Soil Regeneraton Hub
Soil Testing &
Regeneration for
Gardeners and Growers

The Problem

- Food, agriculture, and land use are massive contributors to climate change.
  - 22% of GHG emissions
  - 70% of water withdrawals
  - ~38% of the Earth's land surface
- Degradation of soil impacts plant health, food security, water quality, and nutrition.
- Soil testing is cumbersome, complex, and often hard to interpret.
- Lack of services promoting and educating customers on regenerative practices

Example soil report in excel format

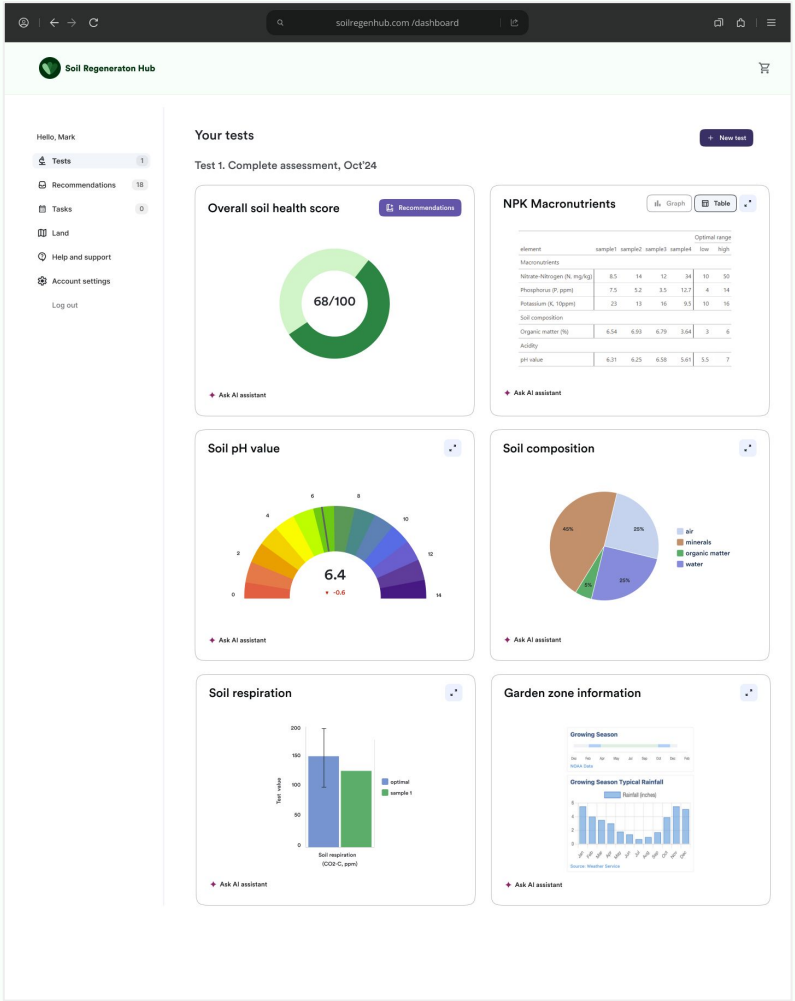
SOILS REPORT		Print Date	Jan. 4, 2022	Receive Date	1/3/22	
		Location	Taylor Coccari & Rebecca Friendly			
		Requester	Toni Hopman, Toni Hopman & Associates			
		graphic interpretation: * very low, ** low, *** moderate				
			* * * * high, * * * * * very high			
ammonium bicarbonate/DTPA extractable - mg/kg soil		Sample ID Number	22-04-11		22-04-12	22-04-13
Interpretation of data low medium high		Sample Description	Sample 1, Citrus, Exist + 1 New Lemon, 12-18"		Sample 2, D. G. Area, 8-12"	Sample 3, Arbutus Marina, Olive Trees, Drought Tolerant Plant, 10-16"
	elements		graphic		graphic	graphic
0 - 7 8-15 over 15	phosphorus		75.89 *****		52.47 *****	35.26 *****
0-60 60 -120 121-180	potassium		307.91 *****		135.09 ****	164.10 ****
0 - 4 4 - 10 over 10	iron		39.80 *****		43.22 *****	22.35 *****
0- 0.5 0.6- 1 over 1	manganese		7.84 ****		6.48 ****	6.53 ****
0 - 1 1 - 1.5 over 1.5	zinc		128.88 *****		110.53 *****	47.32 *****
0- 0.2 0.3- 0.5 over 0.5	copper		16.97 *****		14.17 *****	9.34 *****
0- 0.2 0.2- 0.5 over 1	boron		0.38 ***		0.23 ***	0.29 ***
	calcium		422.84 ****		353.46 ***	445.96 ****
	magnesium		204.27 *****		186.07 *****	309.85 *****
	sodium		75.87 **		51.40 **	95.54 **
	sulfur		20.93 *		26.94 **	27.83 **
	molybdenum		0.39 ****		0.38 ****	0.23 ****
	nickel		2.67 **		2.26 **	2.17 **
The following trace elements may be toxic	aluminum		n d *		n d *	n d *
The degree of toxicity	arsenic		0.69 **		0.50 **	0.14 *
depends upon the pH of	barium		0.93 *		1.06 *	1.19 *
the soil, soil texture,	cadmium		0.58 *		0.50 *	0.41 *
organic matter, and the	chromium		0.07 *		0.07 *	n d *
concentrations of the	cobalt		0.06 *		0.08 *	0.07 *
individual elements as	lead		21.41 ***		17.40 ***	13.81 ***
well as to their interactions.	lithium		0.30 *		0.26 *	0.28 *
	mercury		n d *		n d *	n d *
	selenium		n d *		n d *	n d *
The pH optimum depends	silver		n d *		n d *	n d *
upon soil organic	strontium		1.60 *		1.28 *	1.80 *
matter and clay content-	tin		n d *		n d *	n d *
for clay and loam soils:	vanadium		0.72 *		0.67 *	0.55 *
under 5.2 is too acidic						

