HYDROCHAR

A HYDROGEL-BIOCHAR SOLUTION FOR WATER RETENTION AND SOIL HEALTH

AUTHORS

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If the grownups won't we will

INTRODUCTION

We decided to delve into the agricultural industry.
Taking inspiration from our NCERT books, talking about NPK fertilizers and the upcoming solutions to increase yield, we noticed that all of the fertlizers had various cons.
We asked if we could create a fertilizer, which is AFFORDABLE, ECOFRIENDLY and ACCESSIBLE.
Will it fix the most common issues faced with Conventional fertilizers?
Will it increase soil water retention?
Will its impact be sustainable?
Is it Scalable?

OBJECTIVE

We aim to become the next step in the Green Revolution and make it Greener. We want to achieve a fertilizer which creates a long term sustainable and ecofriendly fertilizer which replaces and reduces the use of toxic chemical fertilizers

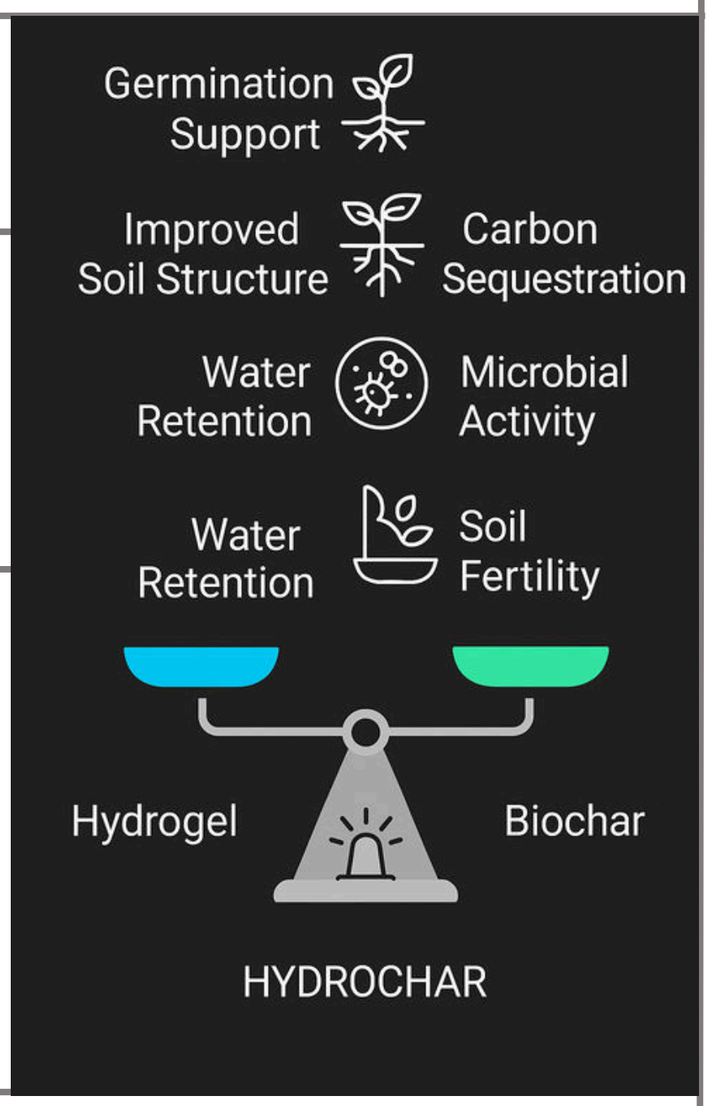
METHODOLOGY

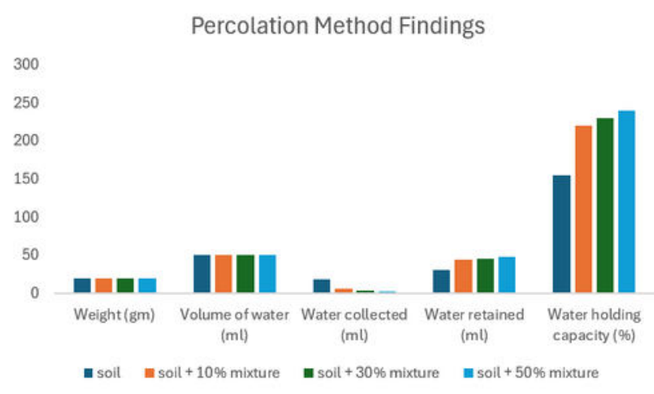
Our process to come to this solution was as follows:

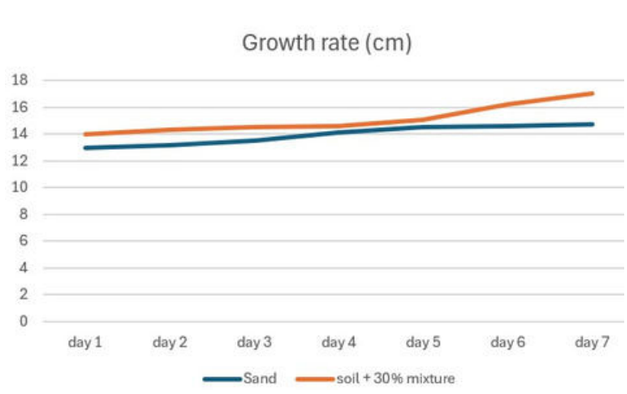
1. Identify a problem which has a great impact in India
2. Do field research, talk to farmers and research analysts
3. Gather the cost of using traditional fertilizers as to have a Price to Beat
4. Find suitable materials to use and their biodegradable and most efficient versions, maintaining balance
5. Do experiments on fertilizers properties to measure effciency

OUR FINDINGS

Water Retention: Hydrogel + Biochar mixtures can lead to a 50-65% reduction in irrigation needs.
Nutrient Retention: These mixtures achieve 85-88% nutrient retention, significantly reducing leaching.
Crop Yield: Using hydrogel + biochar can result in an 18-25% increase in crop yield over the long term.
Cost: The annual cost per acre for hydrogel + biochar is estimated to be ₹1,090 - ₹3,140, compared to ₹8,000 - ₹12,000 for conventional fertilizers.
Return on Investment (ROI): Hydrogel + biochar can provide a 100% ROI in one season.
Rainwater Harvesting: Hydrogel + biochar shows a 95% improvement in rainwater harvesting.







ANALYSIS

The analysis of the hydrochar experiment revealed key insights into its effects on soil properties. The experiment measured pH, growth rate, water retention, and nitrogen content, showing how hydrochar influenced these factors compared to other soil types. The results demonstrated that hydrochar affected water retention positively, improved nitrogen content, and contributed to better growth rates in comparison to the control soils.

CONCLUSION

Increased soil water retention by 40% and reduced irrigation needs by 30%-50%.
Hydrochar application led to faster plant growth, indicating sustainable increase in agricultural yields and productivity.
Future research should explore combining hydrochar with intelligent irrigation systems and AI for wider application across various crops and soil types.