Welcome to the thematic workshop! The "doors" will open very soon!

Moderator:

Darja Kukovič, Project Manager, ITC, Slovenia

Digital Technolgies uptake in order to support the future of food systems

Thematic Workshop 5

16 February 2023

Organiser

ITC
INOVACIJSKO TEHNOLOŠKI GROZD
INNOVATION TECHNOLOGY CLUSTER

AGRIFOOD
DIGITAL INNOVATION HUB

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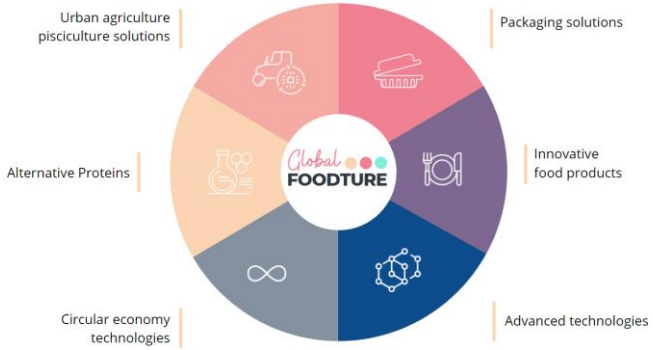
Global Foodture in a nutshell

Global Foodture is a project designed to **boost the sustainable transition of the food system worldwide through collaboration and innovation** aiming to stimulate innovation collaboration between European SMEs and Asian organisations: Japan, Singapore, South-Korea & Thailand

Themes

- **Agriculture - cultivation & support solutions**
- Alternative proteins
- Sustainable packaging
- Solutions to reduce food waste
- Health products, functional and personalised food



Activitites

- 2022 – 2023: Online matchmaking, training program, **thematic workshops** and onsite international missions to Thailand and Singapore

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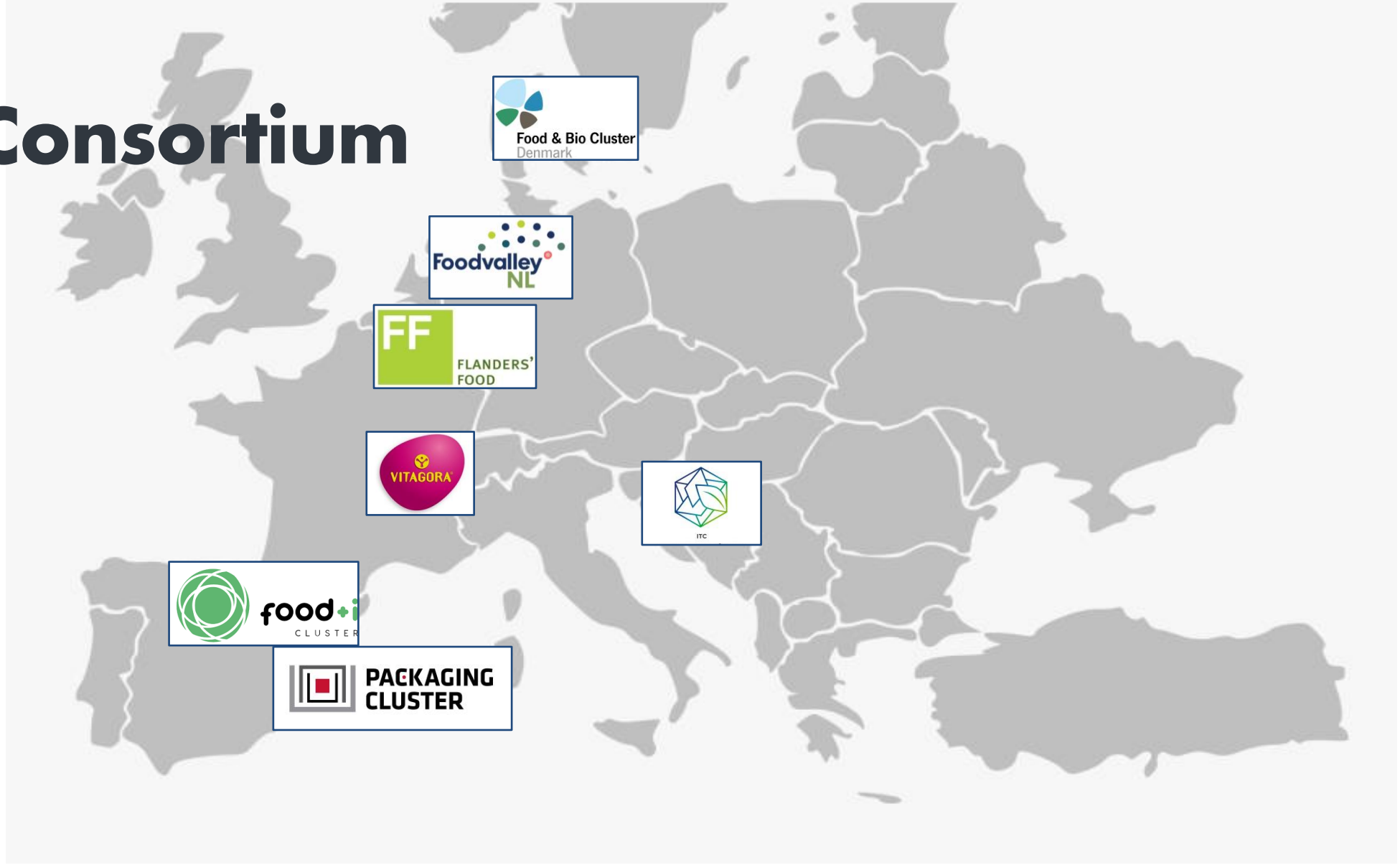
Consortium



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Focus on four Asian countries

- The target region selected for this ambitious project is **Asia**, particularly the four key markets of
  - Japan
  - South Korea
  - Singapore
  - Thailand

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Programme

09.00	Welcome and Introduction by Darja Kukovic, Project manager, ITC Cluster
09.05	“Digitalising traceability systems using blockchain technology as the natural technology go to ” by Prof. Muhamed Turkanovic, University of Maribor – Blockchain Lab:UM
09.20	“Use applications of blockchain in biovalorization ” by Mateja Dermastia, ANTEJA
09.30	”Trust and transparency of data in food supply chain using OriginTrail DKG” by Tomaž Levak, Trace Labs - OriginTrail Core Developers
09.40	“AI-Powered Global AgriFood Trade with Visibility & Finance” by Gary Loh, DiMuto
09.50	End of Master Class 1 and start of Master Class 2
09.55	Introduction to masterclass 2 by Darja Kukovic, Project Manager, ITC
10.00	“Focusing on sustainable business with AGRIVI”, by Antonija Šoštarić, AGRIVI
10.15	“agroNET: from optimizing farm operations to monetizing farm data” by Srdjan Krco, DUNAVNET
10.25	“Data based precision livestock farming” by Zoltan Tarr, CUBILOG
10.35	“ Design of an agricultural information system for the Asian Monsoon region ” by Takanori Nagano, Graduate School of Agricultural Sciences, Kobe University
10.45	Q & A - Wrap & Closing by Darja Kukovic, Project Manager, ITC
11:00	End of Thematic Workshop

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Master Class 1

Focus on the use of blockchain technology in in food systems

origintrail

Trust and transparency of data in the food supply chain using OriginTrail DKG

Tomaž Levak

Founder & Managing Director @Trace Labs - OriginTrail Core Developers

Trust has two enemies

Bad character

Impossible to eliminate

Challenge

Bad data

Possible to reduce

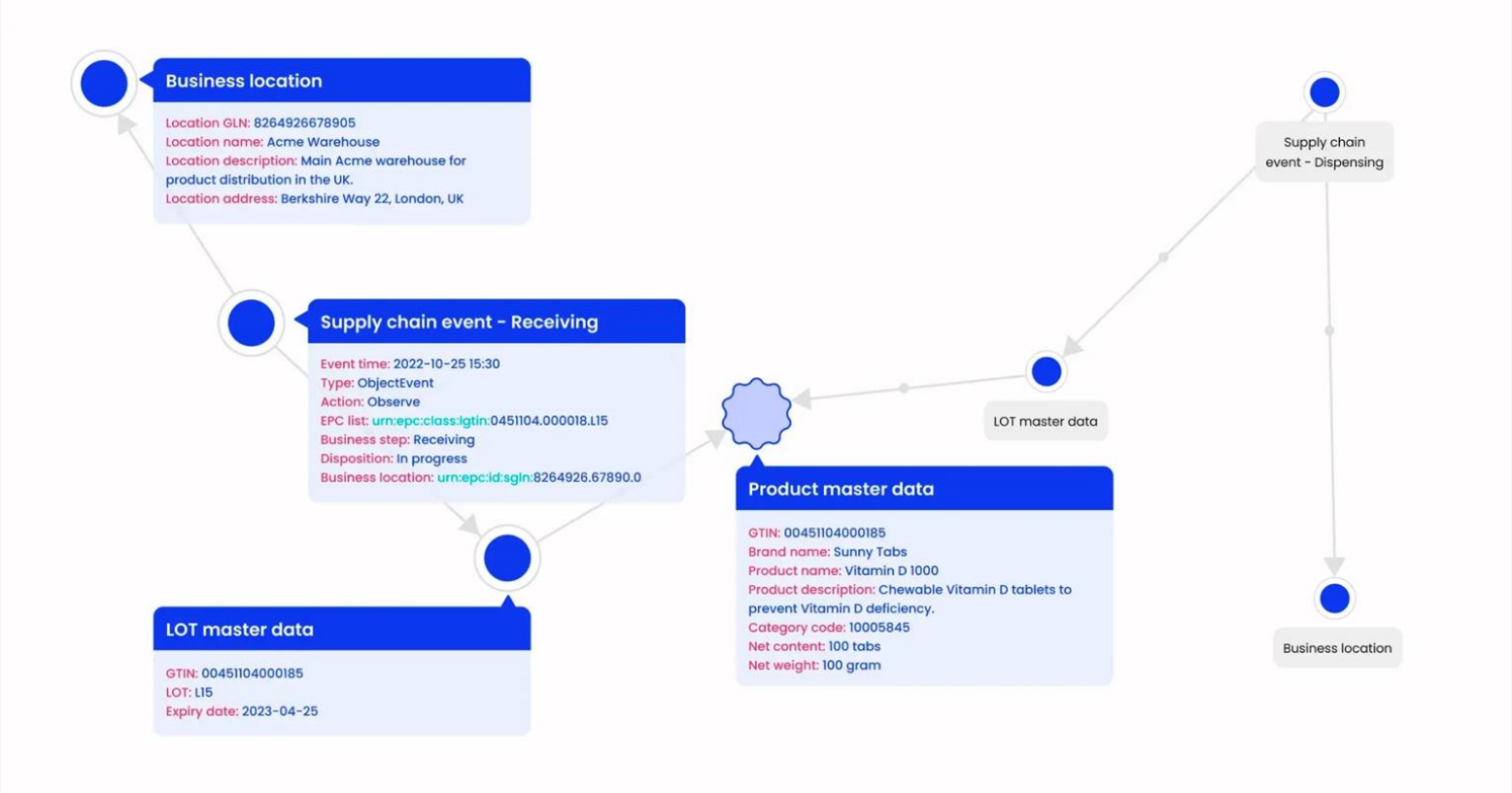
Image source: John G. Keogh

Organizing knowledge assets, making them discoverable and verifiable for a sustainable global economy.

