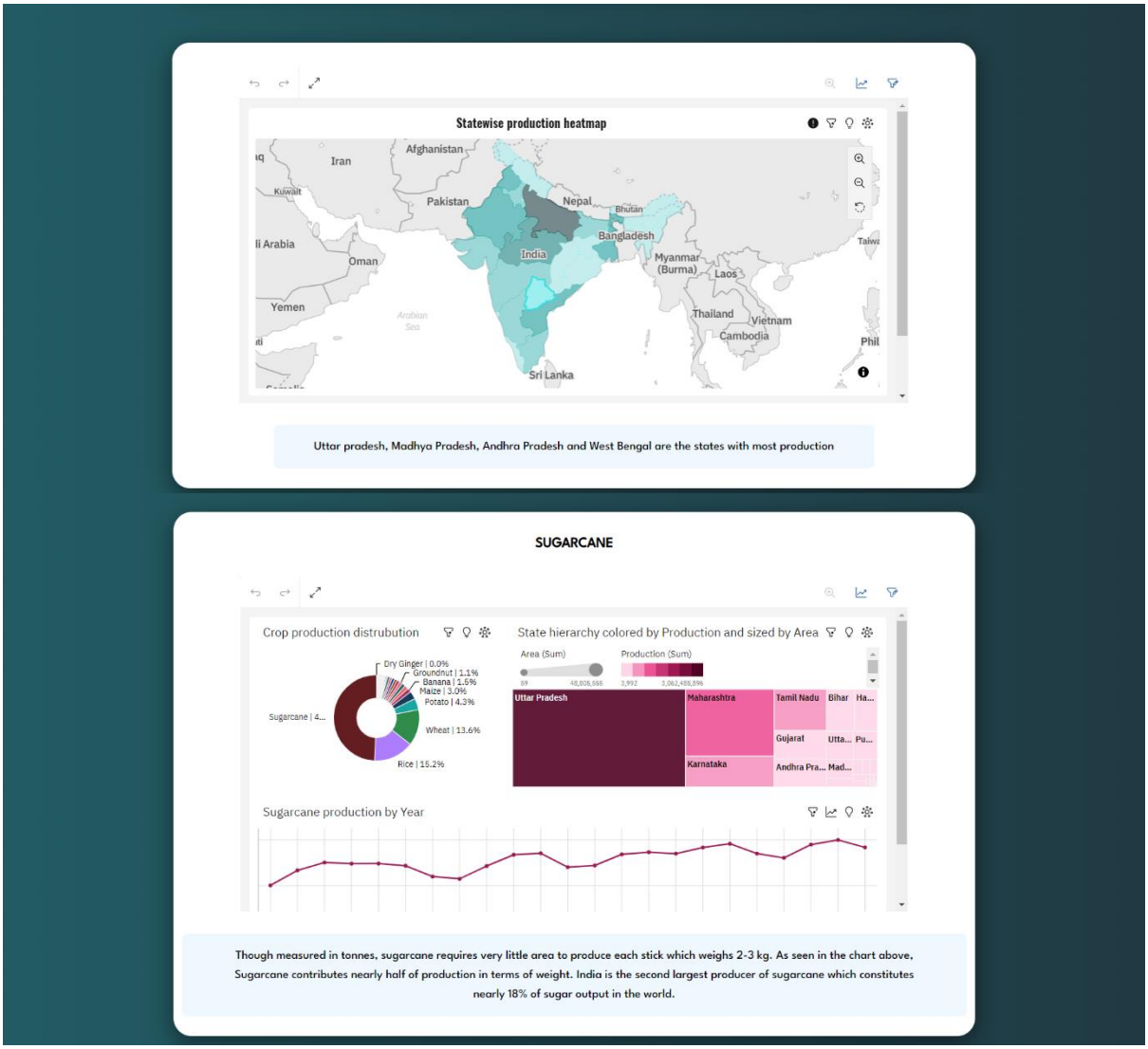
5. FLOW CHART



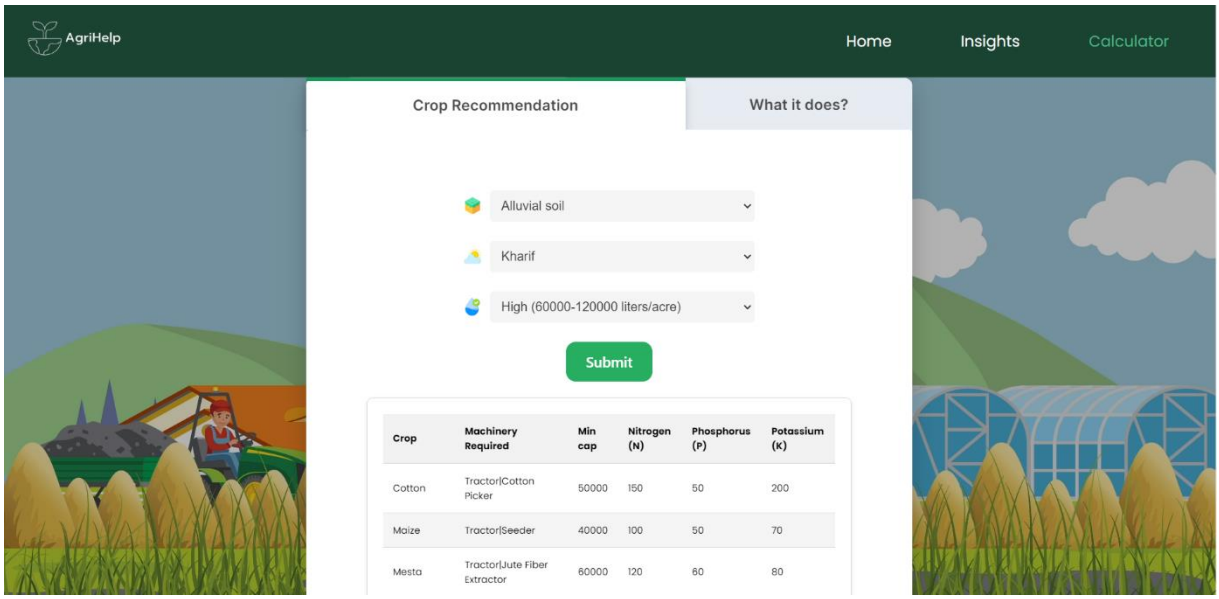
6. RESULT

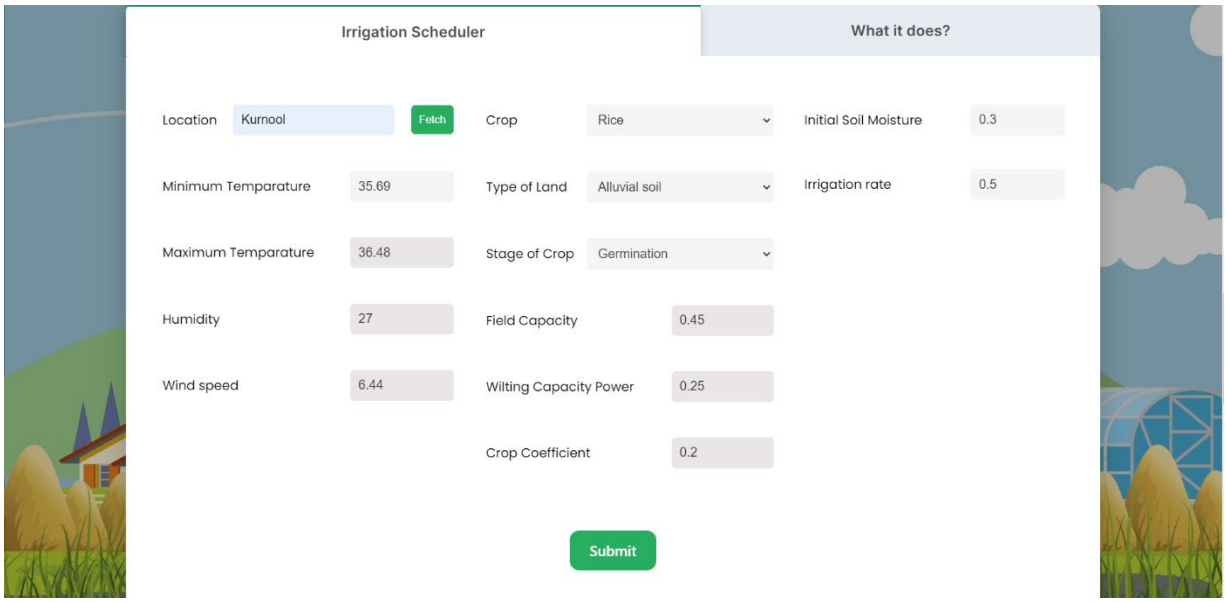
We have developed dashboards using IBM Cognos where we have used extensive data encompassing a decade's worth of information on Indian agriculture. This data encompasses the diversity of crops cultivated across different states. After thorough analysis, we extracted valuable insights into various crop categories. Our dashboards vividly depict agricultural trends spanning a decade, showcase the top producing crops, highlight high-yield varieties, and present a wealth of additional agricultural information. You can view the snapshots of these informative dashboards below:





