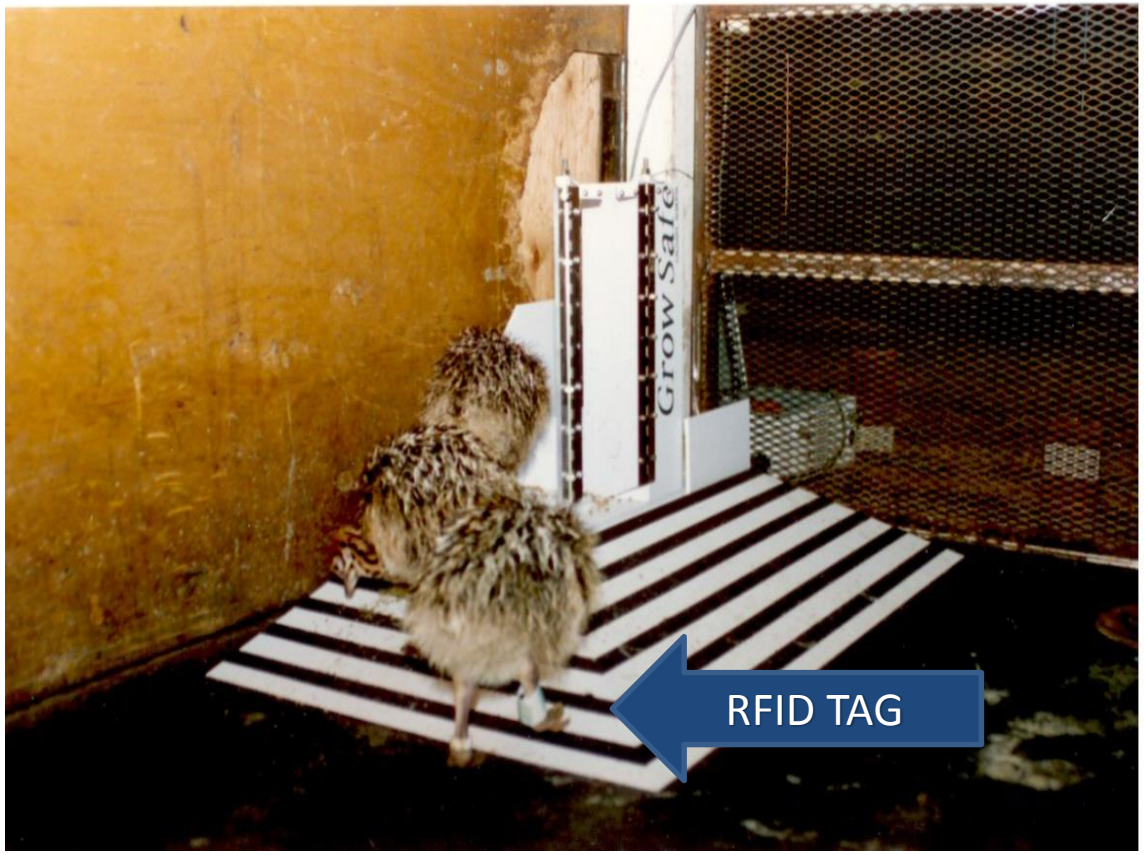
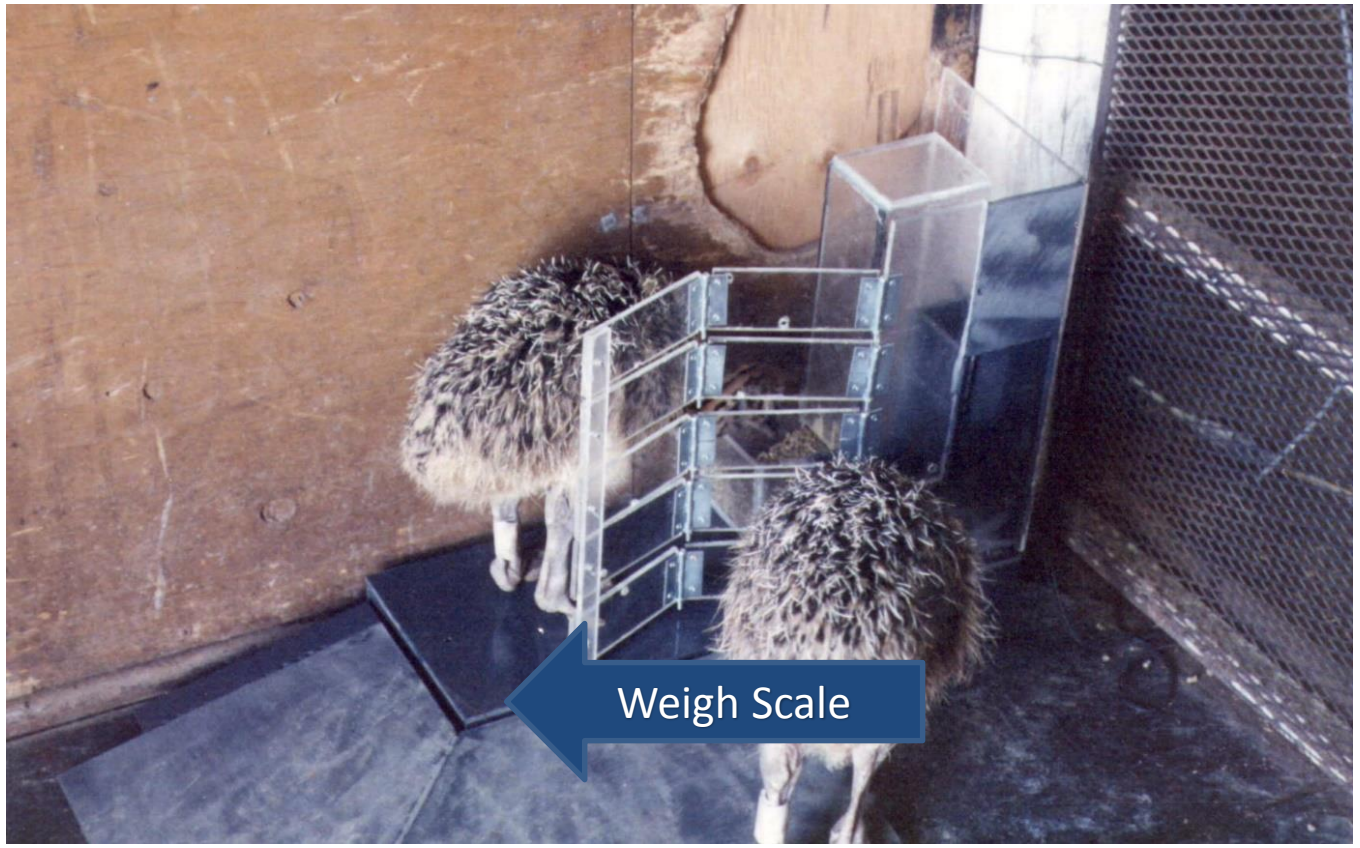
GrowSafe

