C.L.I.M.A.

Crop Land Intelligence & Modeling Analytics

https://clima-demo.vercel.app/

About **one-third of food planted on farms** is lost or wasted every year

That's approximately 1.3 billion tons...

*In 2023 farmers lost $55.6 million **per day** due to unforeseen weather circumstances and poor crop management*

That's roughly $45,000 lost per 1,000 acres, every year, just because of poor timing and weather nobody saw coming...

Other problems include:

SOIL EROSION AND NUTRIENT DEPLETION

UNPREDICTABLE RAINFALL PATTERNS

WATER SCARCITY OR IRRIGATION FAILURE

INVASIVE WEEDS AND HERBICIDE RESISTANCE

PEST INFESTATIONS

DROUGHT AND HEAT STRESS

Input costs are rising,

+18% increase in seed costs, +37% fertilizer costs, and 32% increase in fuel.

Picture it.

A $50,000 cornfield begins to deteriorate when it is planted in sub-optimal zones and fails to account for critical weather variables

Your soybean field drowns overnight due to mishandling of floods resulting a loss of $80,000 and completely uprooting your plans for the season .


A disease mysteriously starts spreading across your tobacco farm and results in $30,000 worth of product losses.

The Solution: C.L.I.M.A.

- *A Machine Learning-powered platform that continuously analyzes NASA climate data and advanced satellite imagery to give farmers real-time, field-specific guidance that prevents losses and maximizes yield.*
- *C.L.I.M.A. is not just an innovative service, it is a movement to create a less wasteful and more efficient future for American agriculture.*

Our Team of Farming Solvers

Mate Dort:
CIS @ Life University

Brody Weinfurtner:
Data Sci & Business
@ Emory

Jack Bashaw:
Math and CS
@Emory

Leah Loukedis:
Physics and CS
@ Emory

NASA Patent #1: HSEG (Hierarchical Segmentation Engine)

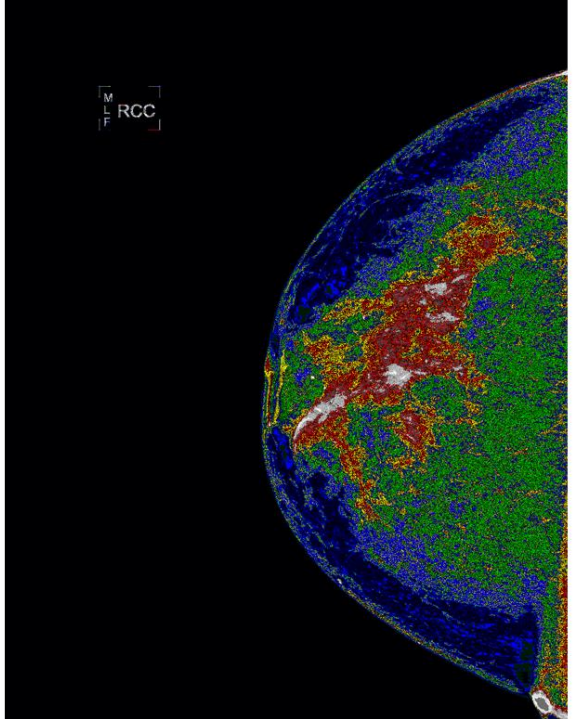
Originally designed by NASA to analyze spacecraft and satellite imagery with extreme precision.

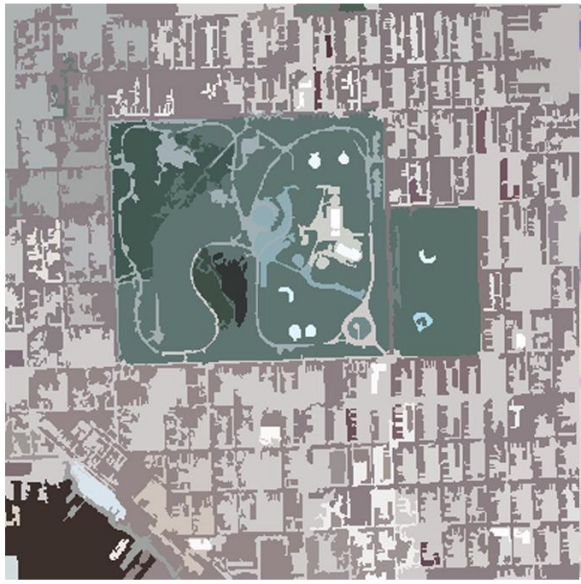
How It Works:

- Groups similar pixels into **regions** based on color, texture, and reflectivity.

