Department of Primary Industries and Regional Development

GOVERNMENT OF WESTERN AUSTRALIA

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LEAP – Optimising lime application as a use case to demonstrate the benefits of farm data sharing

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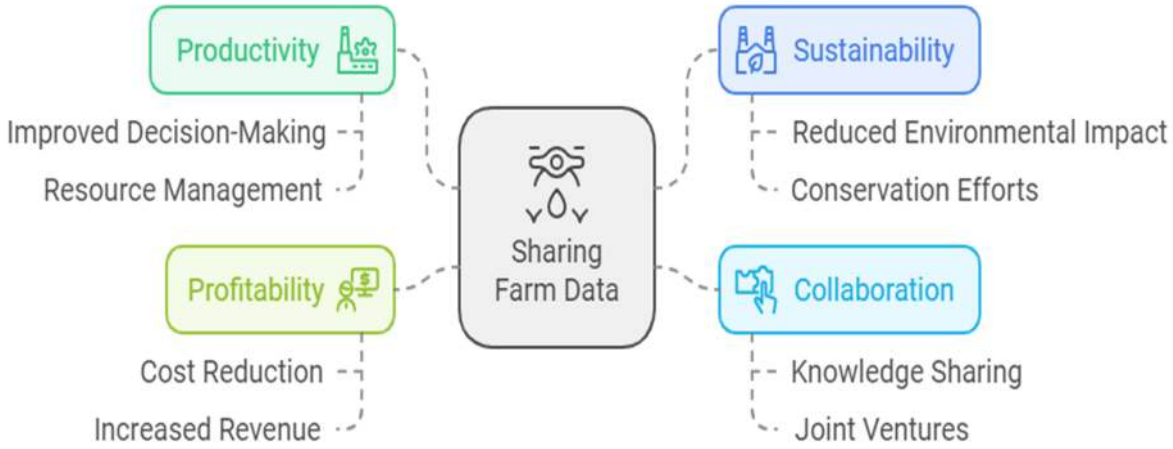
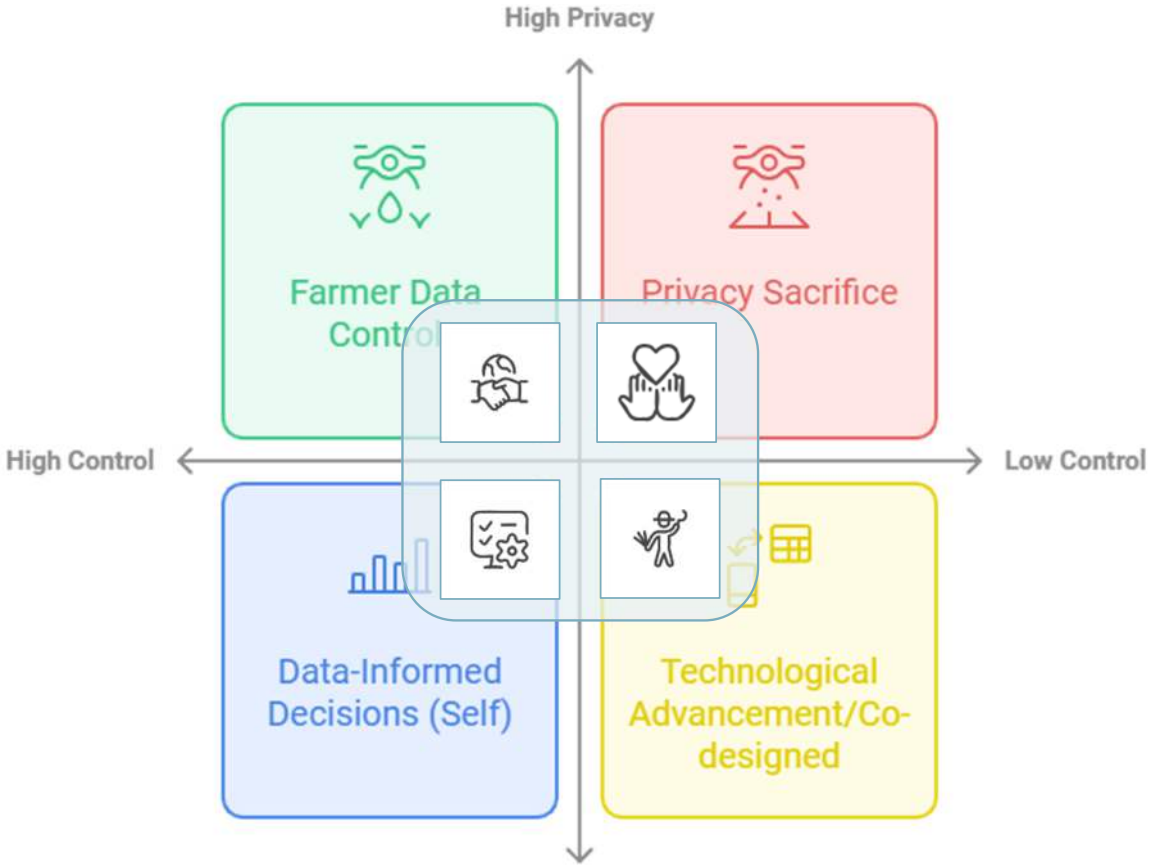
Why Data Sharing?