As explained in proposed solution, we have developed the recommenders and scheduler and snapshots can be viewed below:





7. ADVANTAGES AND DISADVANTAGES

Advantages:

- Farmer can make inform decisions and cultivate high-yield crops, optimizing their agricultural output.
- Water resources can be used efficiently, reducing waste and ensuring sustainable irrigation practices.

- Farmers can easily determine which nutrients are required for crop growth and apply them effectively, enhancing soil health and crop yield.
- Pesticide recommendations simplify pest management, aiding in the efficient eradication of pests and diseases, safeguarding crops.

Disadvantages:

- Farmer has to go through the soil test procedure repeatedly to use some of our solutions.
- We have only used little number of crops for pesticide recommendation, which can be solved if training data is increased.

8. APPLICATIONS

The solutions can be applied effectively, especially in countries like India, where agriculture is a significant contributor to the economy and where there is a need for improved farming practices and farmer support. From farmers with no prior soil data knowledge to those well-informed about their land and crops, our solutions have wide range of audience. The solutions can benefit:

- **Farmers** who want to make optimal resource utilization.
- **Agricultural Organizations** to provide guidance and support to farmers in enhancing productivity.
- **Government Initiatives** can incorporate these solutions to promote sustainable farming practices and support farmers.
- **Agri-Tech Companies** can integrate our solutions into their products and services to offer more comprehensive and data-driven solutions to farmers.

9. CONCLUSION

In Conclusion, our project represents a significant leap forward in the domain of agricultural support. By leveraging extensive data on Indian agriculture and creating advanced visualizations and analytics, we've created a comprehensive set of solutions to address the challenges faced by farmers.

From aiding farmers with limited soil information in selecting the most suitable crops to optimizing irrigation, managing nutrients and recommending pesticides our solutions offer support for sustainable and high-yielding farming practices. By bridging the gap between traditional farming practices and data-driven insights, we aspire to foster a more prosperous and sustainable agricultural sector.

Our project is a powerful fusion of data, technology and agricultural expertise poised to transform the way farming is practiced.

10. FUTURE SCOPE

The future scope of the project extends to various domains or areas:

- **Integrating IOT,** sensors can provide real-time soil and weather data further improving recommendations and irrigation scheduling.

- **More Solutions,** if the data collection can be done then crop rotation, cover cropping and dry farming all these practices can be recommended to farmers for better farming.
- **Policy integration,** policy-makers can integrate these solutions into government initiatives and amplify the impact.
- **Market Linkage,** if we could manage to access markets then this could become a complete agricultural chain.

11. BIBILOGRAPHY

Resources:

https://eos.com/blog/soil-moisture/

https://lumo.ag/what-are-smart-irrigation-systems-and-how-do-they-work/

https://eos.com/blog/precision-irrigation/

API and tools:

https://rapidapi.com/wettercom-wettercom-default/api/forecast9

https://www.ibm.com/docs/en/cognos-analytics/12.0.0?topic=hosted-cognos-analytics-cloud

https://www.ibm.com/docs/en/cloud-paks/cp-data/4.7.x?topic=services-watson-machine-learning

12. APPENDIX

https://backend-parshu-8203-dev.apps.sandbox-m3.1530.p1.openshiftapps.com/