Engineers computer and animal specialists applying science and technology to improve animal well-being and farm profitability

Applications for the Livestock Production Chain

# 1990 - Measured Weight Feed & Feeding Behavior

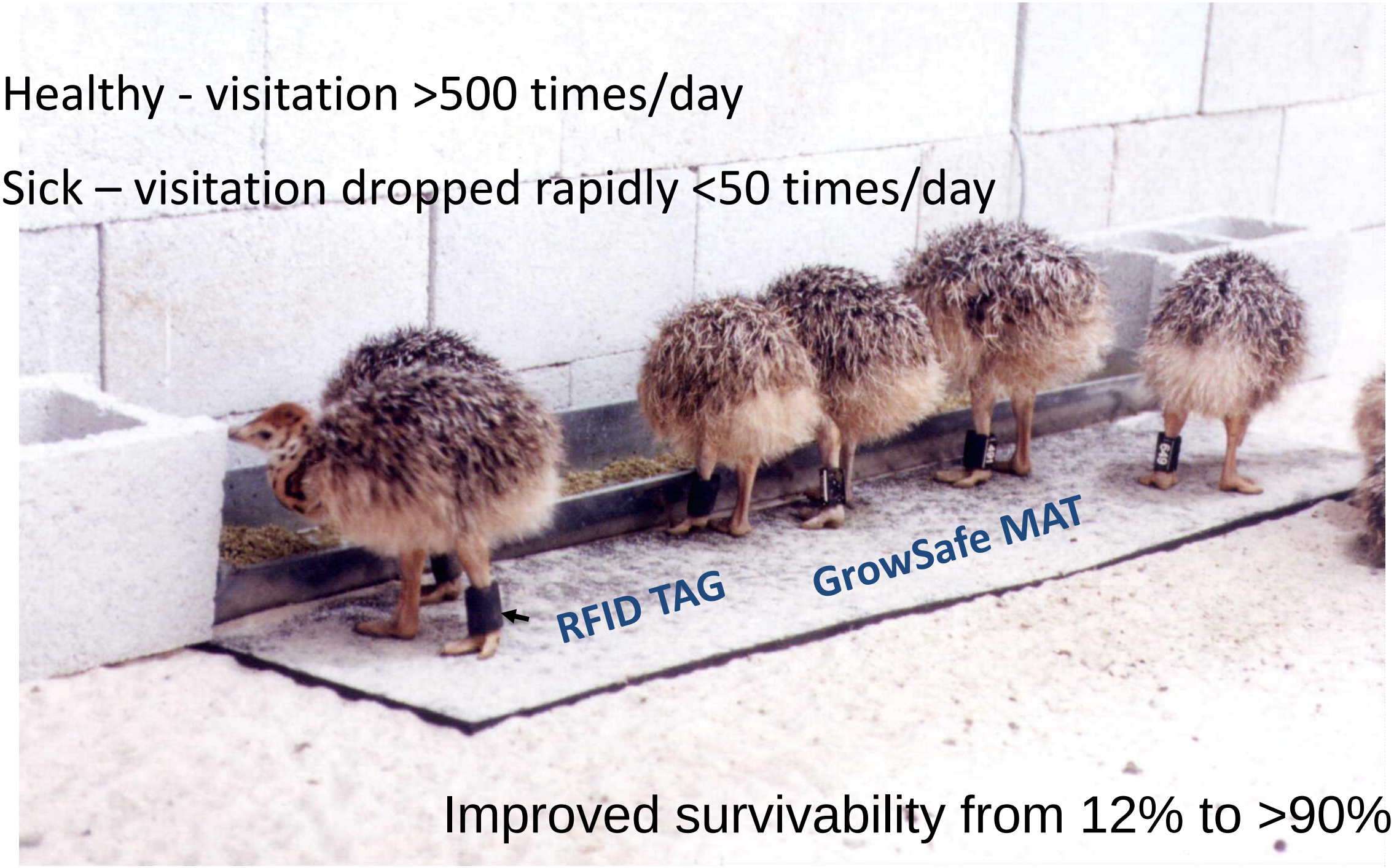



Confinement disrupted social order - needed to measure unobtrusively

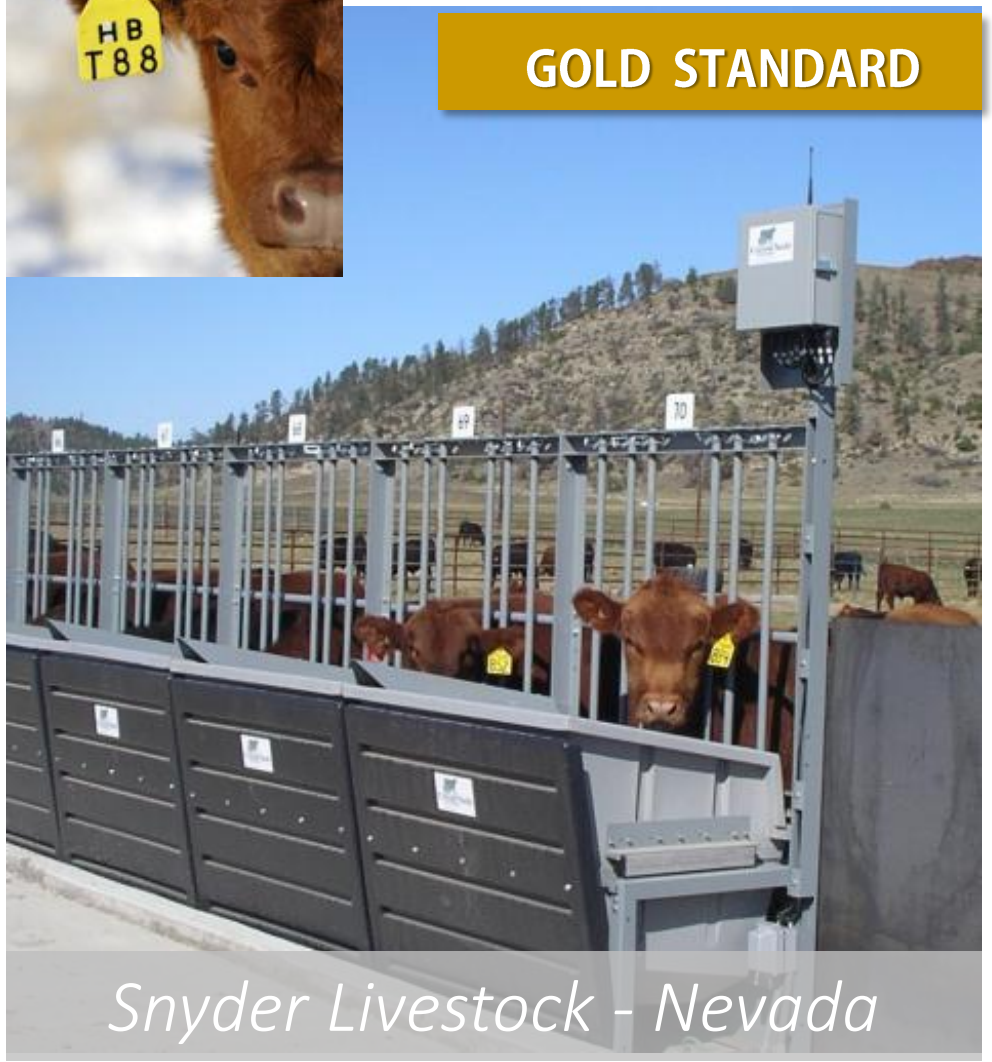
Healthy - visitation >500 times/day

Sick – visitation dropped rapidly <50 times/day




Improved survivability from 12% to >90%

# Application #1 Efficiency Measurement




*Snyder Livestock - Nevada*

- Animals RFID ear tagged
- RFID antenna in trough rim
- Trough on load cells – 3 gm
- Tag & feed measured many times each second
- Data audited daily – SPC
- Always connected to GrowSafe