Sharing Farm Data

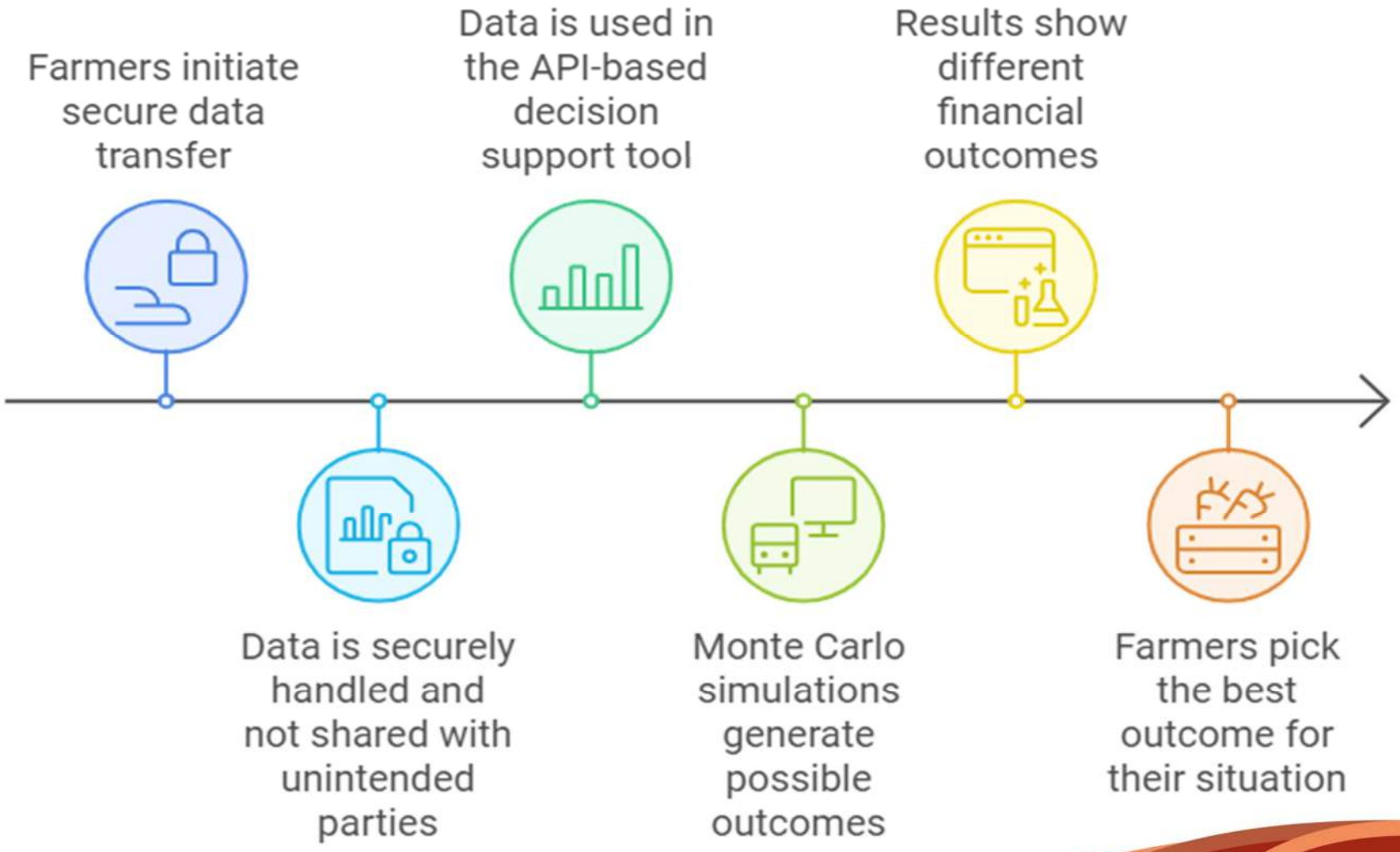
Pros	Cons
Improved decision-making	Loss of data control
Enhanced production quality	Privacy risks
Precision input placement	Data dependency
Collaborative technology development	Potential misuse
Data-driven advancements	Sacrifice of autonomy

Data Sharing tradeoff in agriculture



Secure Farm Data Sharing and Liming Decision Support Process

LEAP Modelling Framework



How Does It Work?

Like iLime, but for the Whole Farm!