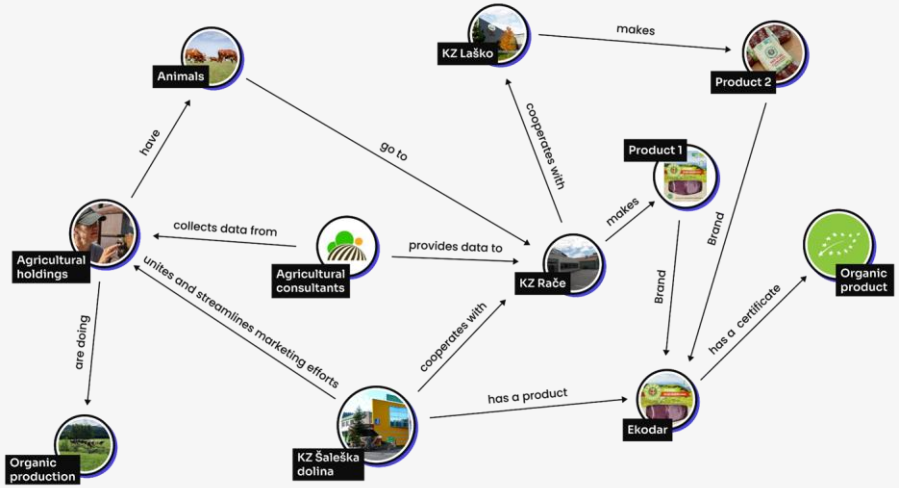
What makes Knowledge Assets special?

Knowledge Assets can be owned	**Knowledge Assets are composable**	**Knowledge Assets are discoverable**
Knowledge Asset data can be private or public	**Knowledge Asset data is structured.**	**Knowledge Asset data has integrity.**

Example of connected knowledge assets



OriginTrail Decentralized Knowledge Graph



Global trusted knowledge infrastructure

Ability to discover, verify & share knowledge based on OriginTrail protocol

Applied in food supply chains since 2013, expanded to various sectors

origintrail

Transparency and trust in agri-food sector

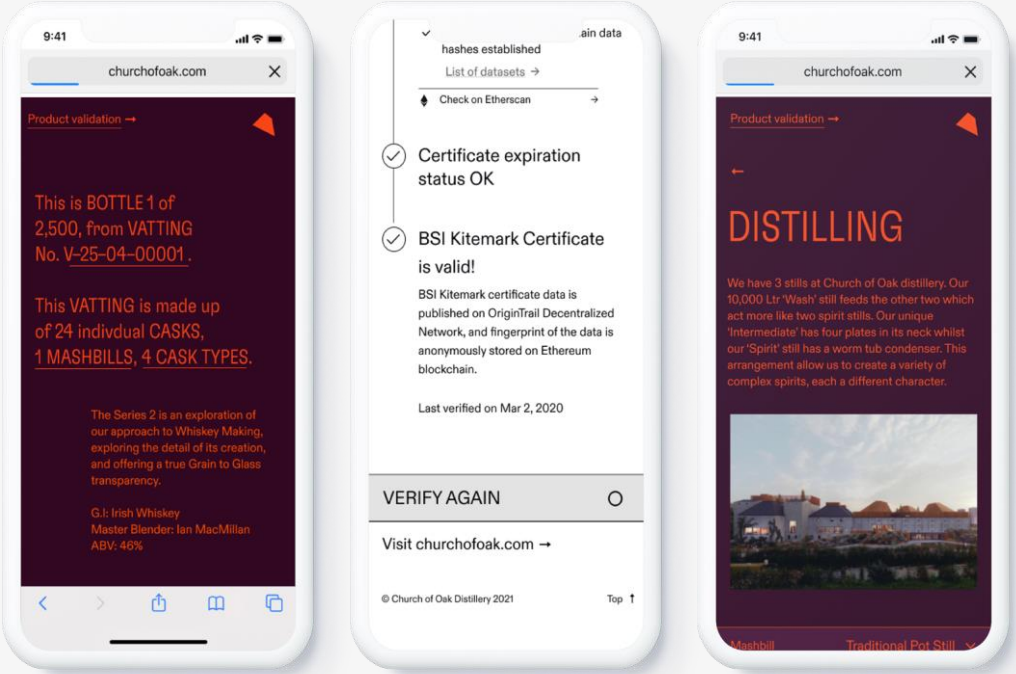
TheFSM

demeter

ekopakt

SMART AGRI HUBS

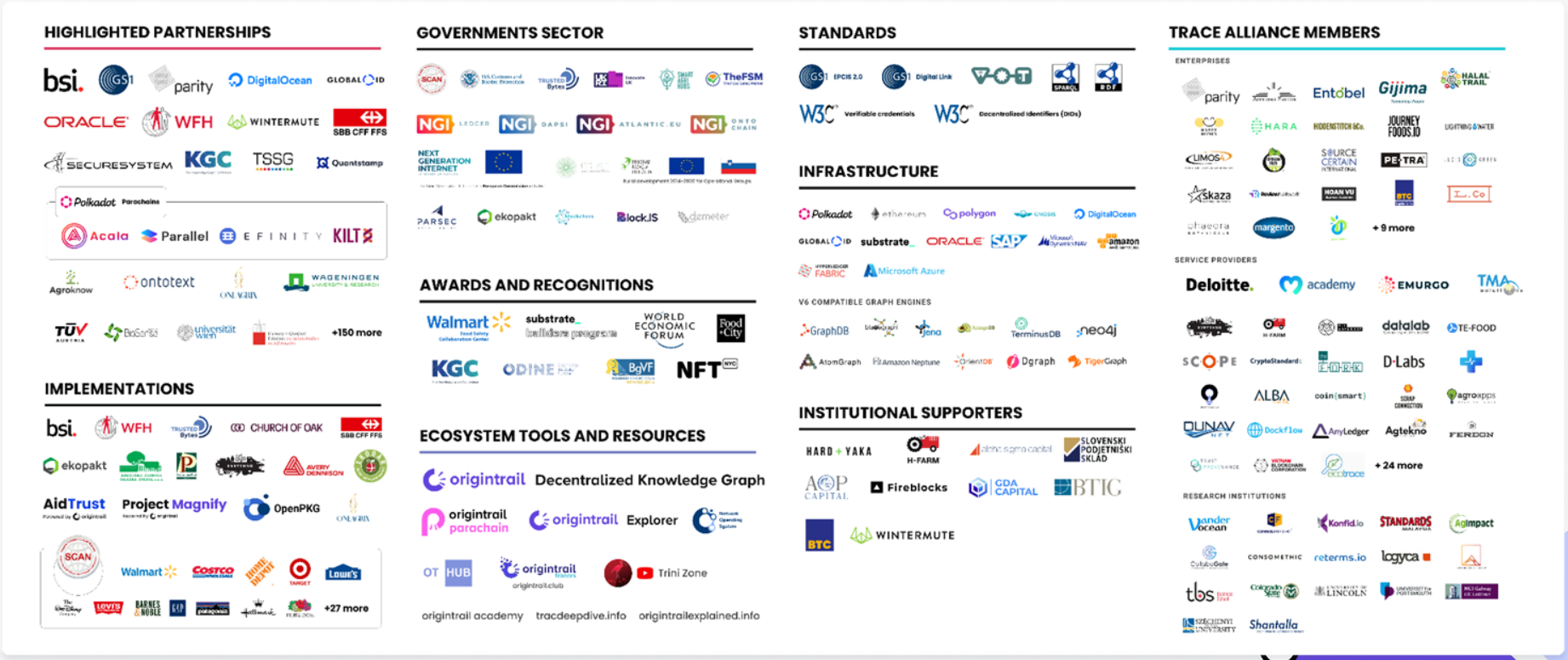
Sustainable brand promise



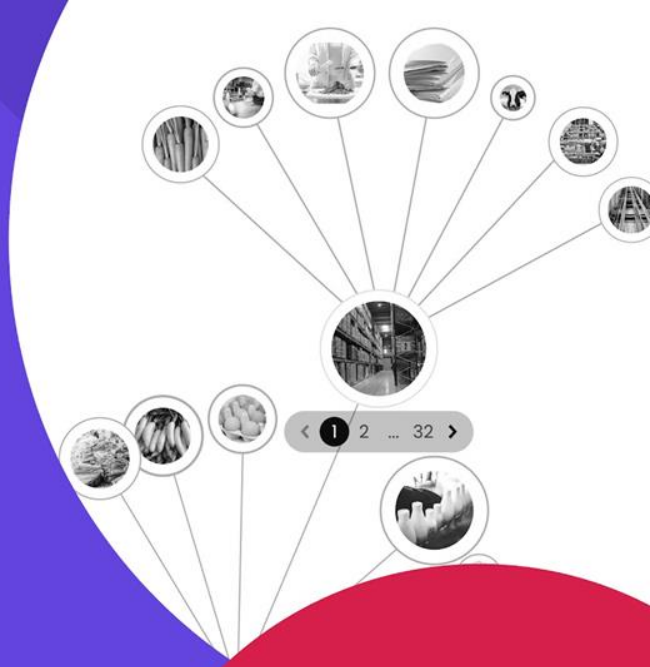
“OriginTrail is not a company, it is an ecosystem”

Ecosystem map

DECEMBER 2022



origintrail.io



Leading global companies' solutions on OriginTrail

Trusted factory

BSI and SCAN are utilizing the OriginTrail protocol to ensure the integrity of security audits for over 40% of US imports.

Rail Travel Safety

Ensuring the safety of train travel by tracking every piece of rail track material used by the Swiss Federal Railways.

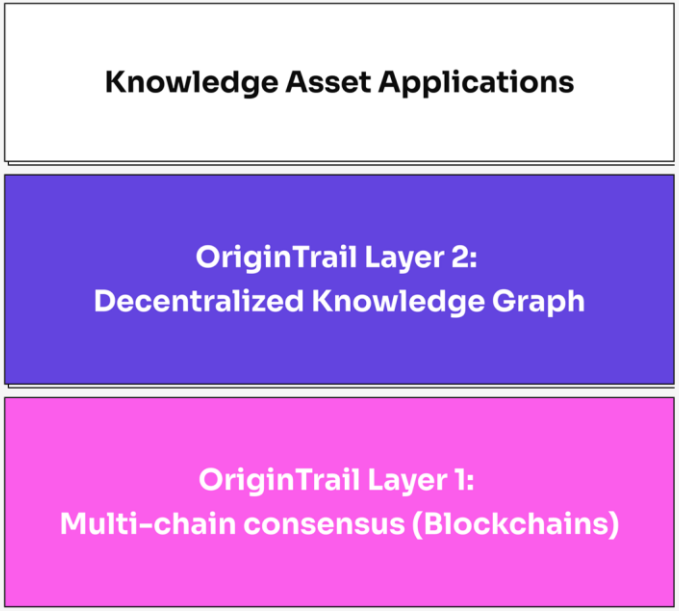
Food and Beverage Traceability

A "transparency-by-design" traceability solution ensuring brand's core consumer promise for a start-up Irish Distillery.

Pharmaceuticals

Making sure patients receive the right treatment is crucial for the global healthcare system. We help achieve that and are proud to be supported by the World Economic Forum along the way.