Source: Drawdown.org

Our Solution

- A soil testing and regeneration service for gardeners, landowners, and small farmers.
- User-friendly sample collection and data visualisation.
- Advanced testing including:
  - Soil Health Score
  - Macronutrients, Heavy Metals
  - Soil Ph & Respiration
- Personalized recommendations to regenerate soil health, improve nutrient density, aid plant health and production, reduce runoff, and capture and store carbon.

UI Representation



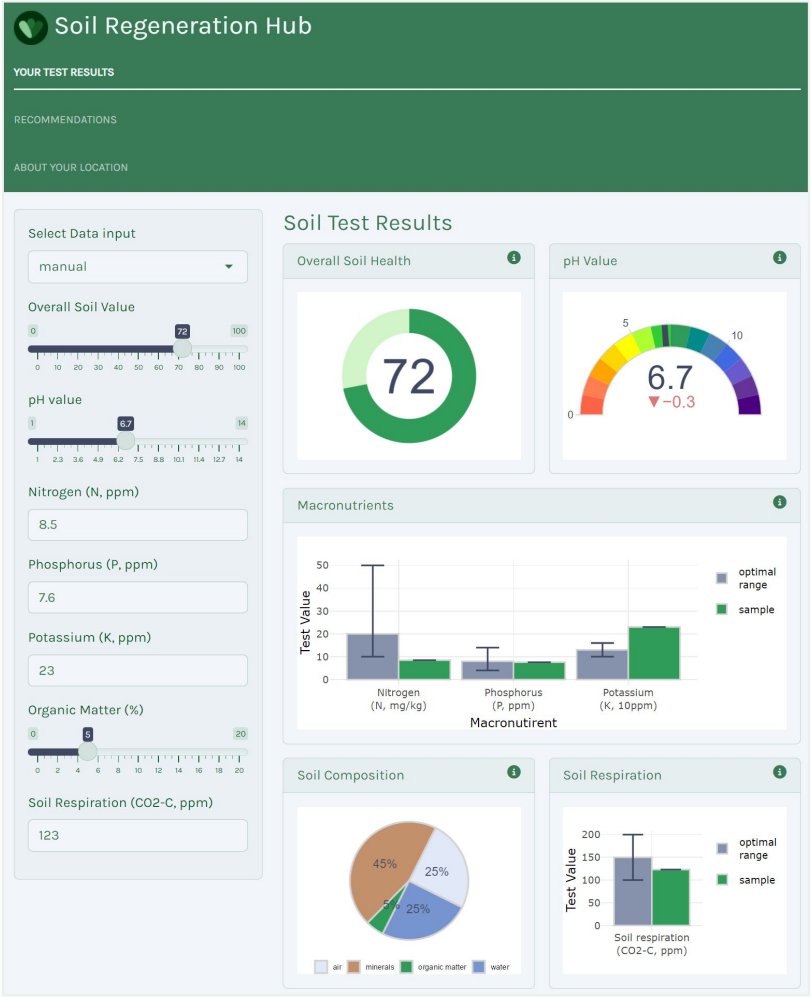
Capstone Project Dream Team

- **Taylor Coccari** - Project lead
- **Eva Harrison** - UI & Product design
- **Juliane Manitz** - Statistics & ML, App Development
- **Scott Hoffberg Wilson** - Data Engineering
- **Clarissa Maciel Fetherston** - Research
- **Eric Wallace-Deering** - Business strategy and research
- **Cole Blum** - Business strategy and research