On-Farm Data Used in Model

- Paddocks with
  - At least one year of crop data
    - Crop grown
    - Crop yield
  - Soil pH < 7.0 (inclusive)
- Soil pH at
  - 0-10cm,
  - 10-20cm and
  - 20-30cm
- Soil textures

Other Data Used in the Model

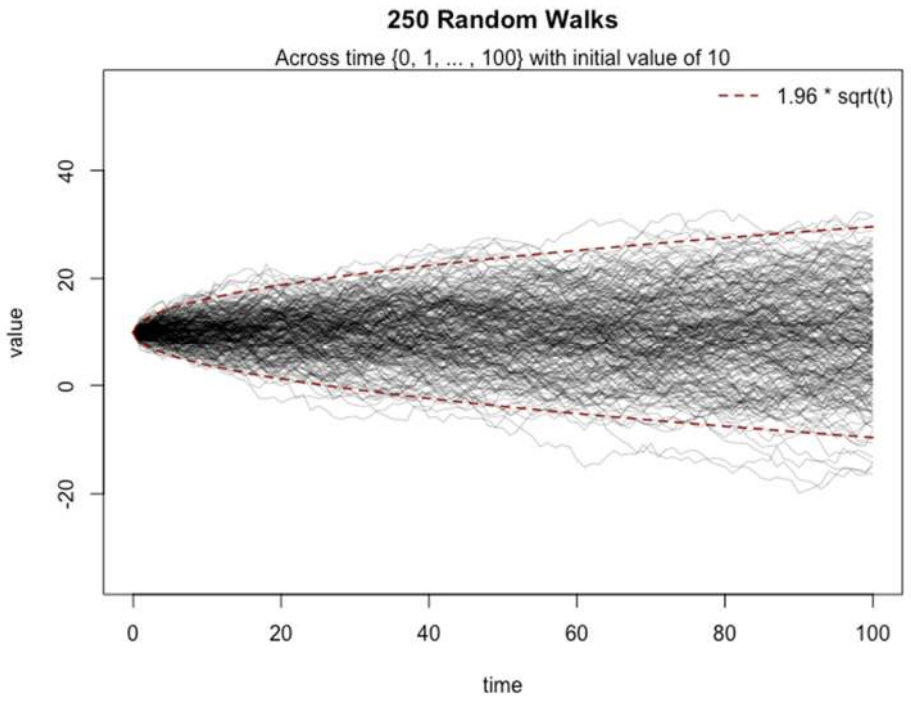
- Rainfall zone
- Lime pit location
  - Lime values
- Grain ‘n Graze for port prices
- CBH
  - drop-off locations and
  - freight costs
- Soil Gravel, soil exchangeable aluminium class,
- Soil organic carbon at all 3 soil depths

Seven iLime Strategies

All of these are over 20 years

1. 1 tonne per 10 years
2. 1 tonne per 7 years
3. 2 tonnes per 10 years
4. 4 tonnes year one
5. 5 tonnes over 15 years
6. 4 tonnes incorporated to 20 cm
7. 4 tonnes incorporated to 20 cm + 1 tonne in year 10

What does the model (LEAP) do?



- **4** Paddocks running 3-year crop rotations
- **5** Soil Sampling Site Profiles
- **2916** Crop Rotations
- **4** Liming Agents for 4 Farms

= **87400** runs of the iLime model over a 20-year analysis period

= **1,749,600** rows of data

Ingest existing farm data

Farm Data Management Platform (AxisStream - AxisTech)

Automatic systems (IoT)

- Paddock yield
- Crop and sequence
- Soil sampling data

API

Secure data transfer

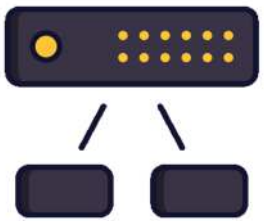
DPIRD - Extrata

Data sharing

- Maintain data ownership
- Secure sharing and storage
- Always in control of data access

API

Simulation modelling



LEAP and API clients (iLime and Extrata)

Modelling

- Run multiple liming amelioration scenarios
- Predict yield/crop value
- Predict soil response to liming (pH, Al exchange)

API

Share output

Customised report

Report

- Farmers receive results via AxisTech-AxisStream
- Support liming decision at whole farm level
- Visuals and ability to combine output with additional farm data

Icons by Lordicon

Extrata® Overview

What is Extrata?

An enabler to improve agriculture

- An API data (exchange) hub
- Built in WA by DPIRD, informed by farming
- Trusted, neutral operator
- NFF Farm Data Certified

Why use Extrata?

A secure way to exchange data

- A secure, online environment
- Attracts data aggregators who analyse and deliver insights
- ***Platform does not store nor enrich producer data***