GrowSafe SYSTEMS
www.growsafe.com

# 1st App – Genetic Selection Feed Efficiency – Beef

Residual Feed Intake (RFI)

Measured FI - Expected FI = RFI

Selection for RFI reduces [1]

- Feed Intake - 12%
- Methane - 30%
- Manure NPK - 17%

[1] Agrifacts

Cattle Per Animal Savings:

Feedlot = $60+ per 120d

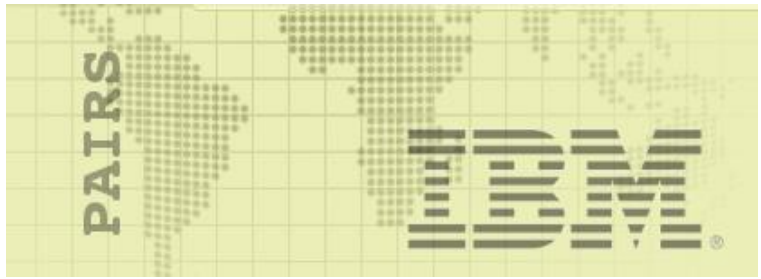
Cow Herd – 10 more animals /100

System Cost On Farm = $15 per animal

GrowSafe SYSTEMS www.growsafe.com

# Enhanced Breeding Selection

- GrowSafe curating all “allowed” historical client data
- Data processed through standardized server analytic method
  - Site-specific climate data
  - Diet parameter inclusion
  - Daily RFI values using GSB weights
  - Advanced behaviour trait inclusion
  - Audited data to Genetic evaluation




<u>Whole farm efficiency and greenhouse gas mitigation.</u>

# 2nd App – GrowSafe Beef® - Feedlot

Kunz Feedyard - Alberta

Always Connected to GrowSafe

Data acquired when animal drinks:

- Non-invasive
- Weight, water intake and watering behavior measured

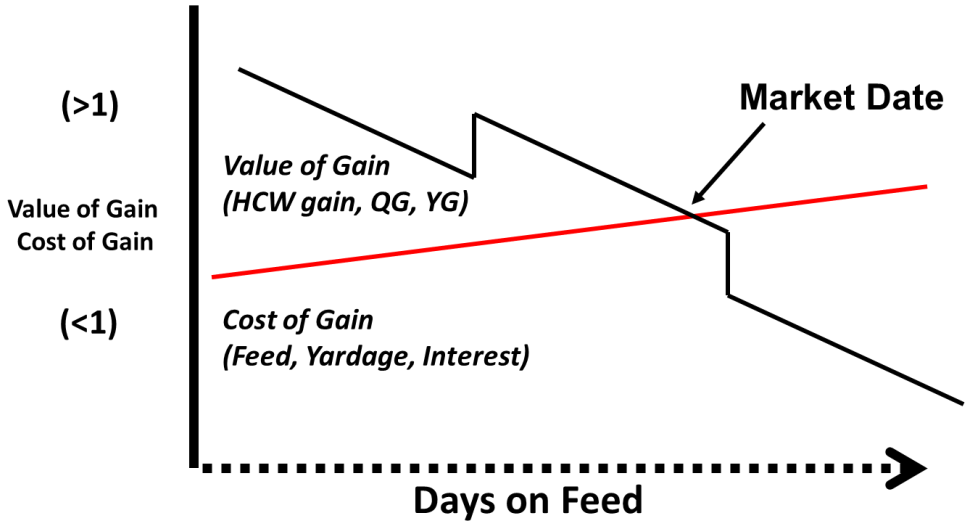
Feedlot Cost:Benefit = $1:$6

GrowSafe SYSTEMS www.growsafe.com

- Measures partial body
- Conversion partial to full body and market weight highly accurate

# Predictive ‘Learning’ Algorithms

- API’s Integrate feed/treatment/harvest data
- Reports daily weight and growth statistics
- Accurately forecasts future feed intake and weight
- Digitally profiles animal health
  - ID sick 4d+ adv clinical symptoms
  - 24 hrs adv body temp change
- Determines optimum market time
  - When cost begins to exceed value