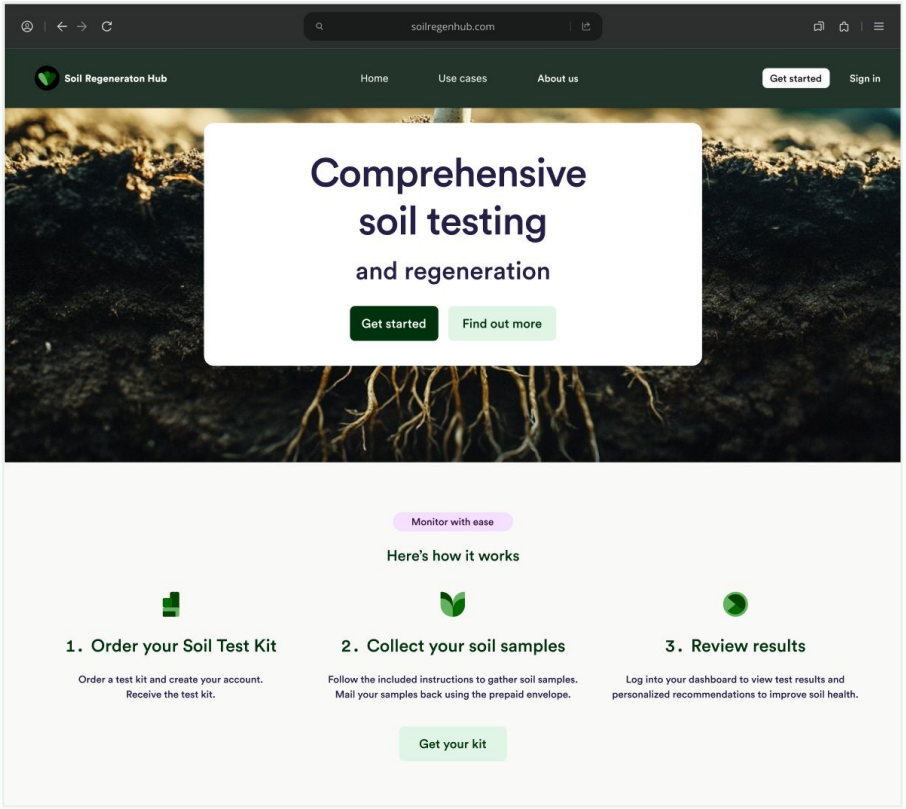
Milestones Achieved

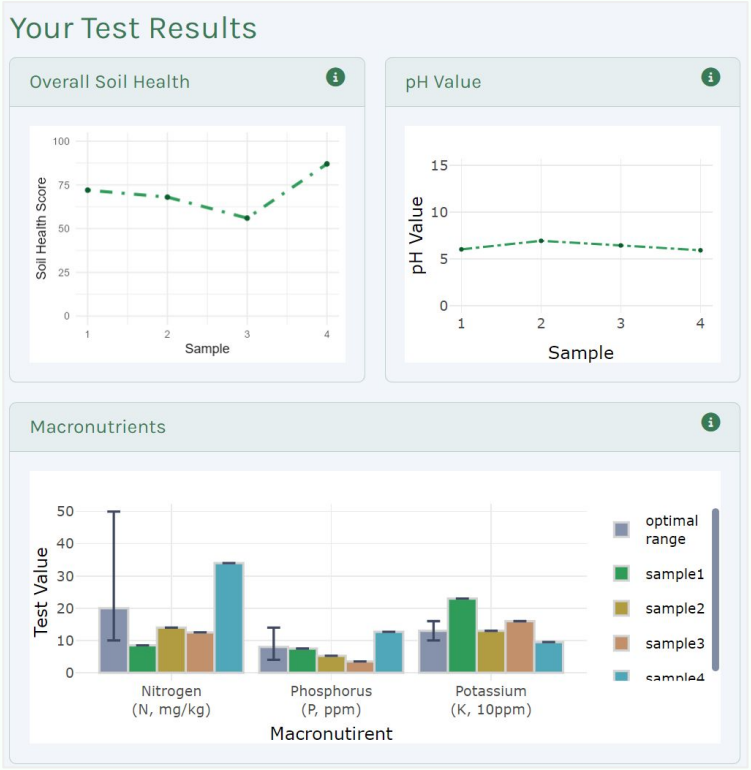
- **MVP Prototype:** built a product prototype with UI, branding and key UX flows
- **Functional dashboard prototype:** built in Shiny apps
- **Garden Zone Widget:** with API connections to various services (USDA, SSURGO)
- **Market Research:** conducted comprehensive research, customer segmentation, and competitive analysis
- **Customer Discovery:** market survey and customer interviews in progress to validate the product with positive early feedback