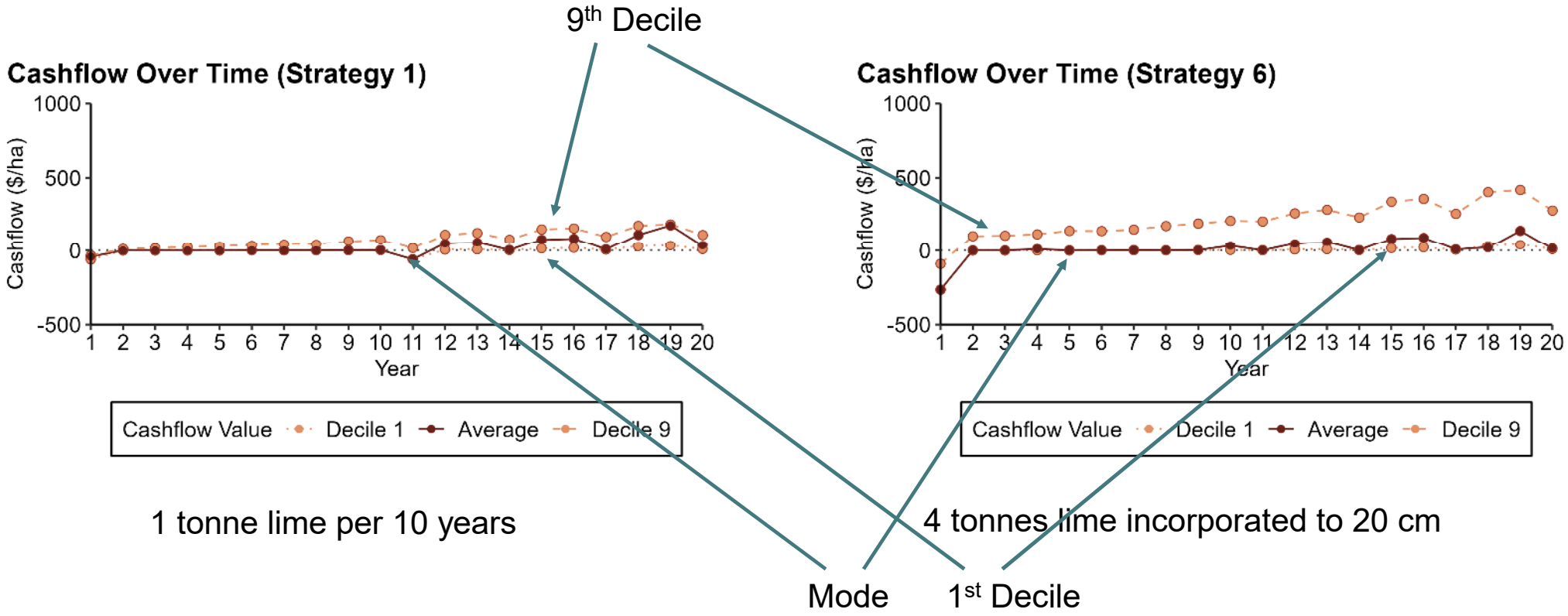
How can you use Extrata?

Leverage data for informed decisions

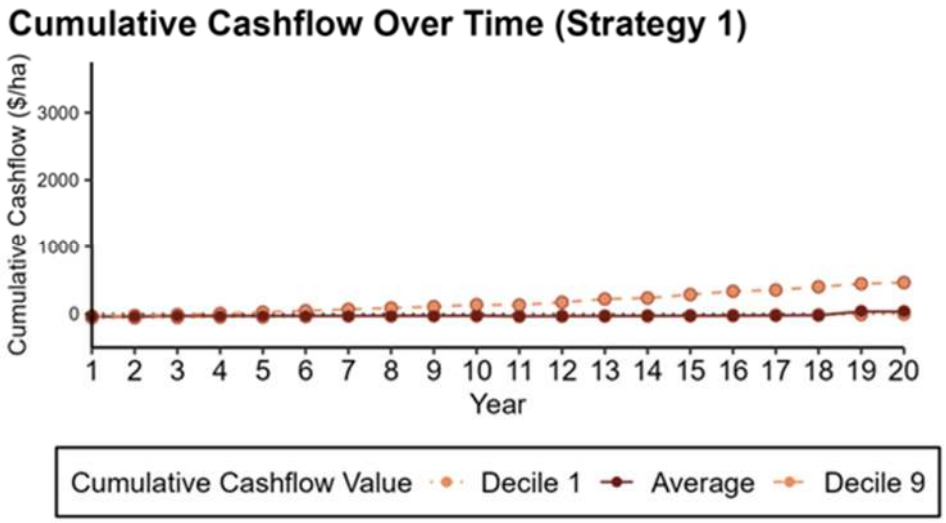
- Combine data for richer insights
- Optimise farming operations in real-time
- Enhanced future planning