In C.L.I.M.A.:

- We run HSEG on satellite or drone imagery to identify farmland from satellite imagery
- HSEG receives several inputs: spectral bands, indices, texture descriptors
- Pixels with similar characteristics are grouped to divide farmland into **precise soil zones**
- Temperature Vegetation Dryness Index (TVDI) gives metric of **soil moisture per zone**
- The system reveals hidden differences in soil health, drainage, and fertility.
- Farmers see a **living field map** showing exactly *where each crop will grow best*.



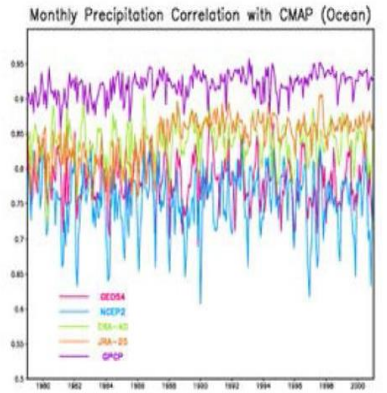


NASA Patent #2: MERRA/AS and Climate Analytics-as-a-Service (CAaaS)

Built by NASA to model Earth's climate using decades of satellite and atmospheric data—tracking how temperature, rainfall, wind, and humidity interact over time.

Key Specs (MERRA dataset)

- Input: 114 observation types (land, sea, air, space) into "frozen" numerical model (~4 million observations/day)
- Output: a global temporally and spatially consistent synthesis of 26 key climate variables (~418 under the hood)
- Spatial resolution: 1/2 ° latitude × 2/3 ° longitude × 42 vertical levels extending through the stratosphere
- Temporal resolution: 6-hours for three-dimensional, full spatial resolution, extending from 1979-Present