Functional Prototype



Prototype Snapshots





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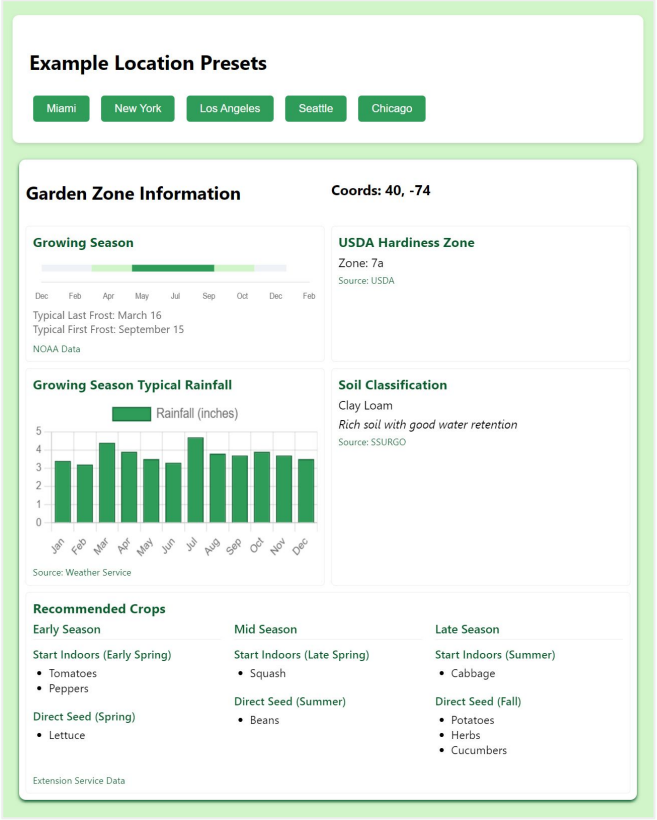