OriginTrail synergizes blockchains and knowledge graphs

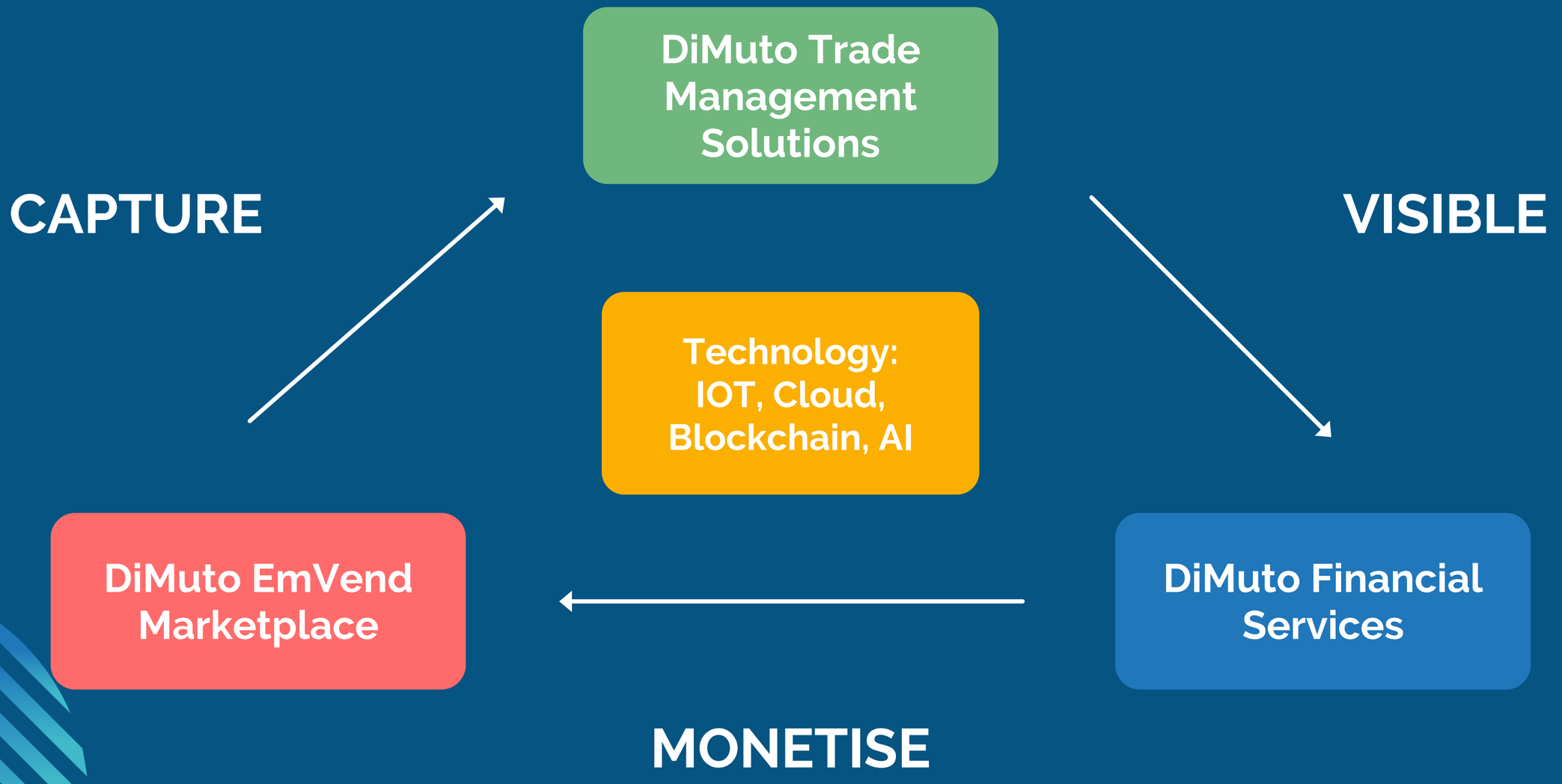


- Multi-blockchain decentralized knowledge graph
- Key primitive: Knowledge Assets, designed to support GS1, W3C and ISO standards
- Hosted on the permissionless OriginTrail Decentralized Network, open source software
- Supporting various applications in synergy with knowledge graph tools, blockchains and AI

DIMUTO

AI-Powered Global AgriFood Trade with Visibility & Finance

Powering the DiMuto Ecosystem



DIMUTO

Our Platform as a Service Business Model

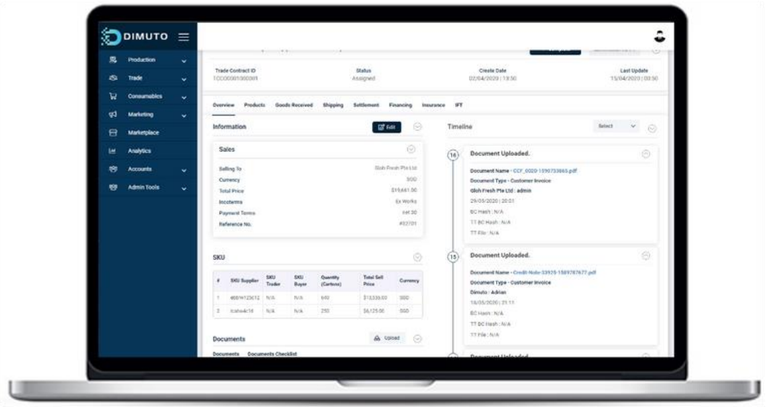
01 Digital Identities ON DEMAND

+

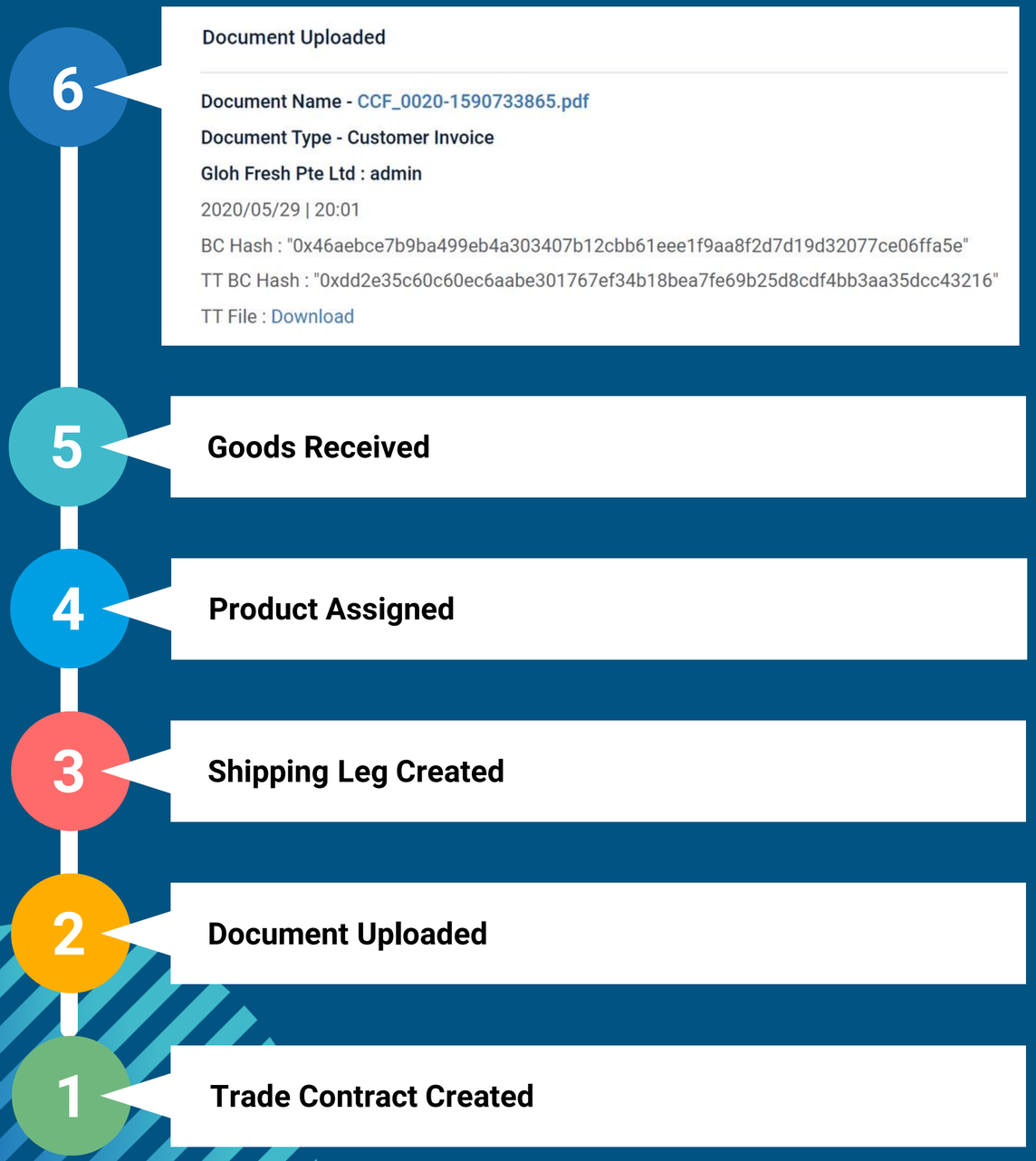
02 Digitization Devices PER MONTH

+

03 DiMuto Platform PER MONTH



DIMUTO



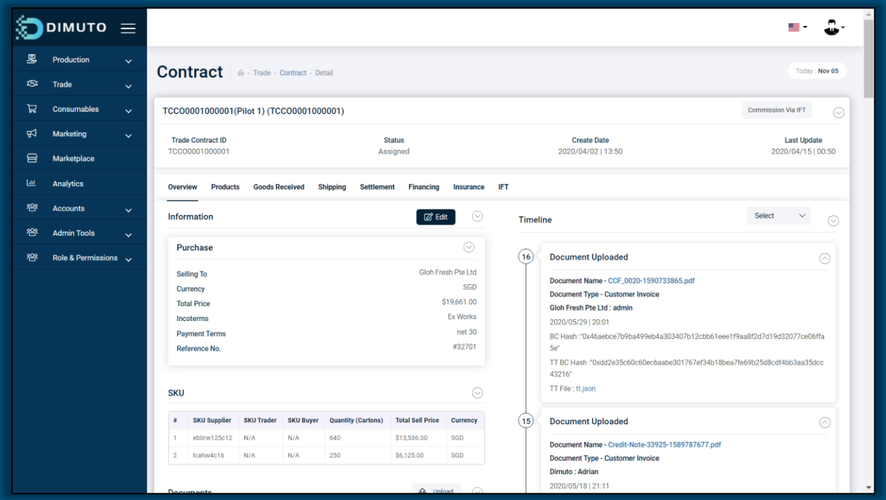
Connecting Granular Dots Across the Supply Chain

Enable collaborative data capturing and eliminate organizational silos with DiMuto's all-in-one Trade Solutions.

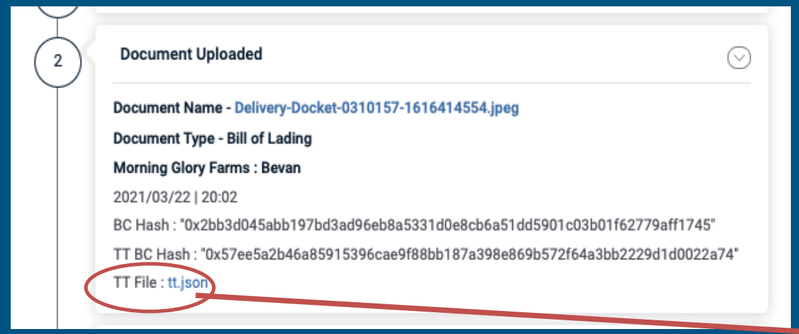
DIMUTO

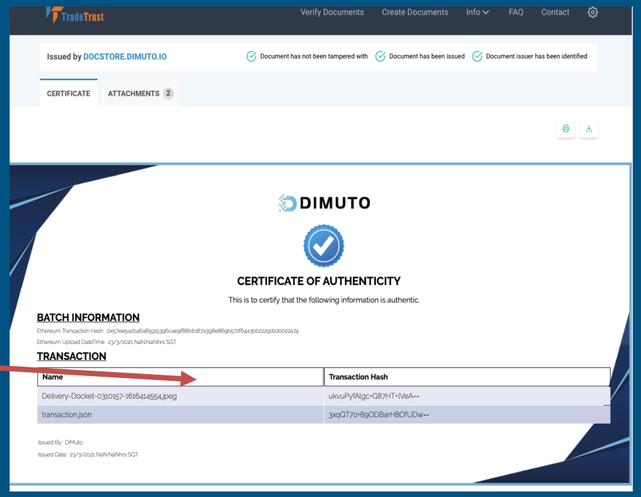
Verifiable Traceability

Key Documents: PO/SO, BL, COO, Health Cert, Phyto Cert, IoT Document, Loading Report, Packing List, QA Document, Invoices, Booking Confirmation, Letter of Protest, etc.