Example Report Figures

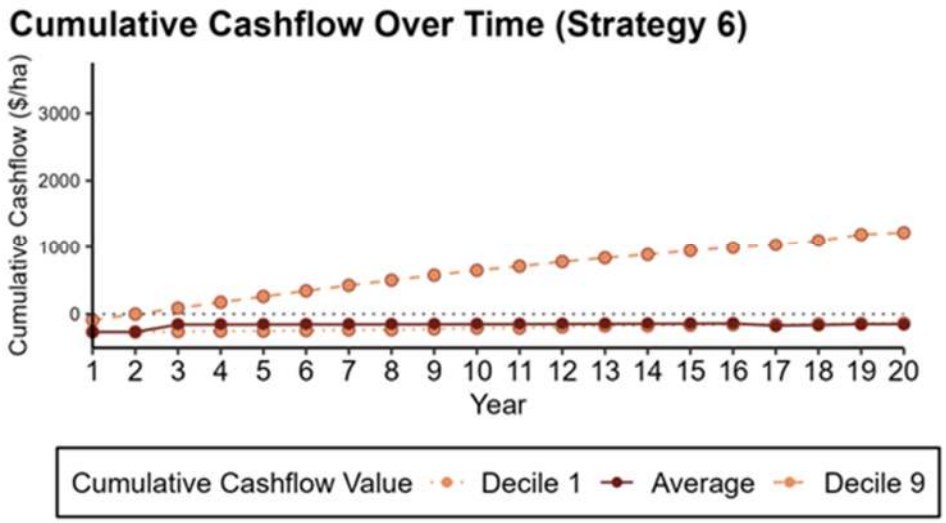
Example Report Cashflow



Example Report Cumulative Cashflow

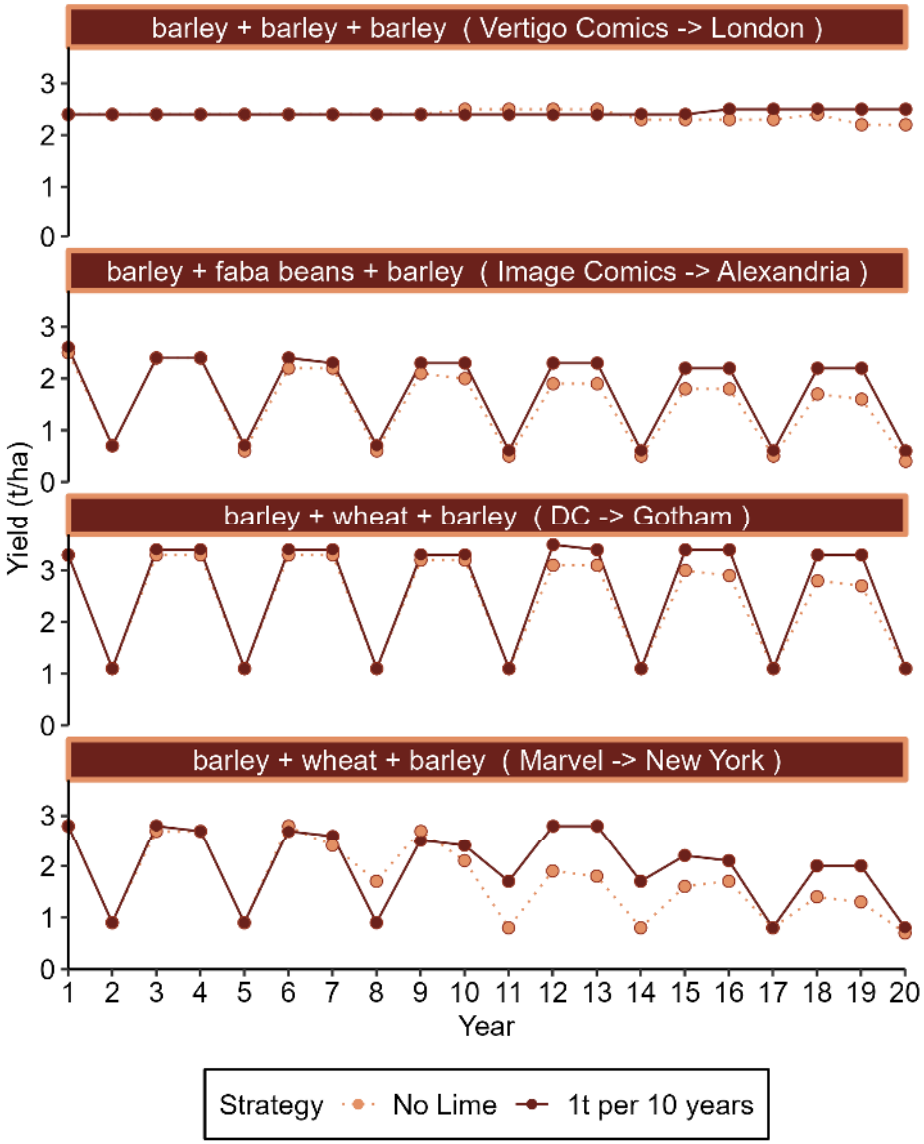