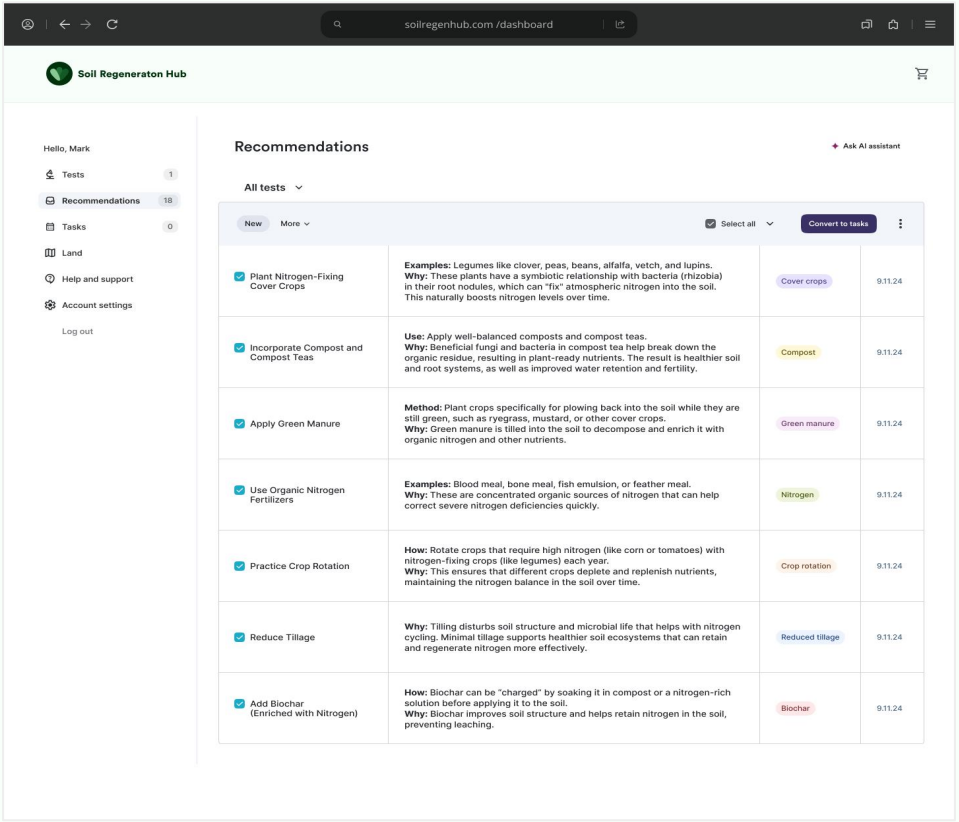
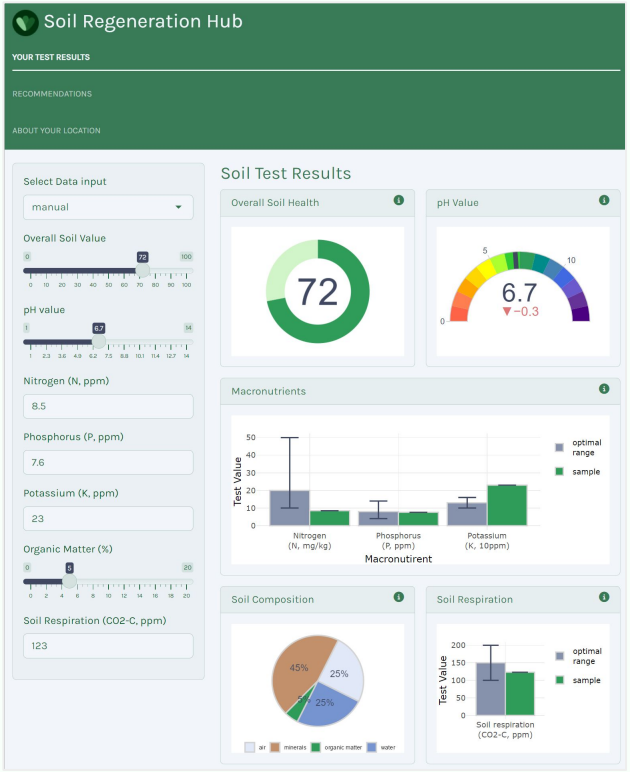
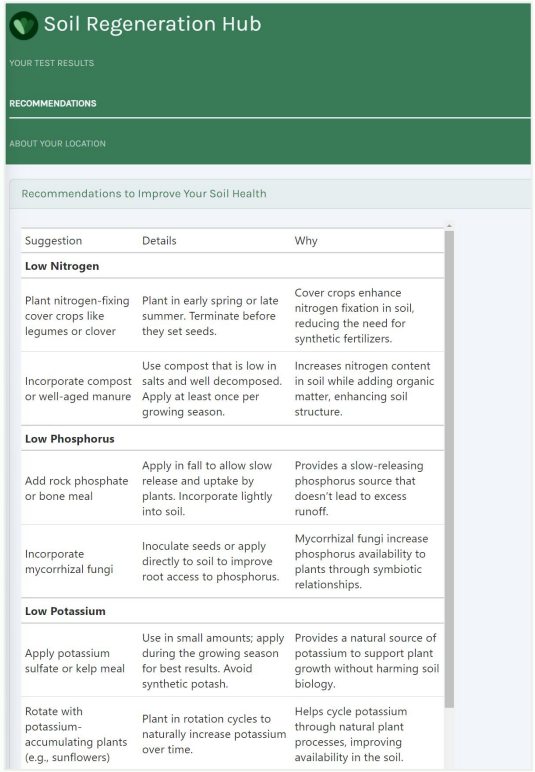
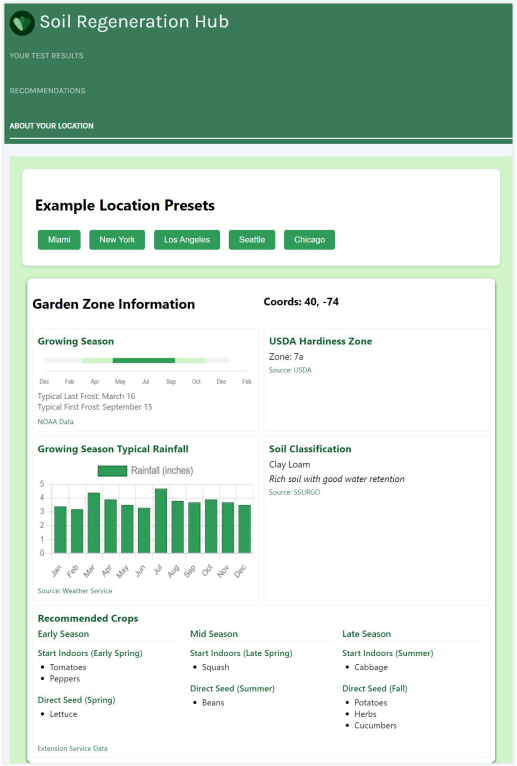