More Data – More We Learn

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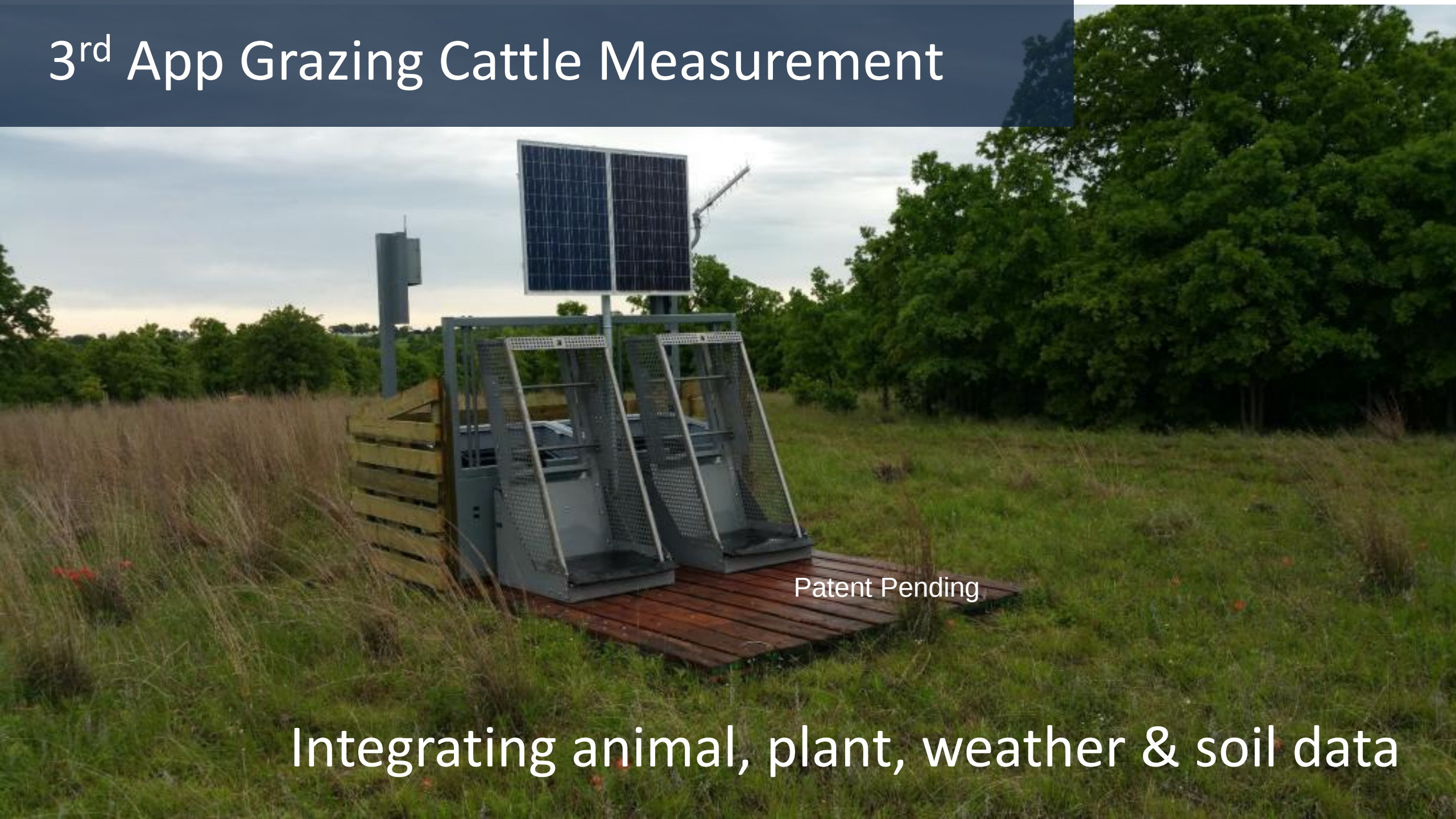
# 3rd App Grazing Cattle Measurement