1 tonne lime per 10 years

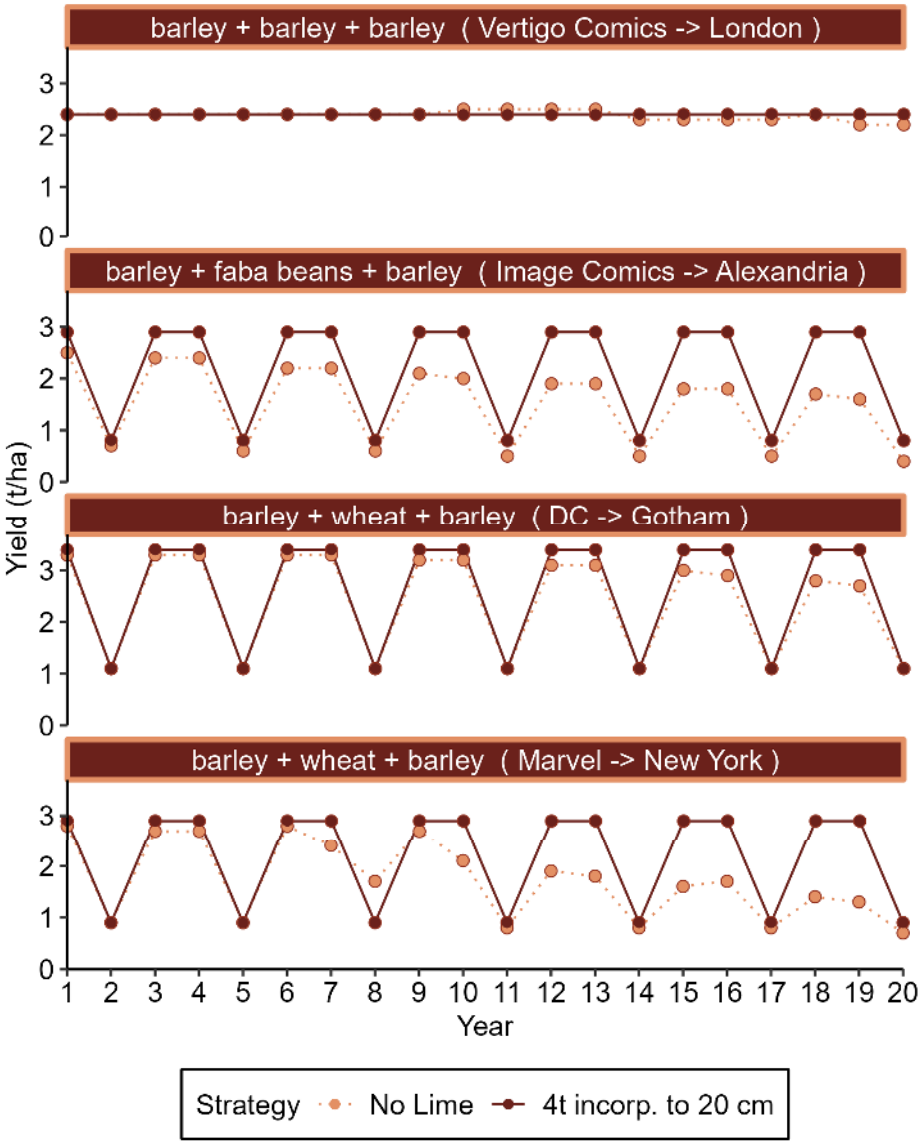


4 tonnes lime incorporated to 20 cm

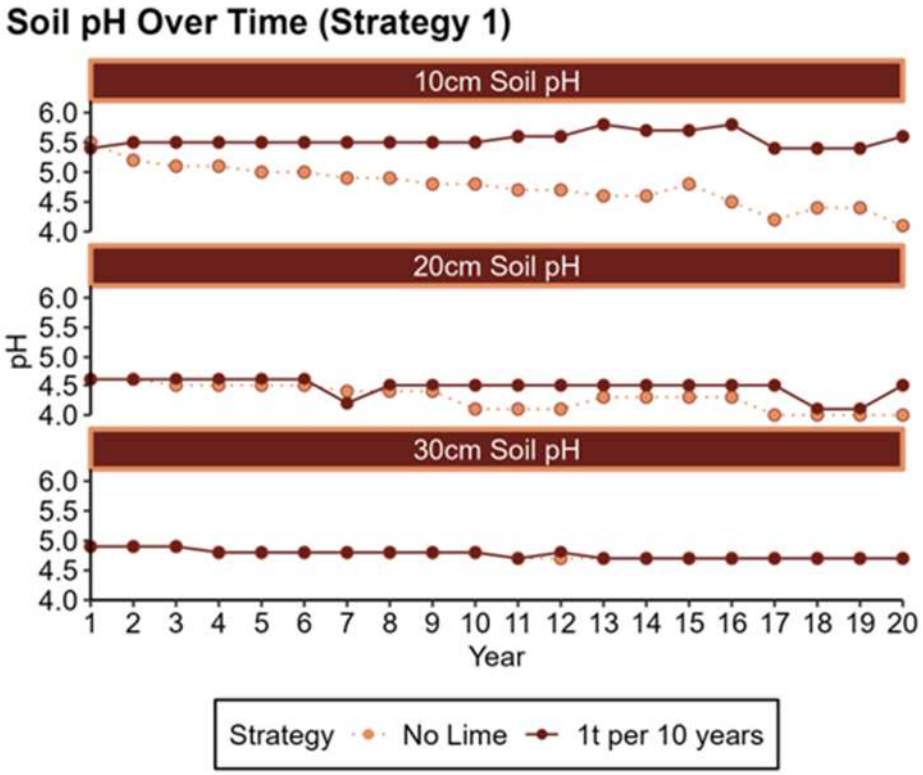
Yield Over Time (Strategy 1)