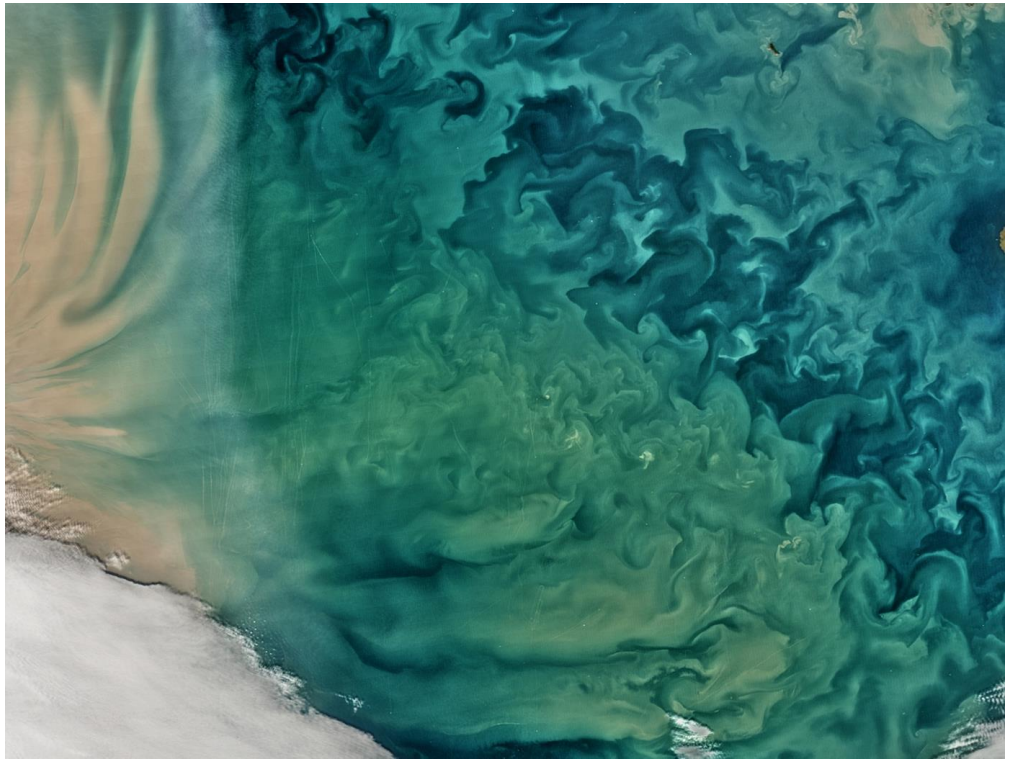


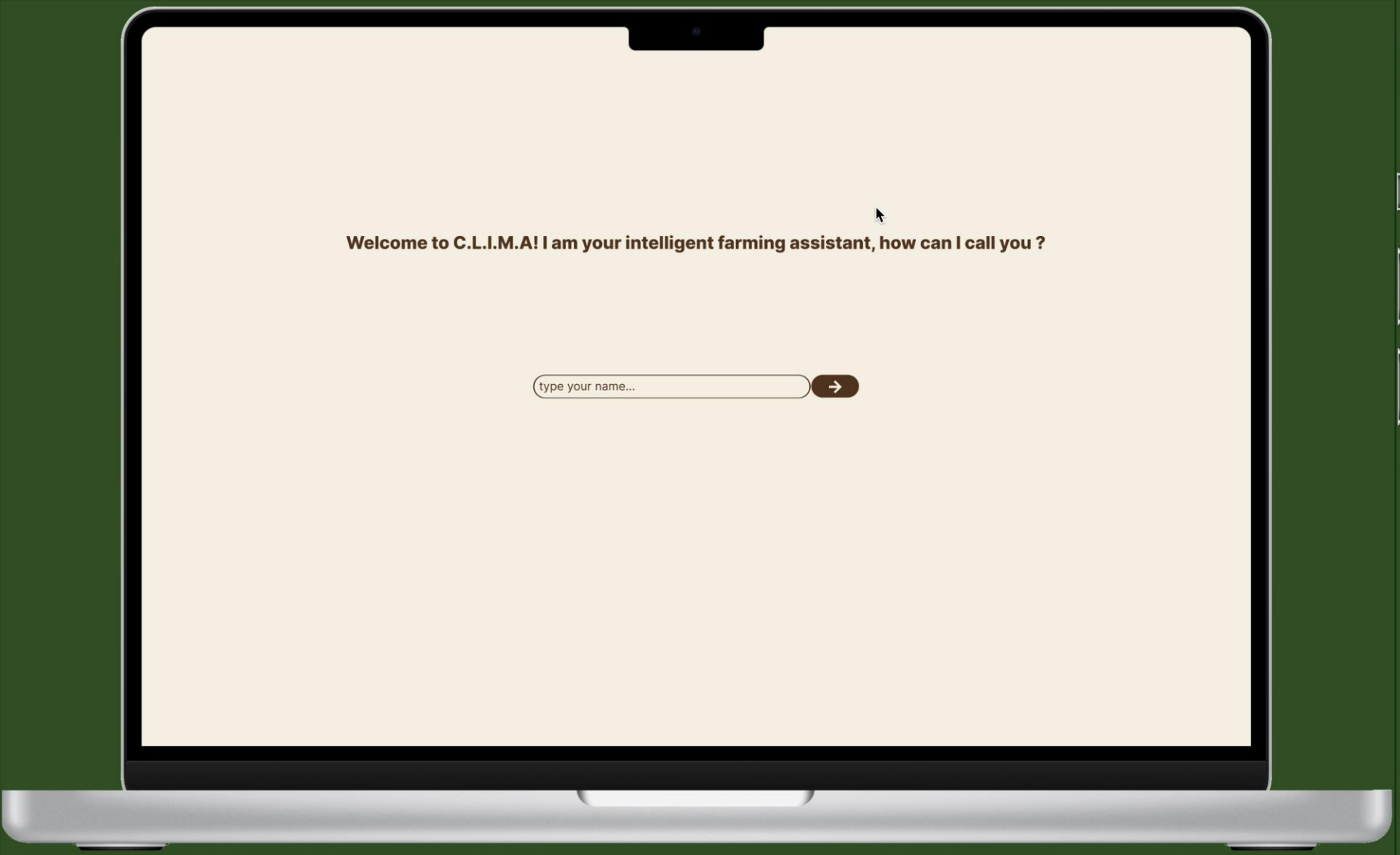
How It Works:

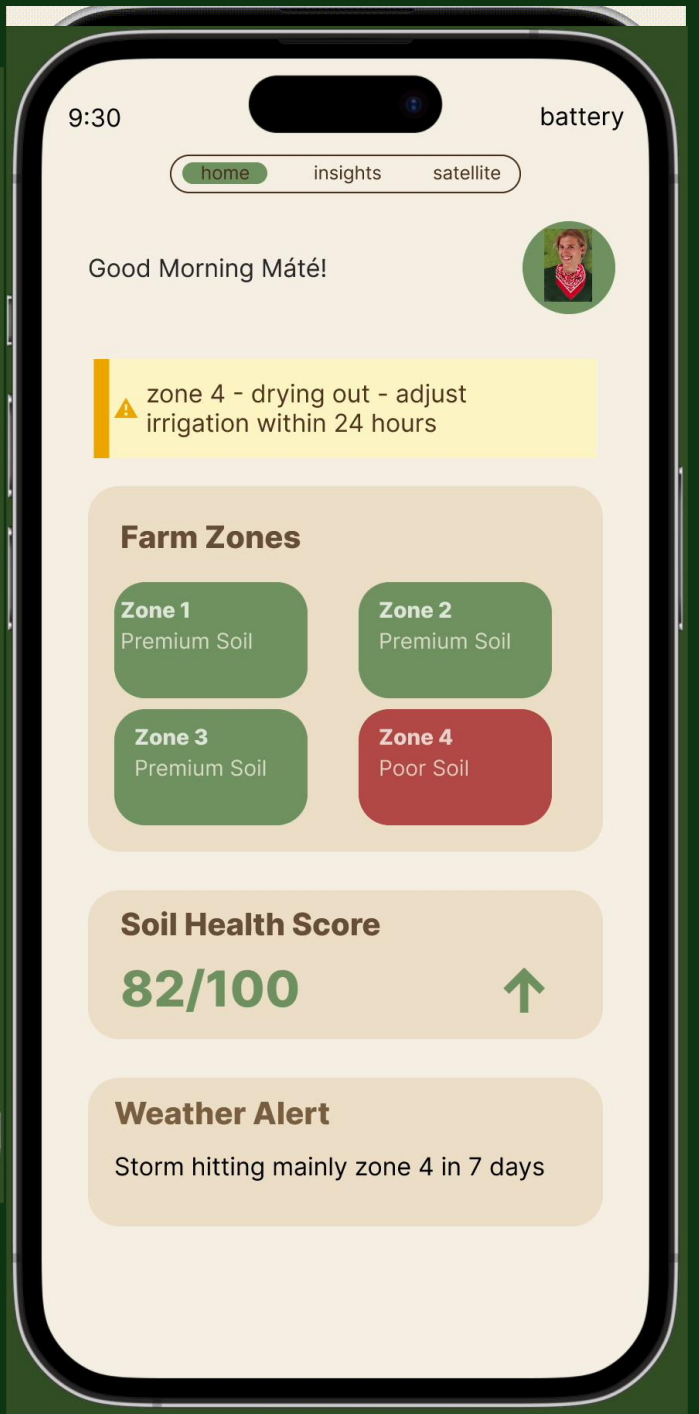
- MERRA combines decades of satellite and climate data into one powerful, consistent global model. It helps predict and analyze everything from droughts and floods to crop yields and air quality on a planetary scale.

In C.L.I.M.A.:

- We connect MERRA/AS directly to each farm's coordinates.
- The system cross-references NASA's live atmospheric data with a farm's unique soil zones from the segmenter model (prev).
- It forecasts how upcoming weather will impact each part of the field, turning climate signals into **actionable guidance -** when to plant, irrigate, or protect.




Welcome to C.L.I.M.A! I am your intelligent farming assistant, how can I call you ?
type your name...


9:30
battery
home
insights
satellite
Good Morning Máté!
zone 4 - drying out - adjust irrigation within 24 hours
Farm Zones
Zone 1
Premium Soil
Zone 2
Premium Soil
Zone 3
Premium Soil
Zone 4
Poor Soil
Soil Health Score
82/100
Weather Alert
Storm hitting mainly zone 4 in 7 days

Unique Features and Competitive Analysis

Soil Quality Mapping – Divides land into soil zones using NASA imaging; shows best crop spots.