Ability to see every transaction action, documents and products under each trade





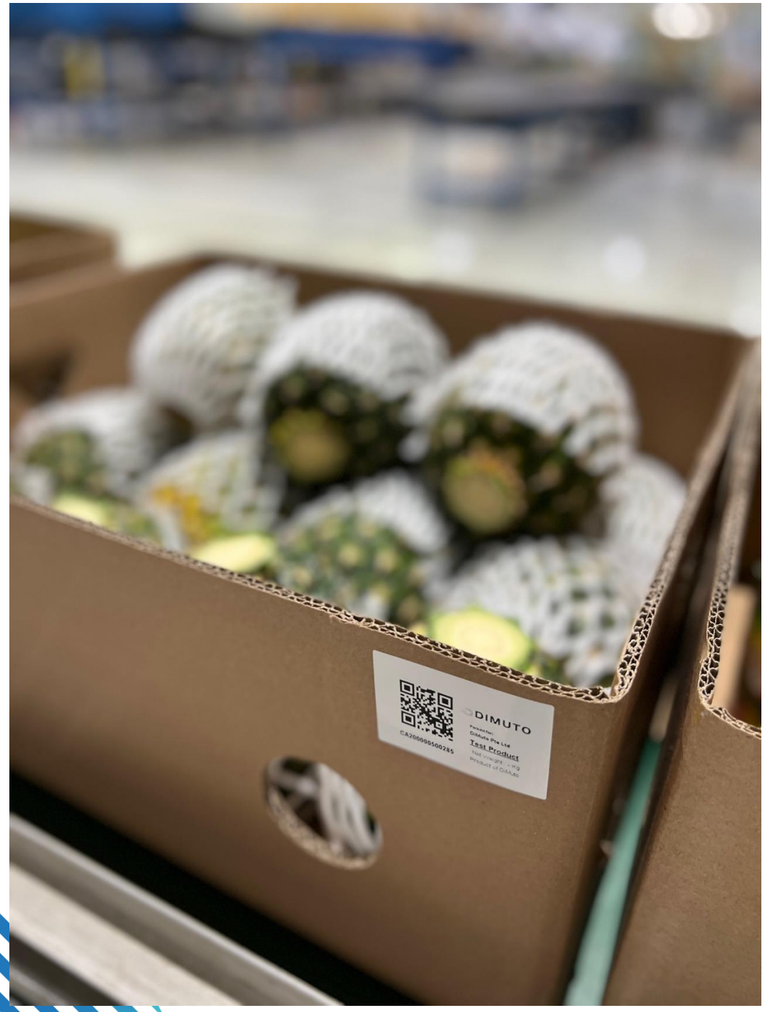
TradeTrust

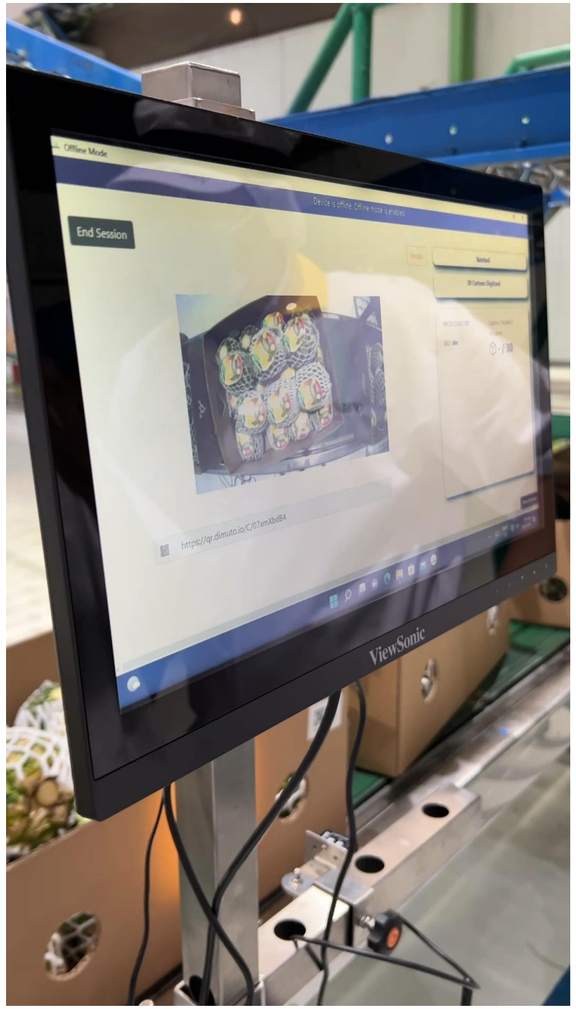
Blockchain hash for every transactions and TradeTrust verification for each trade documents

DIMUTO

Creating Product Visibility Across the Supply Chain

Packing Visibility with Product Quality AI Score





DIMUTO

Pack Plan - Production - Pack Plan - Detail

PPCO0014700006 (PPCO0014700006)

Pack Plan ID	Status	Type
PPCO0014700006	Completed	Batched

Product Quality A.I — Run

Model Applied	Pineapple - Shell Colour
No. of Cartons Applied	2
Optimum Shell Colour	2
Last Modified	2022/07/25 | 14:12

5
Quality Score

Documents — Upload

Document Name	Uploaded By	Date Uploaded	Delete

Carton List

Carton - CA200001883750	Carton - CA200001883751	Carton - CA200001883752	Carton - CA200001883753
Carton ID CA200001883750	Carton ID CA200001883751	Carton ID CA200001883752	Carton ID CA200001883753

DIMUTO

Product Visibility Across the Supply Chain

Packing Visibility

User 'Regy Reppilo: PT Sewu Segar Nusantara'

Status completed

Carton - CA200000444164

Carton ID CA200000444164
SKU PisangMasSunpride_11KG
Pack ID PPCO0013900179
Pallet ID N/A
Load ID LPCO0013900206
Trade Contract ID TCCO0013900152
BC Hash 0x1bd76609f6729f51db00f8d9033d35697b36470f35ad38e566e4f766e3d5de35

Carton - CA200000444176

Carton ID CA200000444176
SKU PisangMasSunpride_11KG
Pack ID PPCO0013900179
Pallet ID N/A
Load ID LPCO0013900206
Trade Contract ID TCCO0013900152
BC Hash 0x1bd76609f6729f51db00f8d9033d35697b36470f35ad38e566e4f766e3d5de35

Carton - CA200000444177

Carton ID CA200000444177
SKU PisangMasSunpride_11KG
Pack ID PPCO0013900179
Pallet ID N/A
Load ID LPCO0013900206
Trade Contract ID TCCO0013900152
BC Hash 0x1bd76609f6729f51db00f8d9033d35697b36470f35ad38e566e4f766e3d5de35

Carton - CA200000444178

Carton ID CA200000444178
SKU PisangMasSunpride_11KG
Pack ID PPCO0013900179
Pallet ID N/A
Load ID LPCO0013900206
Trade Contract ID TCCO0013900152
BC Hash 0x1bd76609f6729f51db00f8d9033d35697b36470f35ad38e566e4f766e3d5de35

Load : (Load Count 1)

PO WW2DM0612 / SO 2552932(Pallet Count: 0)

Non Assigned Carton

Load Plan(s) Pallet(s)

Carton - CA200000444184

Carton ID CA200000444184

Carton - CA200000444185

Carton ID CA200000444185

Pack Plan: (Pack Plan Count 2)

Farmer17_22042022_05
Farmer17_22042022_05

Pack Plan

Pre-Shipment QC

Carton 689

Carton 690

Carton 691

Post-Shipment QC

Inspection Record

INSCO0003600228 (INSCO0003600228)

Inspection ID INSCO0003600228

Status Completed

Overview Details

Defects Summary

Minor Defects Minor (Threshold 10%) View Details

DISEASES	5 / 120 (4.17%)
PHYSICAL DAMAGE	0 / 120 (0.00%)
PEST DAMAGE	0 / 120 (0.00%)
SKIN MARKS / BLEMISHES	0 / 120 (0.00%)
Total Defects	5 / 120 (4.17%)
Total Defective Units	0 / 120 (0.00%)

Major Defects Major (Threshold 5%) View Details

MATURITY	0 / 120 (0.00%)
INSECTS	0 / 120 (0.00%)
DISEASES	0 / 120 (0.00%)
PHYSICAL / PEST DAMAGE	0 / 120 (0.00%)
SKIN MARKS / BLEMISHES	0 / 120 (0.00%)
TEMPERATURE INJURY	0 / 120 (0.00%)
Total Defects	0 / 120 (0.00%)

Total Defects

5/120

- DISEASES
- PHYSICAL DAMAGE
- PEST DAMAGE
- SKIN MARKS / BLEMISHES

DISEASES 5/120 (4.17%)

Carton 900 5/120 (4.17%)