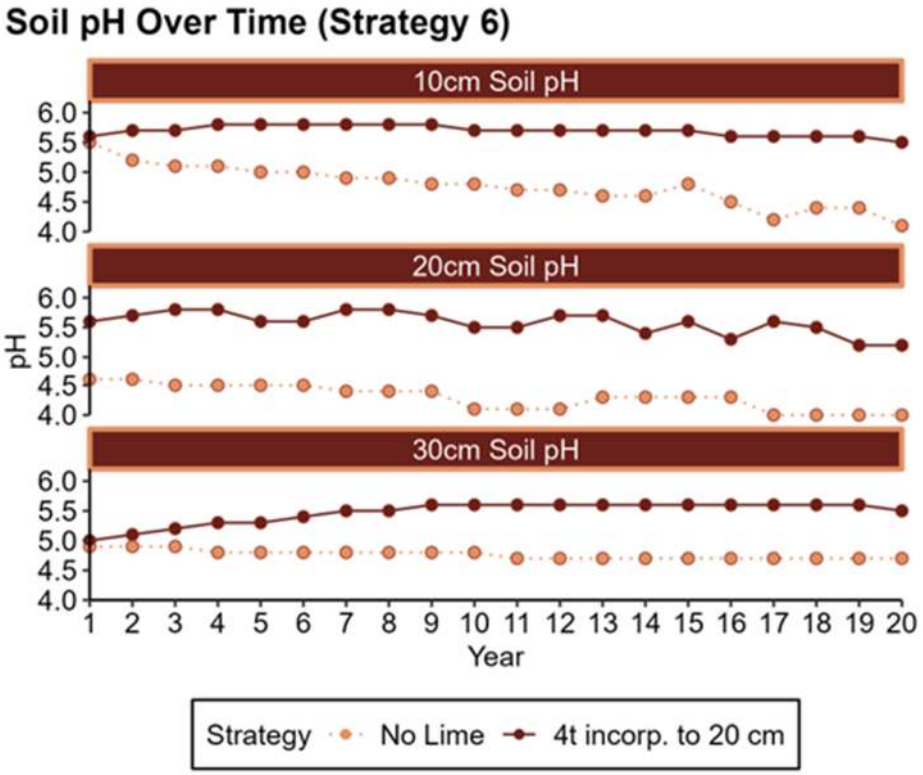


Yield Over Time (Strategy 6)

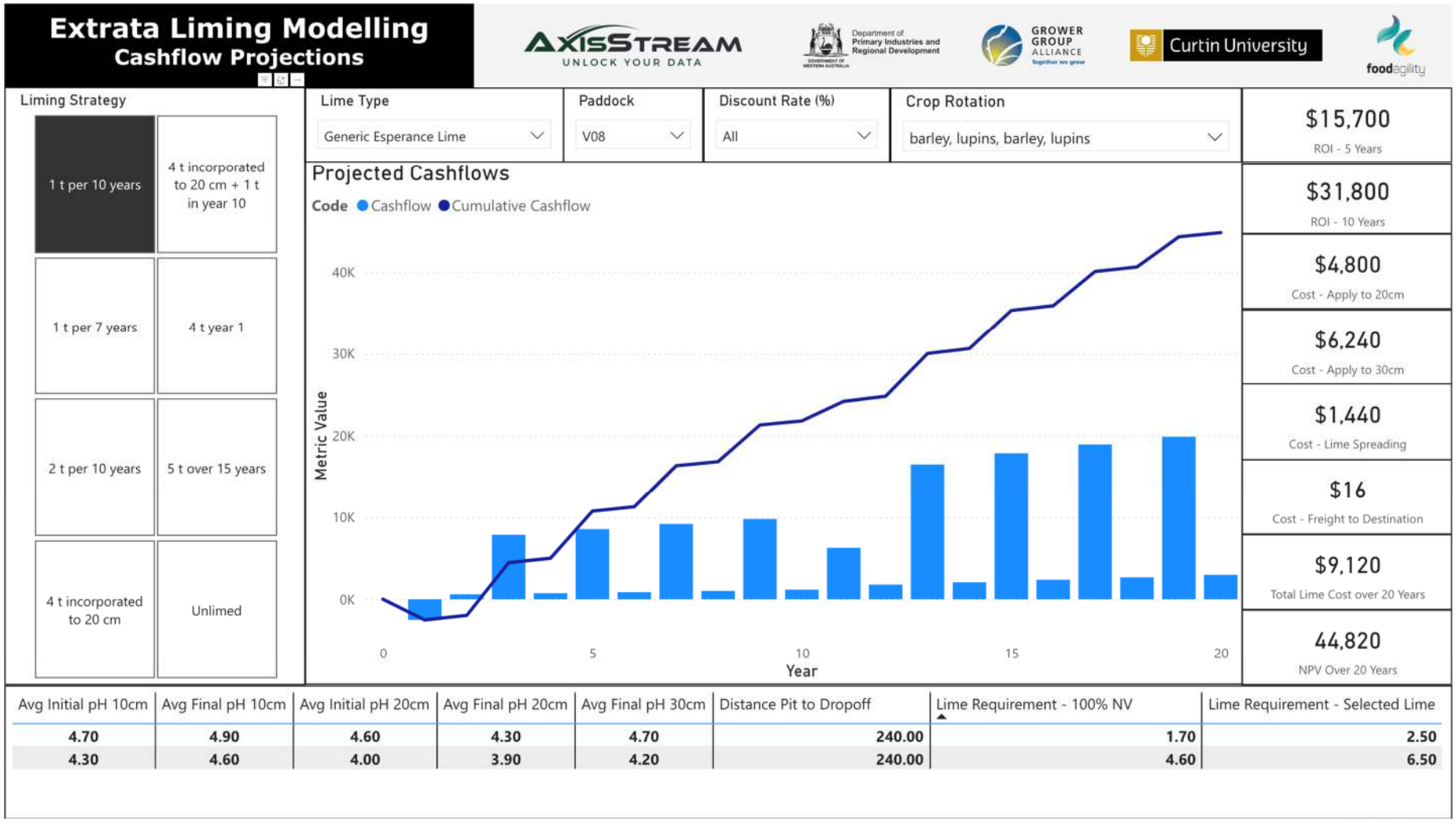


Example Report Soil pH





Output data visualizing dashboard



Avg Initial pH 10cm	Avg Final pH 10cm	Avg Initial pH 20cm	Avg Final pH 20cm	Avg Final pH 30cm	Distance Pit to Dropoff	Lime Requirement - 100% NV	Lime Requirement - Selected Lime
4.70	4.90	4.60	4.30	4.70	240.00	1.70	2.50
4.30	4.60	4.00	3.90	4.20	240.00	4.60	6.50

What's Next?