Crop Planning & Fertility – Recommends what to plant where using soil and plant health data.

Risk Forecasting – Predicts droughts, floods, and weather risks for early action.

Monitoring Dashboard – Real-time map tracking land health, crop progress, and alerts.

Ai Insights – Explains causes of risks and gives precise, data-backed action plans.

Competition:

CropX – similar, but hardware. Requires physical labor, CapEx, less seamless solution.

Taranis / OneSoil: Aerial crop health imaging, but both have minimal soil insight. We integrate both soil and crop intelligence. The two patents introduce superior and differentiated features.

Granular: Farm management/cost tracking. Focused on operations, not land or soil analytics.

AG Leader SMS: Yield mapping/cost tools. Manual data entry and poor imaging.

Why Our solution wins:

Unified system → Combines imaging, weather, and soil data into one actionable platform (others are fragmented).

Action, Not Analytics → Turns complex data into direct recommendations—farmers don't just see problems, they know what to do.

Real-Time Adaptation → Continuously updates with live environmental data, unlike static seasonal reports.

ROI-Driven Impact → Cuts input waste, boosts yield and prevents loss. Farmers see measurable financial gains fast.

Simplification → We turn complicated data into actionable insights in language a farmer could understand.

Growth Strategy

Phase 1

Establish baseline data and show results through free early adopters

Run “NASA on Your Farm” demo campaigns

PILOT

Phase 2

Targeted ad campaigns towards high ICP farm count areas

Strategic partnerships with insurance companies/other companies that want risk/soil data

Phase 3

As amount of data grows and model is more trained, aggregate data and create a C.L.I.M.A. API that lets other companies utilize our data/models

Risks/mitigations:

- **Low farmer adoption -** Offer free pilot tier + referral incentives; highlight NASA partnership credibility.
- **Early inconsistent satellite or field data -** Blend NASA imagery with on-ground validation partners (universities, co-ops) during pilot.
- **Data-privacy concerns -** Build **geo-fenced data storage** compliant with local regulations (GDPR, USDA data frameworks); include clear farmer data ownership clauses in contracts; consult with ag-data policy advisors early.

Ideal Customer profile :

- Mid-to-large commercial farms in the U.S. (1,000 + acres)
- especially row-crop operations (**corn**, soy, wheat) and high-value specialty farms (vegetables, orchards).
- Targeting regions with high weather volatility or farms that have faced financial losses from poor planning or extreme conditions.

Why Now?

Economic Incentives:

- Rising input costs (**+30–70% increases** in seed, fertilizer, and interest) push farms toward optimization tools that promise measurable ROI.
- Government and insurance incentives for **risk-reduction technologies** encourage data-driven farming adoption.