Shiny Apps Demo https://jmanitz.shinyapps.io/soilapp/







Market Research Overview

Market Drivers

- Increasing demand for locally sourced, fresh, organic and nutritious produce
- Growing concerns about food security and the vulnerability of global food supply chains
- Advances in agricultural technologies, such as vertical farming systems and hydroponics

Soil Testing Market

- A range of competitors from mail-in services to labs. Pricing for basic tests from $15-20 and comprehensive tests $50-100
- Current offerings do not promote regenerative practices
- Commercial agriculture customers use precision technology, but there is an opportunity to serve small scale growers and hobbyist gardeners

Target Personas

- Intensive Hobbyist Gardeners
- Small Farms (for profit)
- Small Farms (nonprofit)

Use Cases

- Measuring and improving soil health
- Maximizing plant health and yield
- Increasing nutritional value of vegetables and fruits
- Reducing chemical inputs (fertilizers, pesticides)
- Reducing water usage

What’s Next?

- **Customer discussions:** Continue interviews with goal of reaching 20+ gardeners and small farmers to achieve broad feedback
- **Product development**: Continue to iterate the application and recommendation engine
- **Start-up formation**: With validation, we will proceed with start-up formation, GTM planning, and product development

Support Needed (How You Can Help)

- **Technical Co-Founder:** Seeking a co-founder with soil science or agronomy expertise.
- **Customer Interviews:** Looking for gardeners and small-scale growers willing to demo our MVP prototype.
- **Collaborators & Feedback:** Open to collaboration and welcome any feedback on our MVP.

Thank you!