- Custom liming strategies for the whole farm
- Precision solutions
- More tailored strategy results

Building the Pipeline

- LEAP is designed to be modular
  - We can expand it beyond liming since it only calls an API
  - Using the Monte Carlo framework that it provides we can
    - Machinery
    - Cropping rotations
    - Other fertilisation strategies

Project Partners

Department of
Primary Industries and Regional Development

GOVERNMENT OF WESTERN AUSTRALIA

GROWER GROUP ALLIANCE

Together we grow

AXISTECH

Curtin University

foodagility

Thank you

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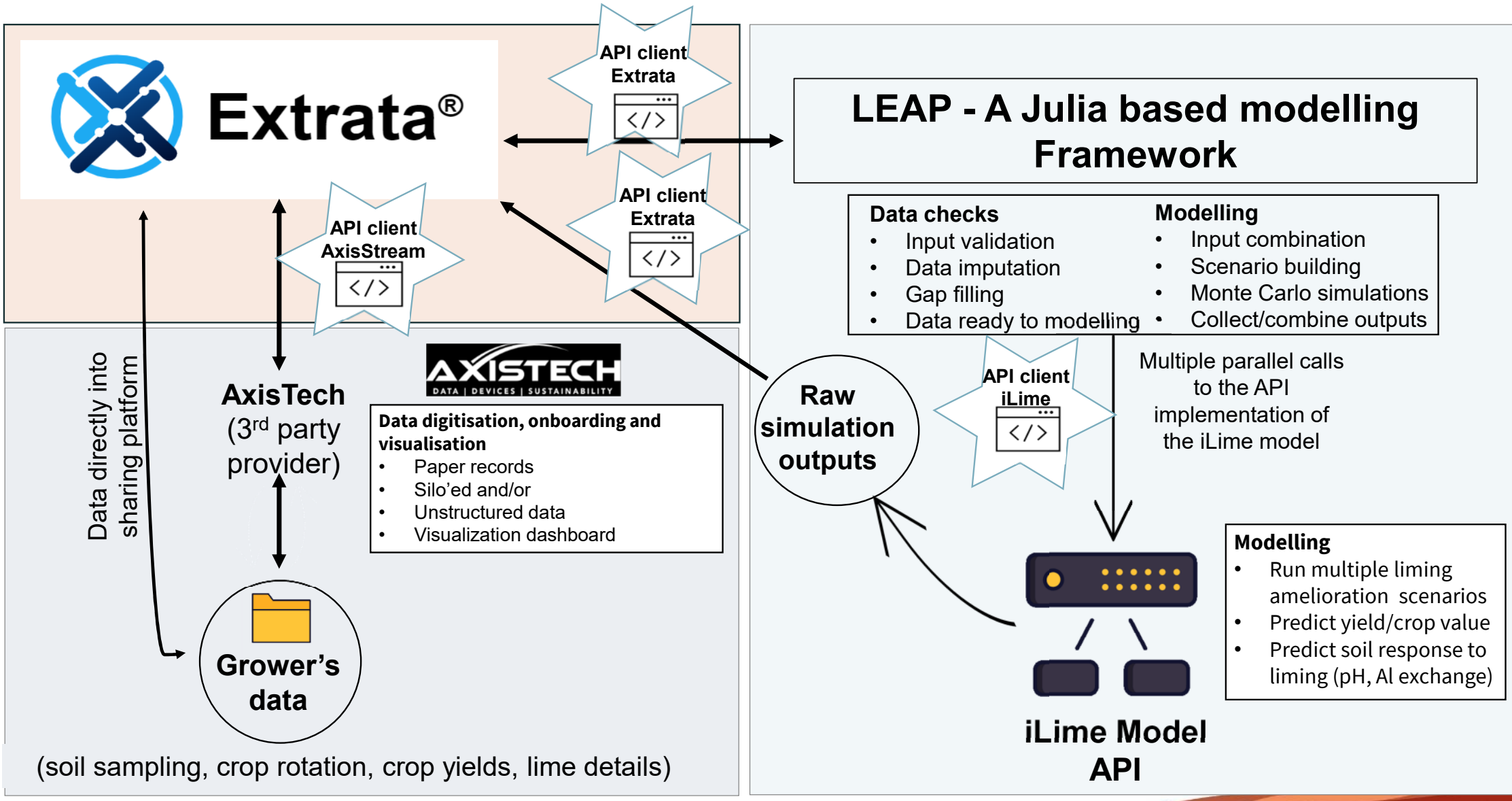

API client = tool to communicate with another application or service, i.e., eConnect+ Extrata or iLime model

Farm Data

LEAP