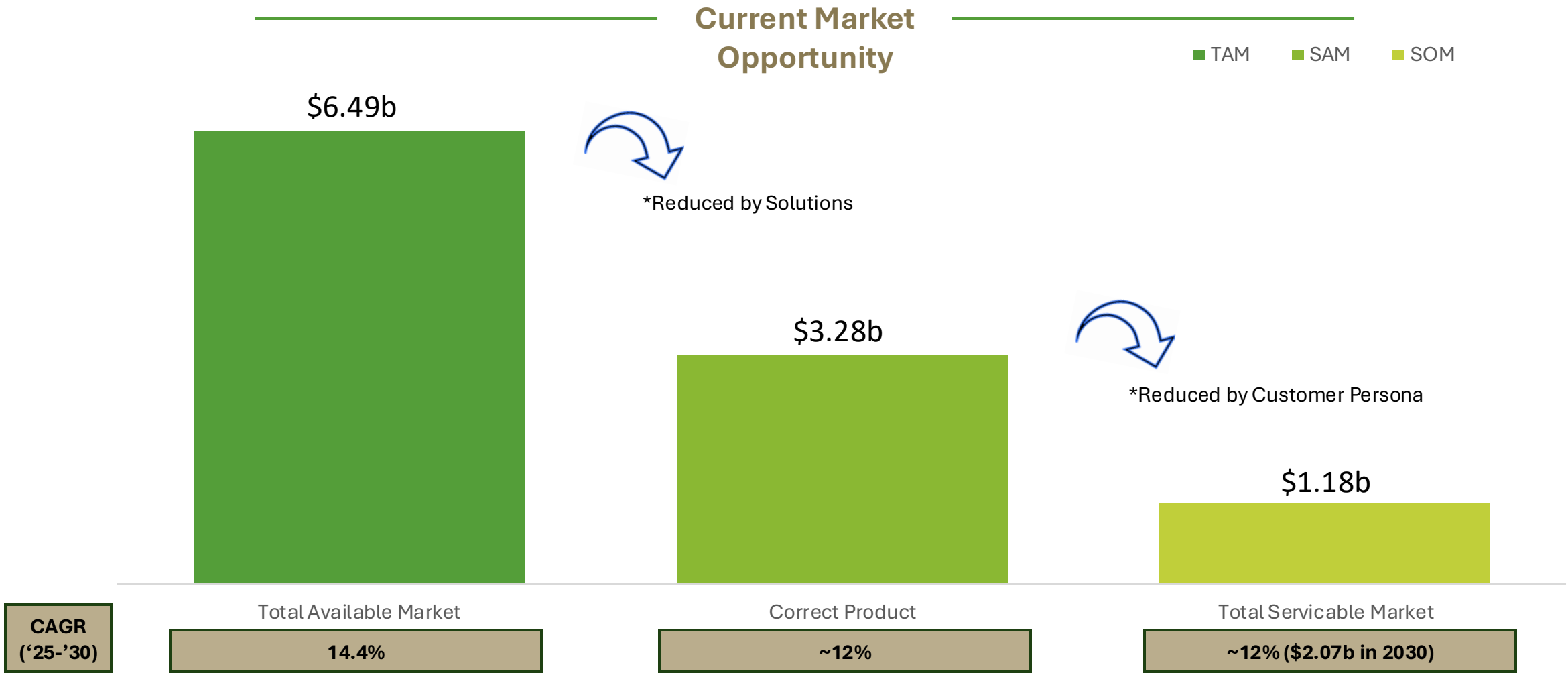
Tech Advancements:

- Broader access to **high-resolution satellite imagery** and **AI models** enables precision mapping at lower cost.

Demographic shifts:

- Younger, tech-savvy farmers entering the industry favor digital tools over manual methods.
- Heightened awareness of **climate risk** and **sustainability** increases willingness to adopt predictive systems.

Agriculture Analytics Market Size Summary 2025 – 2030 (~$14b+)



C.L.I.M.A.

Market Opportunity Exists for Data Advancements in Agricultural Farming

Corn is a good approximation for all farmed crops

Financials

Average Cost — According to the Purdue University "2024 Crop Cost & Return Guide", average cost for rotation corn in 2024 was **$856 per year per acre**.

Average Revenue — According to the Purdue University "2024 Crop Cost & Return Guide", gross revenue for rotation corn in 2024 was **$931 per year per acre**.

ROI for Farmers

- Input cost reduction of **7%**
- Yield Increase **4%**
- Risk/disaster mitigation **$5/acre/yr**

- **Total benefit = $60+$37+$5 = $102/acre/year on average**
- **Net benefit (plus) = $102 - $40 = $62/acre/yr**

- **Base operating COGS (Year 3):** ≈ $10,000 one time cost
- **Patent royalties:** 5 % of revenue
- **Variable costs (cloud, data and satellite):** 20 – 25 % of revenue
- **Gross margin projection:** ~70 % by Year 3 as infrastructure scales

Our Fee

- **Plus** - $3.33/acre /month
- **Pro** - $4.00/acre/ month (higher quality satellite)
- **Yearly** - $40/acre/y ear

Why invest?
What do we need?

- Get in at the forefront of a growing industry
- Climate change continues to present new challenges for farmers
- Population and food need continues to grow
- NASA technology delivered digestibly for farmers who are new to agricultural technology
- Support a company driving changing the lives of farmers and creating a more sustainable planet.

- We’re looking for upfront investment to help us run our “NASA on Your Farm” Campaign
- We’re looking for a strong network that can connect us with subject matter experts on larger farming practices and other value chain features

C.L.I.M.A.

NASA On Your Farm