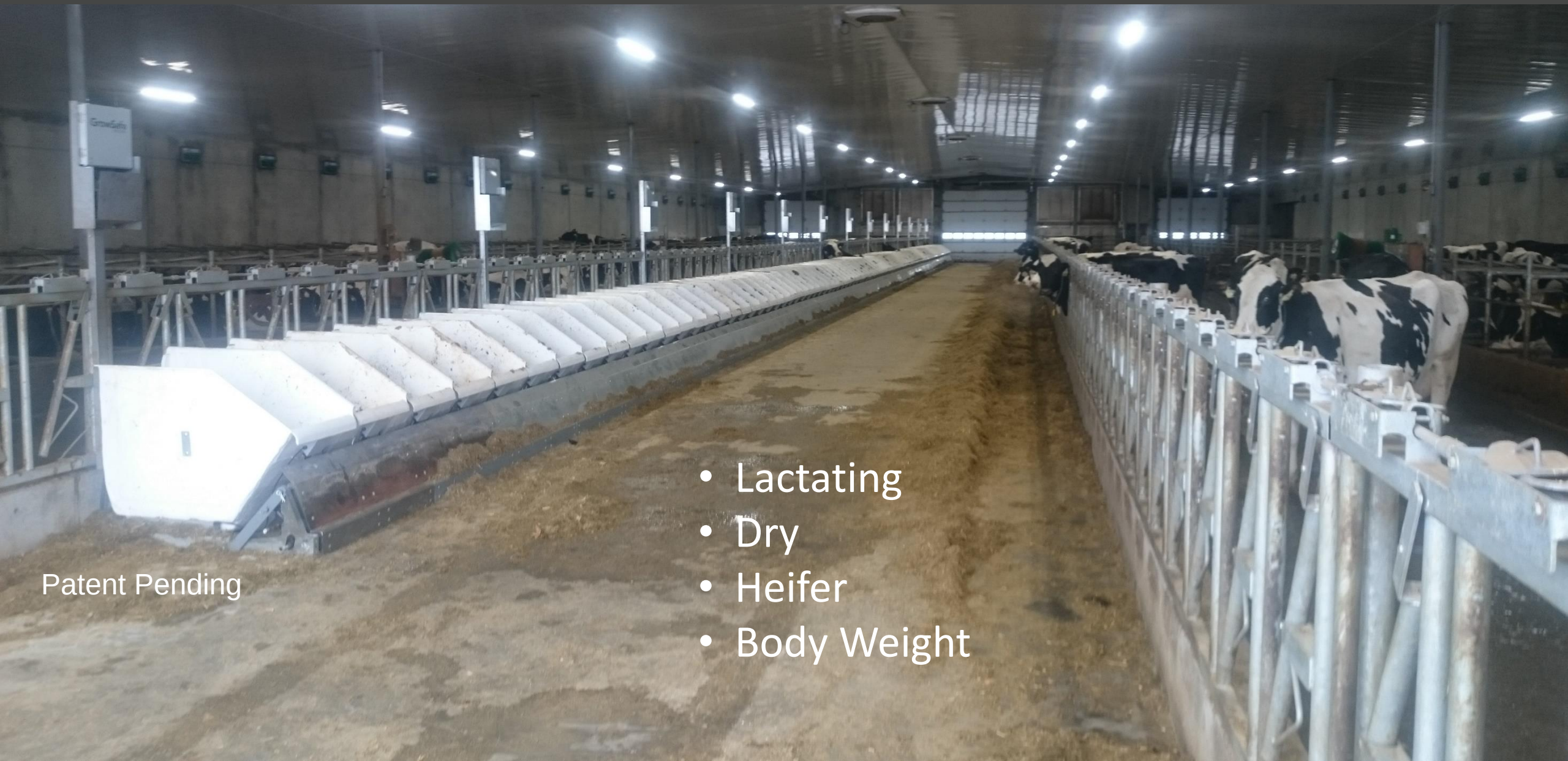



Integrating animal, plant, weather & soil data

# 4th App Dairy On Farm Phenotyping