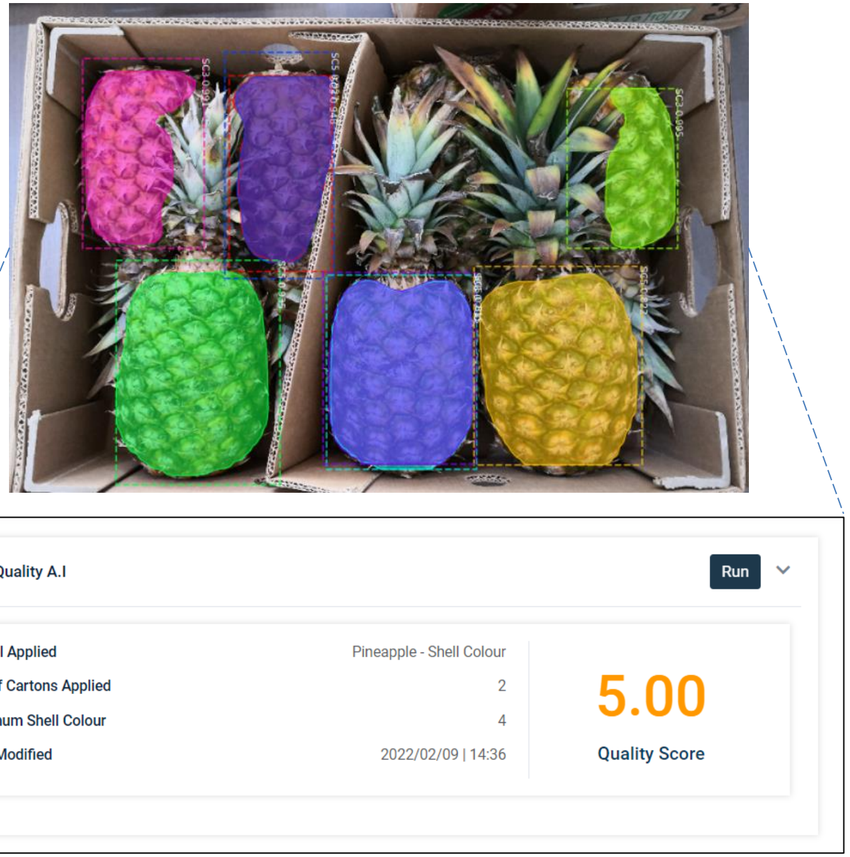
DiMuto Product Quality Score

AI-powered scoring of digitized cartons

DIMUTO

Visibility-Enabled Financing

Proprietary Trade Health AI technology to assess trades



Indicator	Relevant Data Source	Interpretation
Product Quality Risk	PQ Score	The lesser the number of defects, the lesser the credit risk
Payment Dispute Risk	Payment Dispute Score	The lesser the number of late payments, nonpayments and partial payments, the lesser the credit risk
Shipment Score	Shipment Score	The lower the number of shipment delays (taking into account the port in which the goods are shipped from) , the lesser the credit risk
Buyer/Seller Freight Risk	Incoterms 2020	Depending on whether the firm seeking financing is a buyer/seller, and by what mode of transportation are the goods being delivered by, the firm will be assigned a respective credit score
Trade Value Risk	Trade Value Risk	The lower the trade value of the contract ,the lower the credit risk
Trade Activity Risk	Trade Activitiy Risk	We will be looking at the number of SKUs, Containers, Companies and Countries traded with in the past 6 months. The higher the frequency, the lower the credit risk
Collaboration Risk	Collaboration Risk	We will be looking at the containers & total trades between counterparties
Profitability Risk	Annual Reports	Gross Margin, Net Profit Margin, ROA & ROE relative to indsutrial averages or comparable companies
Liquidity Risk	Annual Reports	Current Ratio, Quick Ratios relative to industry averages or comparable companies
Efficiency Risk	Annual Reports	Acc Receivable, Acc Payable, Inventory Turnover, Cash Conversion Cycles relative to industry averages or comparable companies
Solvency Risk	Annual Reports	Debt ratio, Debt to Equity relative to industry averages or comparable companies

Product Quality AI

Objectively determine the quality of fruits

Financial AI

Assess other aspects of the trades + financial documents

DIMUTO

DiMuto Marketplace

Connecting traceable suppliers and buyers together

- Procure new products with full visibility of the pre-shipment goods quality and information
- Expand your global market reach

Our Presence

$16,985,795

Total GMV Tracked (USD)

17,519

Total Containers Tracked

11,631,257

Total Products Tracked

aleta PLANET

140 Countries
Remittance Reach

39 Countries
Local Deposits Reach

UK
Netherlands
Greece
United States
Mexico
Colombia
Ecuador
Ghana
Kenya
South Africa
China
Japan
Vietnam
Malaysia
Singapore
Thailand
Indonesia
Bougainville Island

DIMUTO

Thank You

Connect with us:

HuiMin Lee
huimin@dimuto.io

www.dimuto.io

Master Class 2

Focus on the use decision support systems in agriculture

Focusing on sustainable business with

AGRIVI

Farm Management Software

Global FOODTURE

AGRIVI

WORLD MAP

Our Team

40+

Operating in

50+

COUNTRIES

Serving

100+

CUSTOMERS

One of the leading farm management software companies based on over 100 global industry reports.

Supporting customers on all continents.

Awarded and recognised by UN FAO, Deloitte, EY, Financial Times and others.

Team over 40 AgTech Experts.

Global Customer Portfolio

AGRIVI

Nestlé

Driscoll's
Only the Finest Berries™

Kimberly-Clark

Organic Yemen
أورقانك يمن

BASF
We create chemistry

BNP PARIBAS

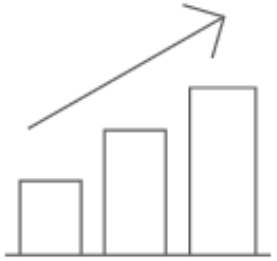
EAST-WEST SEED INTERNATIONAL

PROCESADORA TROPICAL

Beam SUNTORY

+ MANY MORE

The current inflationary environment has made rising input costs a major concern.



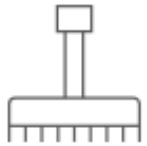
75%

of farmers expect cost hikes in the next 12–18 months

~60%

of farmers expect the current inflationary environment to increase spending by 10–20% in the next 12–18 months

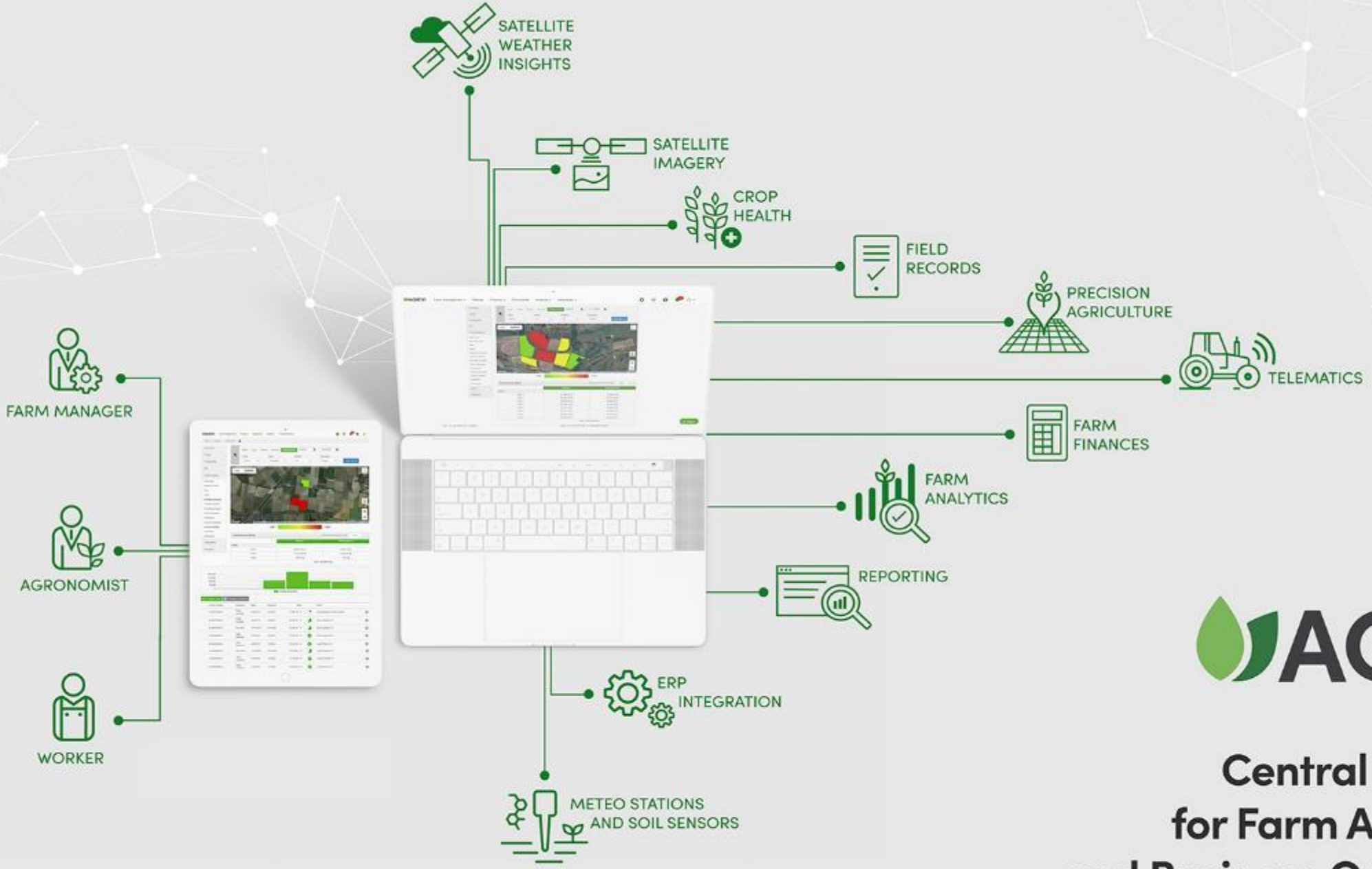
Top three inputs that have increased in cost the most, % cost increase experienced



71% fertilizer

30% crop protection

17% labor



AGRIVI

Central Platform for Farm Agronomy and Business Operations

CENTRALIZE | Farm resource management

ALL FARM DATA ON ONE PLACE

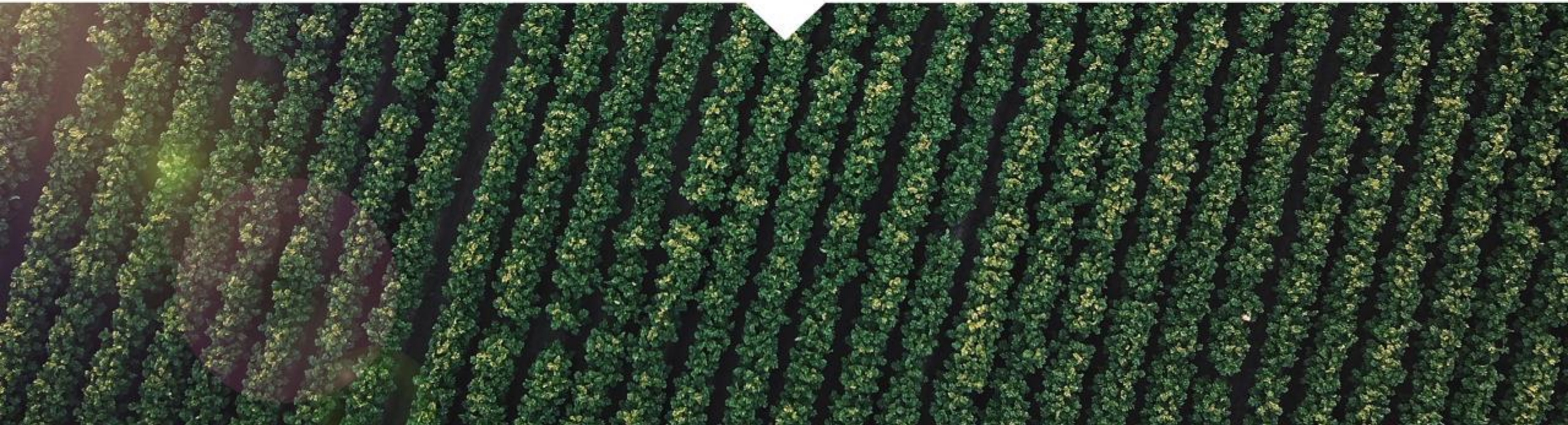
No more papers. No more Excel.

