HYDROGUARD

SMART INDIA HACKATHON 2024

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- **Problem Statement ID:** SIH1691
- **Problem Statement Title:** Adaption of 'Existing Command Area in Response to Shifting of Agricultural Practices
- **Theme:** Miscellaneous
- **PS Category:** Software
- **Team ID:**49460
- **Team Name:** Team Chakravyuh123

Team Chakravyuh[123]

presents...

The Water Optimizer



HYDROGUARD

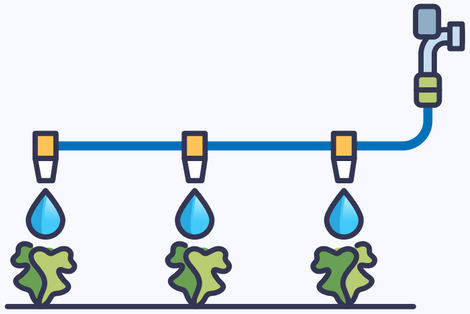
Problem Statement

SIH1691: Adaptation of ‘Existing Command Area in Response to Shifting of Agricultural Practices’

Problem:

- Siltation of Existing Dams and Reservoirs
- Impact of Climate Change
- Outdated Water Management Practices
- Lack of Integrated Long-Term Planning

Solutions



Suggestions for Efficient Irrigation Methods



Comparative Analysis and Prediction System for Water Loss



Calculation and Analysis of Canal Loss



Real-Time Data Monitoring of Command Areas

Solutions

Real-Time Data Monitoring of Command Areas

Google Earth Engine:

Analysing real time data and images to help in monitoring

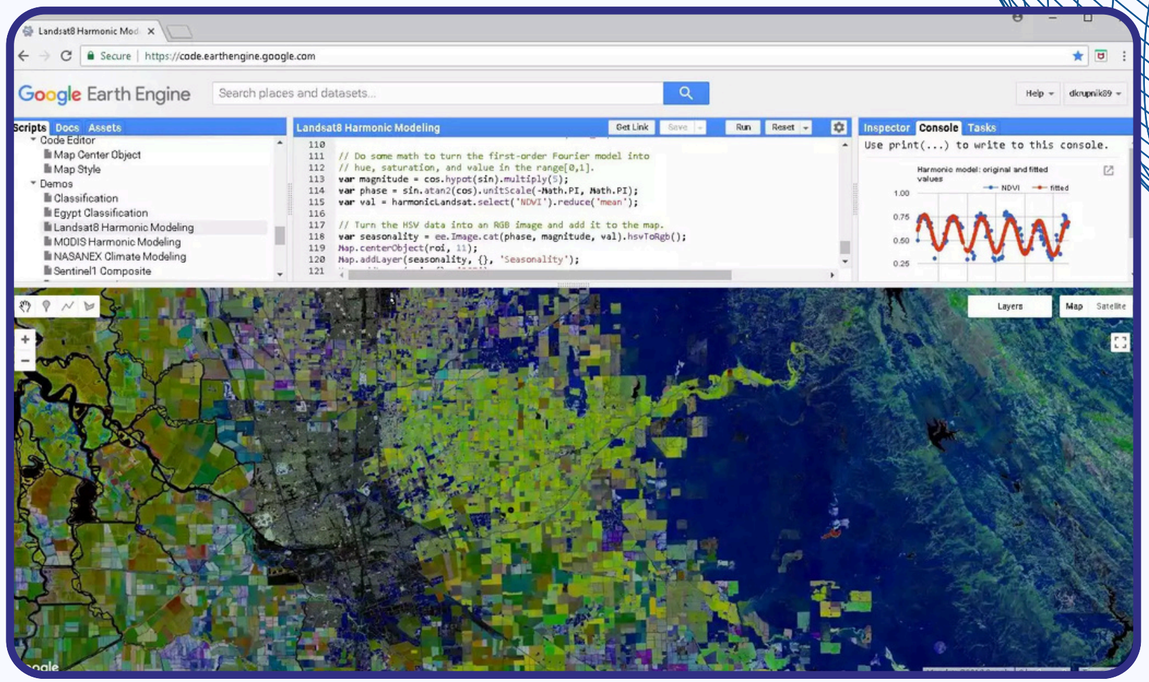
Water level

Volume

Sedimentation levels

Mean Depth

Status of Water Body



Solutions

Real-Time Data Monitoring of Command Areas



Name:
Gobind Sagar

GrossVolume:
123214114212

Latitude:
31.25

Longitude:
76.3

Mean Depth:
35.7

Status:
good

Last Maintenance:
0001-01-01T05:06:32+05:30

Solutions



Calculation and Analysis of Canal Loss

We collect data about a Canal's Physical and Operational Characteristics, such as
Flow rate (Qe)
Width
Soil type
Area
Soil Type
Depth
Length