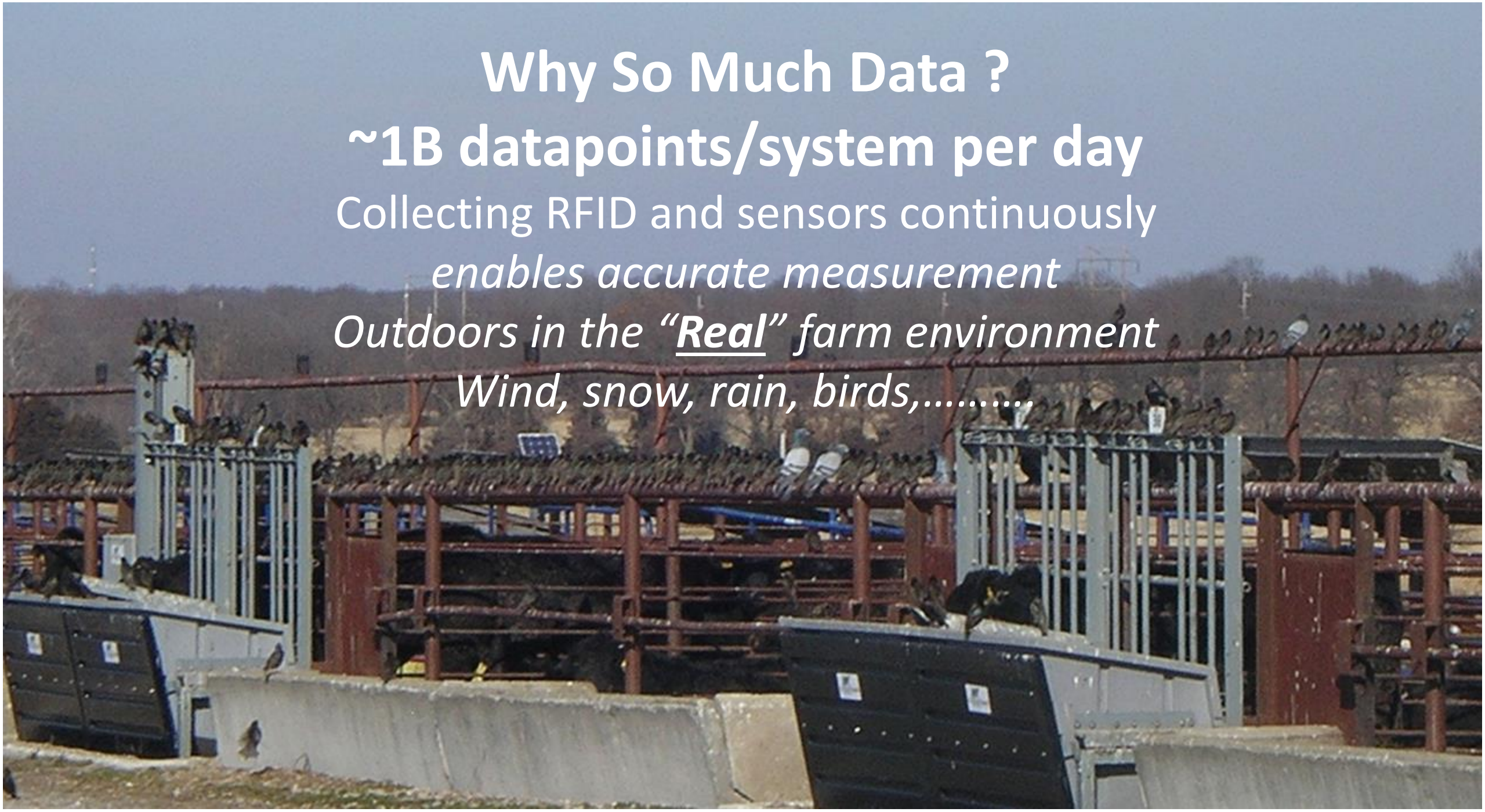
Optimize production, fertility, feed efficiency, animal health and well being