Fields

Machinery

Farm workers

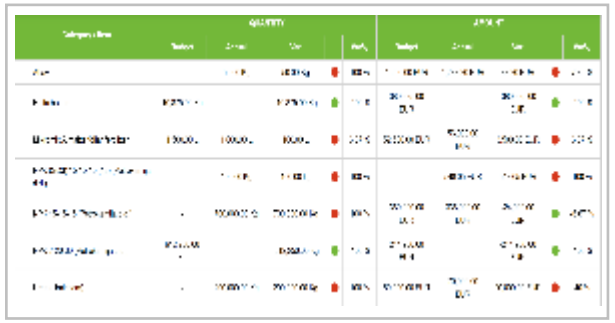
Inventory



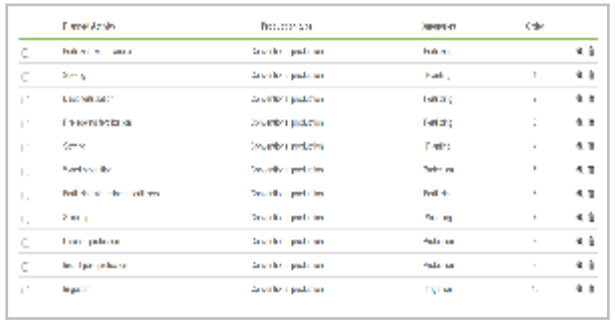
PLAN | Powerful Planning Capabilities

CROP PLAN

FINANCIAL BUDGET



SEASON AGRONOMY PLAN



DAILY WORK ORDERS

TRACK l Field Operations Management

PLAN, TRACK AND ANALYZE COMPLETE CROP PRODUCTION LIFE-CYCLE

Labour management

Soil analysis

Soil cultivation

Planting / seeding

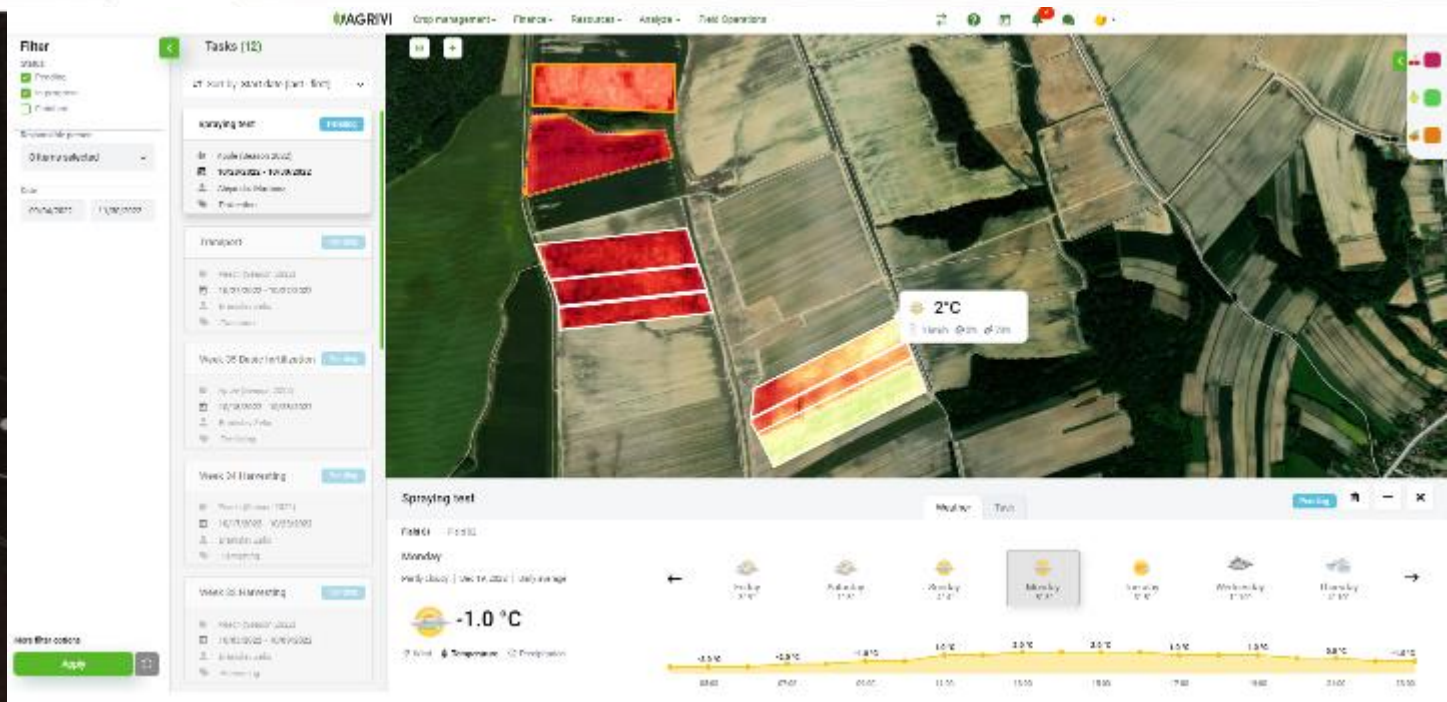
Fertilizing

Spraying

Irrigation

Maintenance

Harvesting



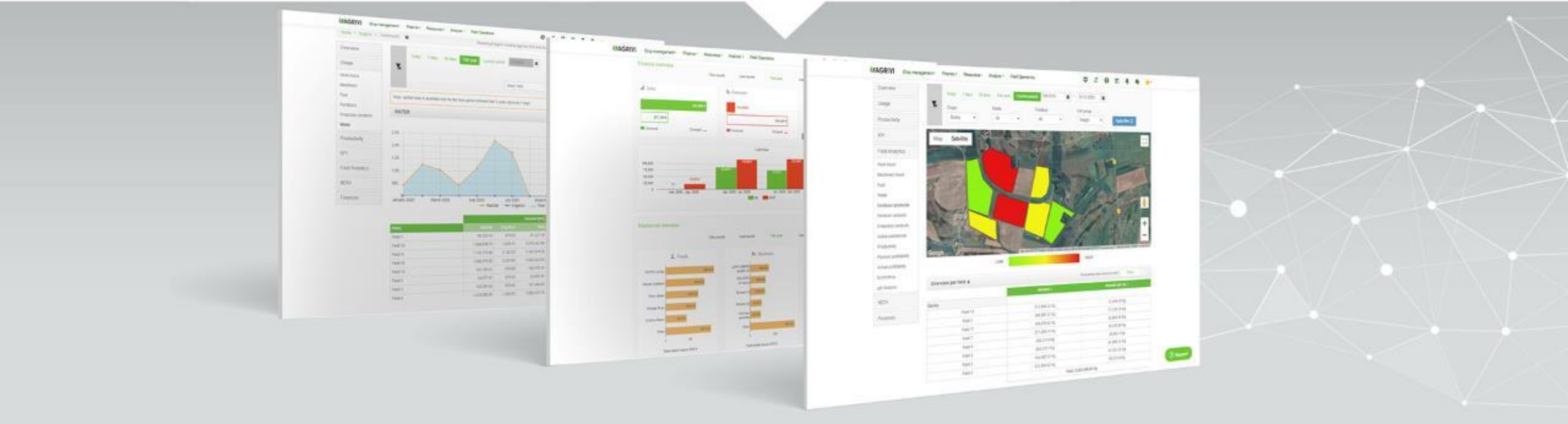
ANALYZE | Powerful Farm Analytics

DASHBOARDS FOR INTERACTIVE ANALYTICS

- Yield analysis per field, crop and variety
- Crop profitability analysis (revenue, expenses, profits per crop)
- Field analysis (inputs, weather, work per field)
- Resource utilization analysis (machinery, people)
- Farm finance KPIs (profitability, return on investment, etc.)

REPORTS (EXPORT TO PDF AND EXCEL)

- Input usage report (fertilizers, pesticides, irrigation, etc.)
- Harvest report per crop and variety
- Farm finance reports
- Reports for certification (Global GAP, ISO)
- Reports for authorities



Global Coverage with Localized Software Experience

AGRIVI

LANGUAGES

User interface and product manuals available in over 10 languages.

CURRENCIES AND UNITS

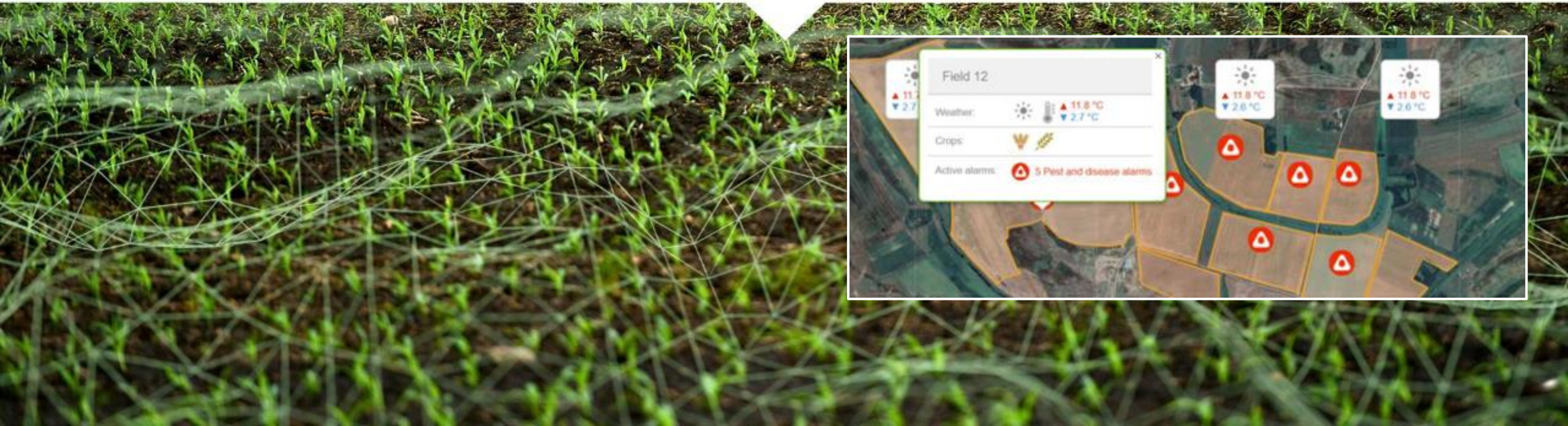
All global currencies available. Platform supports metric and imperial measurement units.

LOCAL PRODUCTS

Built in database of commercial fertilizer and crop protection products with possibility to add local products.

LOCAL PEST ALERTS

Pest alarms for pests present in the country. Pest models calibration by region.



Precision Agriculture with VRA

AGRIVI

MULTI-LAYER MAPS

Prescription map creation based on 8 vegetation indices from satellites, soil and yield maps.

MANAGEMENT ZONES

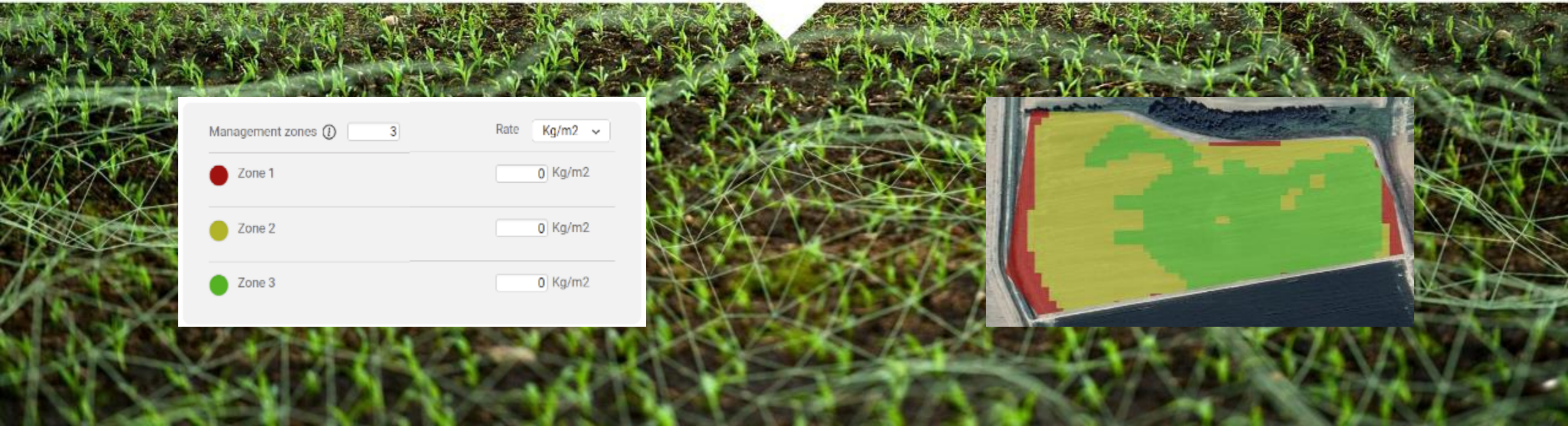
Variable product distribution on up to 20 management zones per prescription map.