$$ET_L = ET_O \cdot K_{eff}$$

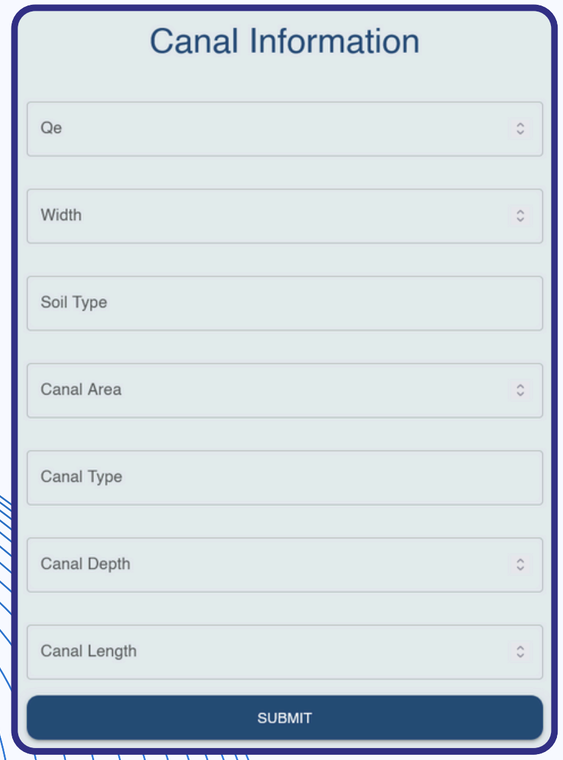
$$K_{eff} = L_1 K_1 + L_2 K_2 + L_3 K_3 + L_4 K_4 / L_1 L_2 L_3 L_4$$

These parameters are essential in assessing water loss within the canal system. Water loss in canals typically occurs due to two main factors: seepage loss and evaporation loss.

Solutions

Calculation and Analysis of Canal Loss

Input Values For Calcultions



Output Response

Response from backend:


```
{
  "message": "Success",
  "data": {
    "seepage_loss": 794430,
    "evaporation_loss": 1166710,
    "total_loss": 1961140
  }
}
```

Solutions



Suggestions for Efficient Irrigation Methods

We analyze irrigation data input such as
Rain
Crop type
Irrigation method
Land cover
to Calculate water requirements and usage. It identifies inefficiencies, suggests optimized irrigation methods (e.g., switching to drip systems), and provides actionable insights to reduce water loss and improve sustainability in agricultural practices.



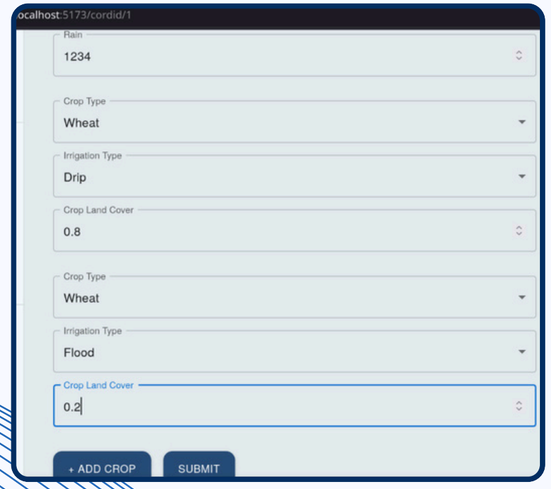
Comparative Analysis and Water Loss

Solutions



Suggestions for Efficient Irrigation Methods

Input Values For Analysis



Output Response

Results from /crops/process:

Water Requirement: 64889.39 MCM
Water Configuration: 83577.54 MCM
Optimal Water Usage: 72027.22 MCM
Suggestions: Can switch wheat to drip.
Configuration Error:



Comparative Analysis and Water Loss

Process Flow Diagram

Visit HydroGuard

See Dams & Reservoir

Click on Dam



Real Time Insights, Graphs & Charts



Processing & Calculating Command Area

Canal Loss

Enter

Enter Parameters



Analyze Losses

Select Crop Type

Find water need



Compare

Potential Outcomes



Water Efficiency

Reduction of water losses through seepage, transpiration, and evaporation. This leads to optimized water usage and conservation in irrigation practices.