# 2017 - On Farm Phenotyping – Dairy



- Lactating
- Dry
- Heifer
- Body Weight

Patent Pending



# Why So Much Data ?

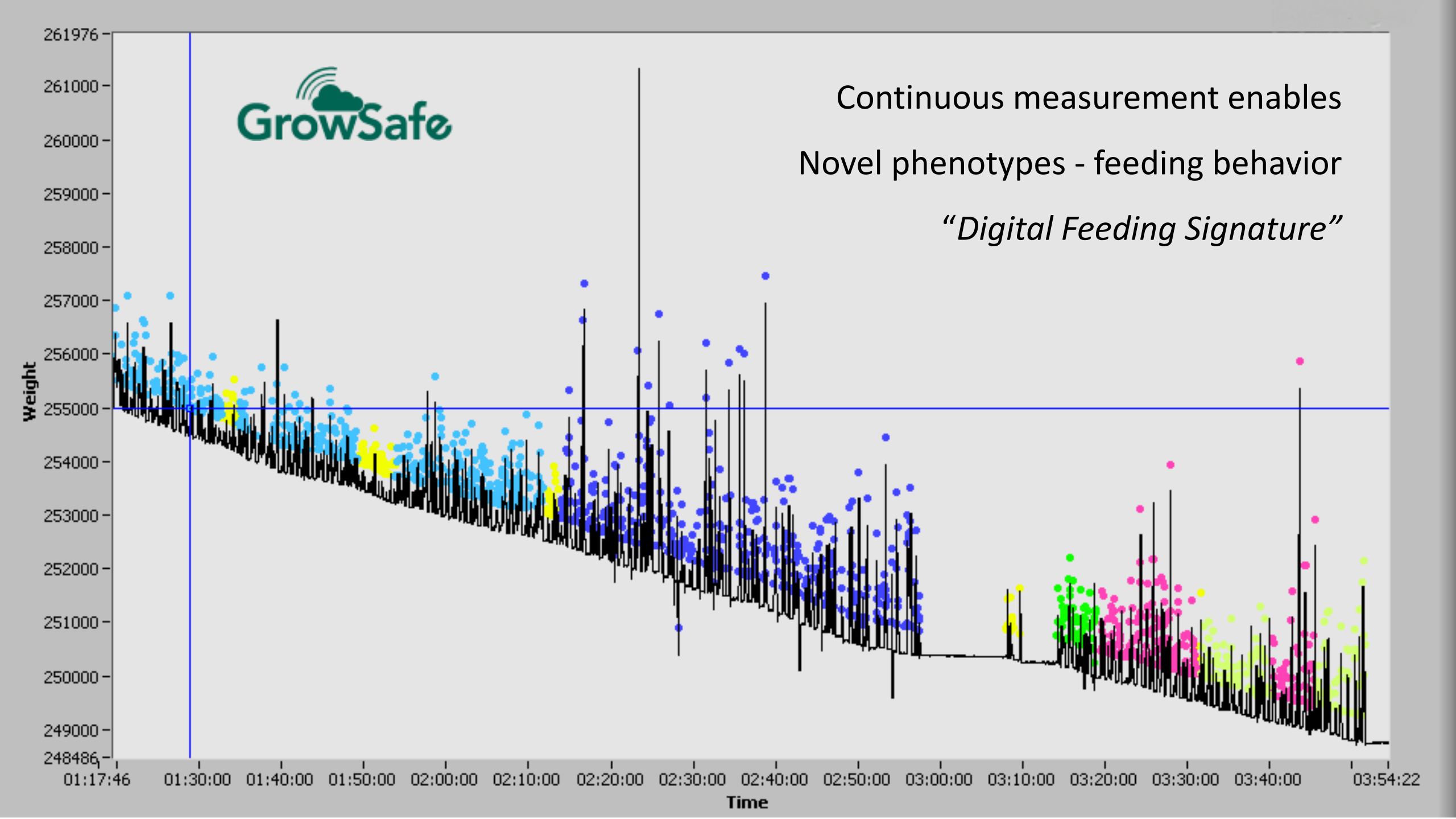
## ~1B datapoints/system per day

Collecting RFID and sensors continuously

*enables accurate measurement*

*Outdoors in the "**Real**" farm environment*

*Wind, snow, rain, birds,……*


GrowSafe
Continuous measurement enables
Novel phenotypes - feeding behavior
"Digital Feeding Signature"
Weight
261976
261000
260000
259000
258000
257000
256000
255000
254000
253000
252000
251000
250000
249000
248486
01:17:46
01:30:00
01:40:00
01:50:00
02:00:00
02:10:00
02:20:00
02:30:00
02:40:00
02:50:00
03:00:00
03:10:00
03:20:00
03:30:00
03:40:00
03:54:22
Time

# Automated Phenotyping Platform

- Measure, monitor analyse complex traits such as efficiency, growth, stress, adaptability, management, environmental tolerance, disease, metabolism
- Explicit continuous data
  - system and animal statistics, subjective and objective observations, descriptions of management protocols all in a **standardized** format

# Genomic predictors not the complete picture!

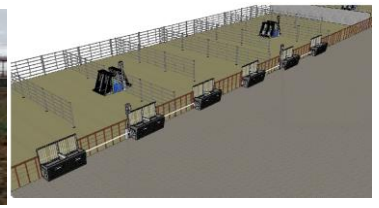
How well a genomic test improves the accuracy of an EPD is related to amount of genetic variation marker test explains.

**“No QTL for RFI explained > than 2.5% of the genetic variation”**

**In the age of the genotype phenotype is king!**

*Source 2016: (Genome wide association of feed intake related traits in beef cattle – feed efficiency consortium)*

| Genetics | Rearing | Growing | Finishing | Processing | Retailer |
|---|---|---|---|---|---|
| 50 Day RFI Test<br>Dairy Calf - March | Housed April-June | Grass July-Dec<br>Housed Jan-June | Housed July-August | Harvest Data | Consumer Taste |



## Measure

ID/Day/Time (Sec.)
Pen Location (GPS)
Feed/Water/Medication
Feedbunk Delivery
Environment
Breed/Pedigree
Biologic/Genomic
Forage/Soil Parameters

## Monitor

Consumption Patterns
Animal Health
Animal Performance
Behavior
Growth & Deposition
System Performance
Stocking Rates

## Predict

Efficiency Traits
Growth Traits
Disease Traits
Market Weight
Market Date
Market Outcome
Carbon Value

## Optimize

Breeding Decisions
Market Value
Advance Logistics
Conservation Offsets
Asset Management
Prescription Feed
Prescription Treat

## Improved

Animal Welfare
Farm Profitability
Verification
Quality & Security
Sustainability

Increased food production
Habitat preservation
Resource conservation
Rural economic stability

GrowSafe Blockchain

Readable by anyone with “permission” (digital key)

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# Our Pride:

Development of unique patented phenotyping technology – 5 continents

Leveraging research through **collaboration**

- 60+ Universities, 65+ grad students, 2400+ publications

Overnight success after 27 years R & D

@GrowSafeBeef