UPLOAD TO MACHINERY

Direct upload from AGRIVI to the machinery or export into file for USB use.

SIGNIFICANT SAVINGS

Save 20-40% of inputs with variable rate application.



AGRIVI

Full Crop Production Traceability

MARKET YOUR PRODUCE AS PREMIUM

1. Generate QR code for harvested produce
2. Put QR code on your produce packaging
3. Consumers can scan QR code on packaging
4. Traceability data is shown on a mobile web

TRACEABILITY DATA

- ✓ Resources used (work hours, fuel, irrigation)
- ✓ Crop nutrients applied (nitrogen, ..)
- ✓ Active substances applied
- ✓ Nutrition data (calories, protein, carb, fat)
- ✓ Field location on a map
- ✓ Photos of the farm

IMPACT DRIVEN COMPANY

AGRIVI

12 SUSTAINABLE DEVELOPMENT GOALS

AGRIVI

Case study

Barbados Agricultural Management Company (BAMC)

Company manages and operates around 30% of the sugar industry in Barbados.

They grow sugar cane, starch crops, and cotton.

AGRIVI

Orlanda Atherley,
CEO at Barbados Agricultural Management Company

“We had all the information but no tools to help us gather it all in one place and assess productivity and efficiency. We also had no accountability at the farm level. This is where AGRIVI came in and really helped us organize our business. We’ve seen a 10-15% increase in revenue already, and we’re only just starting.”

AGRIVI

DELIVERING TANGIBLE BENEFITS.

OPERATIONAL

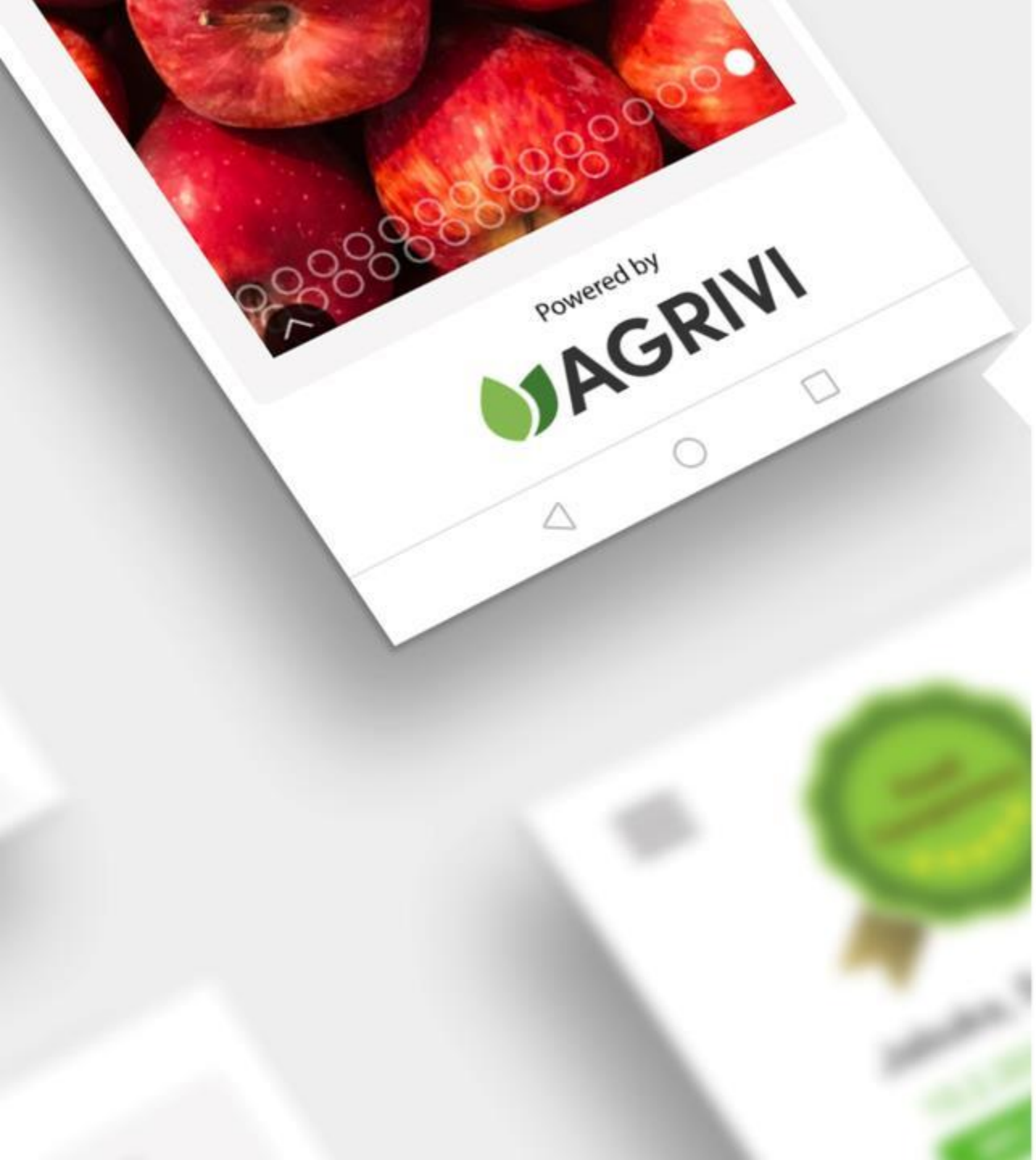
- ✓ Better risk mitigation
- ✓ Timely decision-making
- ✓ Full operations management control
- ✓ Traceability and food safety compliance
- ✓ Simplified administration

BUSINESS

- ✓ Cost savings
- ✓ Yield volume increase
- ✓ Yield quality increase
- ✓ Higher profitability

ESG

- ✓ Improved carbon footprint
- ✓ Support for scaling regenerative practices
- ✓ Labor demographics and utilization control



AGRIVI

Your partner in changing the way food is produced.

Antonija Šoštarić
antonija.sostaric@agrivi.com
+385 99 529 6271
www.agrivi.com

Data-based precision livestock farming

Zoltan Tarr, product development lead
Cubilog Ltd, Budapest, Hungary

Global Foodture thematic workshop
February 16, 2023 - Online

FarmRadar.eu by Cubilog

Cubilog Ltd.

Digitalization. Service. Simple.

CUBILOG

We develop innovative solutions and provide services for the digitalisation and Industry 4.0 challenges of the industrial and agricultural sectors.

We support cost and efficiency optimization, damage prevention and workforce management.

FarmRadar
Livestock monitoring

450+
Barns monitored

since
2016

4000+
Sensors deployed

FarmRadar.eu

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Some of our Partners

Aviagen®

MSTSZ
MAGYARORSZÁGI SERTÉSTENYÉSZTŐK ÉS SERTÉSTARTÓK SZÖVETSÉGE

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BOS-FRUCHT

iCELL

rexroth
A Bosch Company

BUDAPEST
ZOO

KÖVESI
GROUP

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THE POTENTIAL OF DIGITIZATION IN INTENSIVE LIVESTOCK FARMING

Herd-level monitoring: animal health, oestrus, reproduction

Monitoring of housing conditions: animal welfare, environmental impact

Process monitoring: monitoring of the entire management and production processes (including farm equipment)

Resource efficiency monitoring: human resource usage, energy consumption data

© Cubilog Ltd.

DIGITIZATION BENEFITS & CHALLENGES

The benefits of precision livestock farming

- improving animal health and welfare
- reduction in treatment costs
- increased productivity and product quality
- accountability and transparency
- less harmful environmental impact

Challenges of precision livestock farming

- not yet standard - implementation phase
- relatively high asset costs
- lack of local digitization expertise
- few independent expert suggestions
- low level of integration of available solutions

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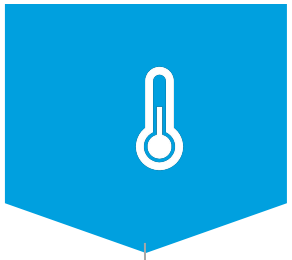
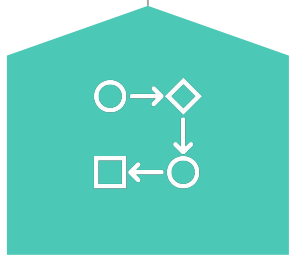
OUR METHODOLOGY

We propose a Framework to unlock the road to operational efficiency and Innovation



we **Measure**

IoT platform



we **Visualise**

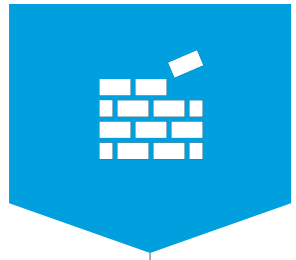
BI platform

we **Provide transparency**

Dashboards

we **Identify**

Innovation FW



we **Implement**

Innovations

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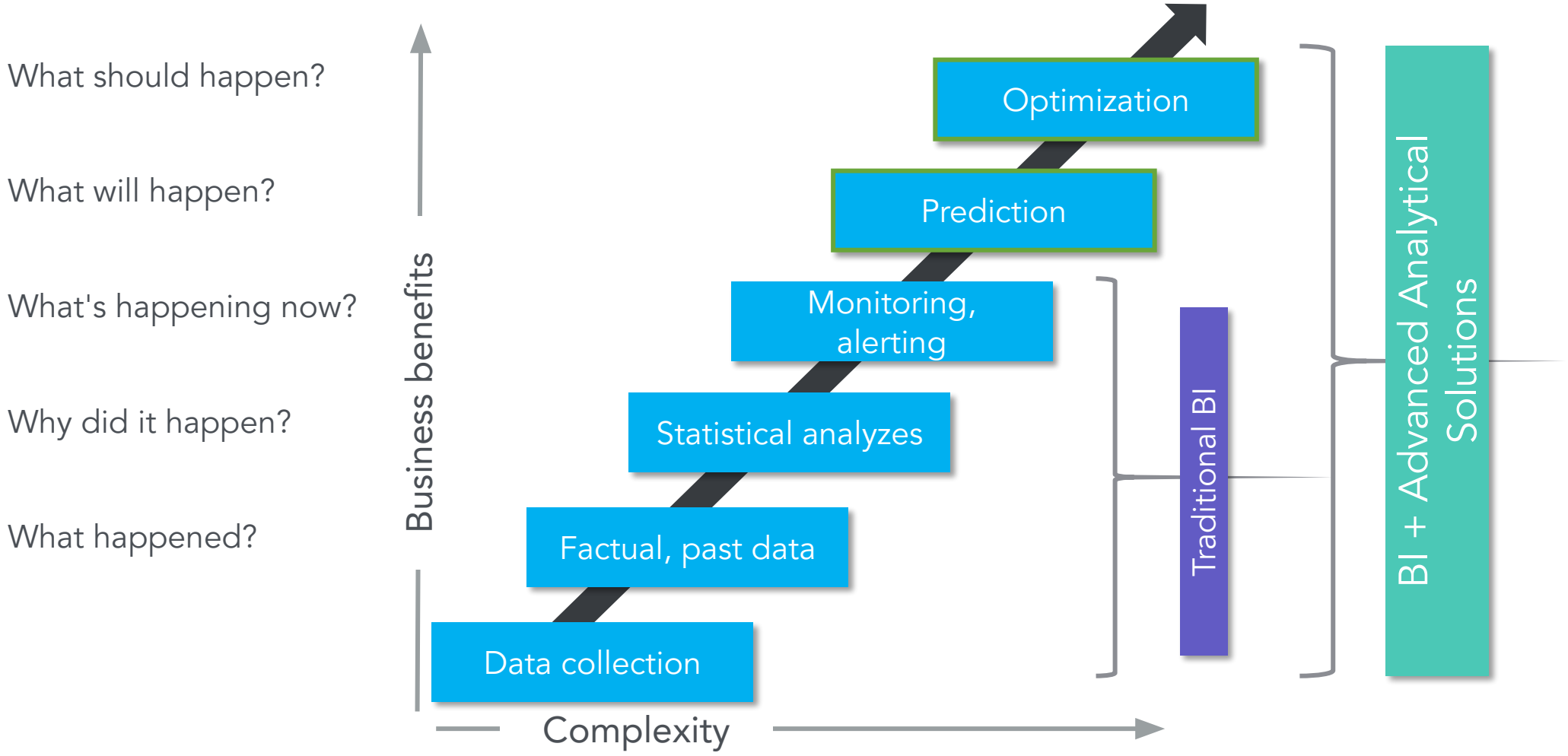
DATA-BASED FARM MANAGEMENT
Digital decision making support process