Enhanced Agricultural

By implementing efficient irrigation methods and monitoring yield , sedimentation and crop requirements, the project can support better crop yields and sustainable farming practices.

Local Stakeholders

With access to actionable insights and recommendations, local farmers and water managers gain more control over their resources, improving community engagement and outcomes.

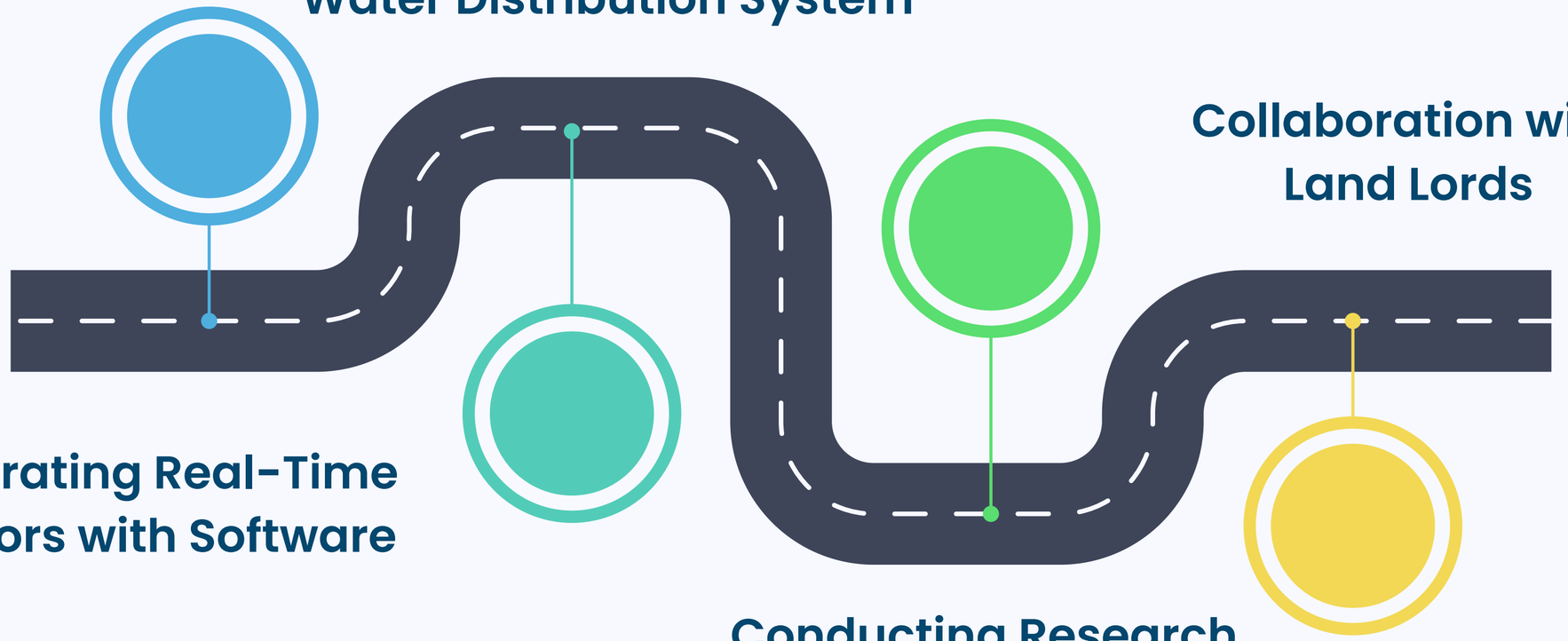




Sustainability

By promoting efficient practices and reducing unnecessary losses, the project supports long-term environmental sustainability and helps manage water resources in the face of climate change.

Future Roadmaps



Thank you!