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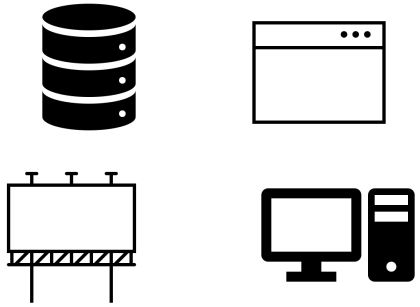
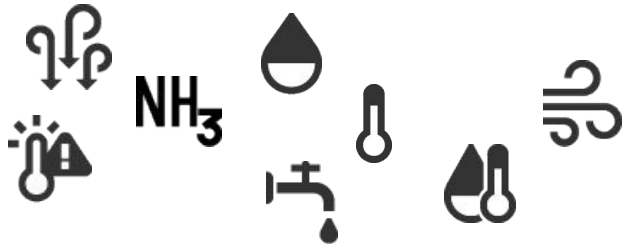
MEET THE PRODUCTION CHALLENGES WITH BETTER DATA AND MORE INFORMATION



DATA INTEGRATION - DATA FROM AUTONOMOUS SYSTEMS



DATA COLLECTION - MICROCLIMATE MONITORING

FarmRadar

Livestock monitoring

DATA PROCESSING, REPORTING, ANALYSIS

DATA-BASED CONSULTANCY AND OPTIMISATION

© Cubilog Ltd.

RETURN OF INVESTMENT

Human resource usage can be optimized - cost savings can be achieved

- centralized security and technology remote monitoring

Fault prediction - production downtime can be avoided

- sensory fault detection
- planned and / or predictive maintenance
- production security

Production optimization with data analysis

- production monitoring and fine-tuning
- reducing energy consumption
- filtering out human errors and omissions

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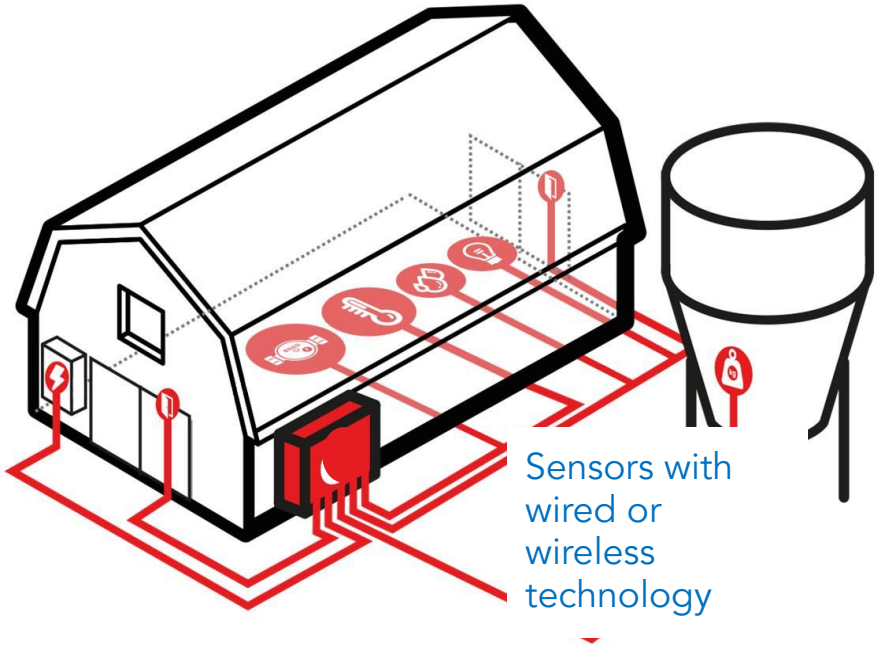
REMOTE MONITORING OF LIVESTOCK FARMS

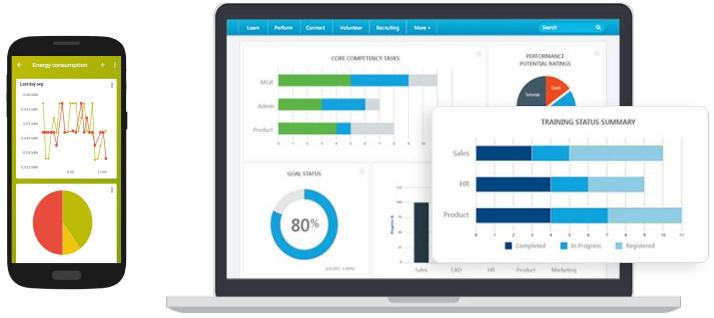
Business intelligence to support decisions

Customized reports

Continuously monitors existing local devices and environmental parameters (meters, climate, etc.)



Sensors with wired or wireless technology



Data, information obtained are available online

© Cubilog Ltd.

DAIRY FARM MONITORING

© Cubilog Ltd.

Functions

Heat stress prevention and monitoring

Monitoring and analysis of parameters affecting milk yield

Water consumption monitoring - do they drink enough; how much water is consumed

Farm equipment monitoring

3,3 l of water = 1 l of milk

Remote reading of water consumption per barn / per drinker

Sending regular reports from the reading via SMS and email

Measurement parameters

- Temperature
- Humidity

} **THI**

- Air pressure
- Air movement
- Brightness

POULTRY FARM MONITORING

Functions

Full technology remote monitoring

Activity logging

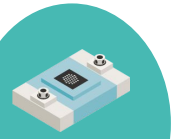
Fault check and alarm

Checking holding parameters

Measurement parameters

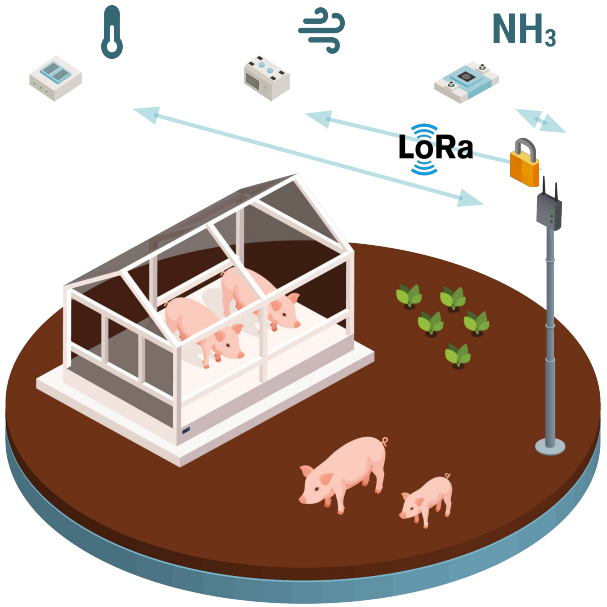
- Temperature & humidity
- Brightness
- Water consumption
- Power failure detection
- Door opening detection
- Silo scale
- Egg counter
- Camera
- Weight measurement
- Measuring air quality (CO^2...)

PIG FARM MONITORING



LoRa devices

- Wireless communication (portable placement & **easy installation -> less health concerns**)
- Up to 8 years battery life – maintenance free



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Functions

Digital tracking of technological discipline

Support and automation of quality assurance processes

Ongoing monitoring of animal welfare and sustainability aspects

Measurement parameters

- Temperature & humidity
- Brightness
- Water consumption
- Power failure detection
- Door opening detection
- **NH3 measurement**

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Our customer has said

„I have a better understanding of production and production processes from a distance, than when I am at the farm.”

Zoltán Tarr
Product development lead

zoltan.tarr@cubilog.com

Test it!

www.FarmRadar.eu

FarmRadar
Livestock monitoring

e-Asia Joint Research Program
Development of Machine Learning and Remote Sensing-based Water Management Platform for Sustainable Agriculture in Asian Deltas (MARSWM-ASIA)
2021 — 2024

Design of an agricultural information system for the Asian Monsoon region - The project MARSWM-Asia-

Takanori NAGANO[1] Natsuki YOSHIKAWA[2] Masaomi KIMURA[3]
Yoshitaka MOTONAGA HA Lan Thanh[4] SETIAWAN Budi Indra[5]

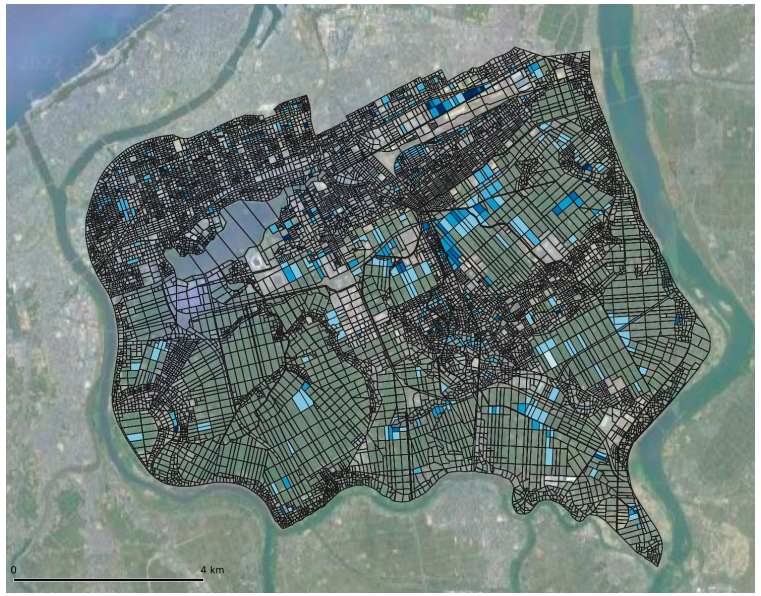
1 Graduate School of Agricultural Science, Kobe University
2 Faculty of Agriculture, Niigata University
3 Faculty of Agriculture, Kindai University
4 Institute of Water Resources Planning (IWRP), Vietnam
5 Bogor Agricultural University, Indonesia

- Objective of European/American agricultural information system:

  Maximizing production while reducing inputs (water/fertilizer)

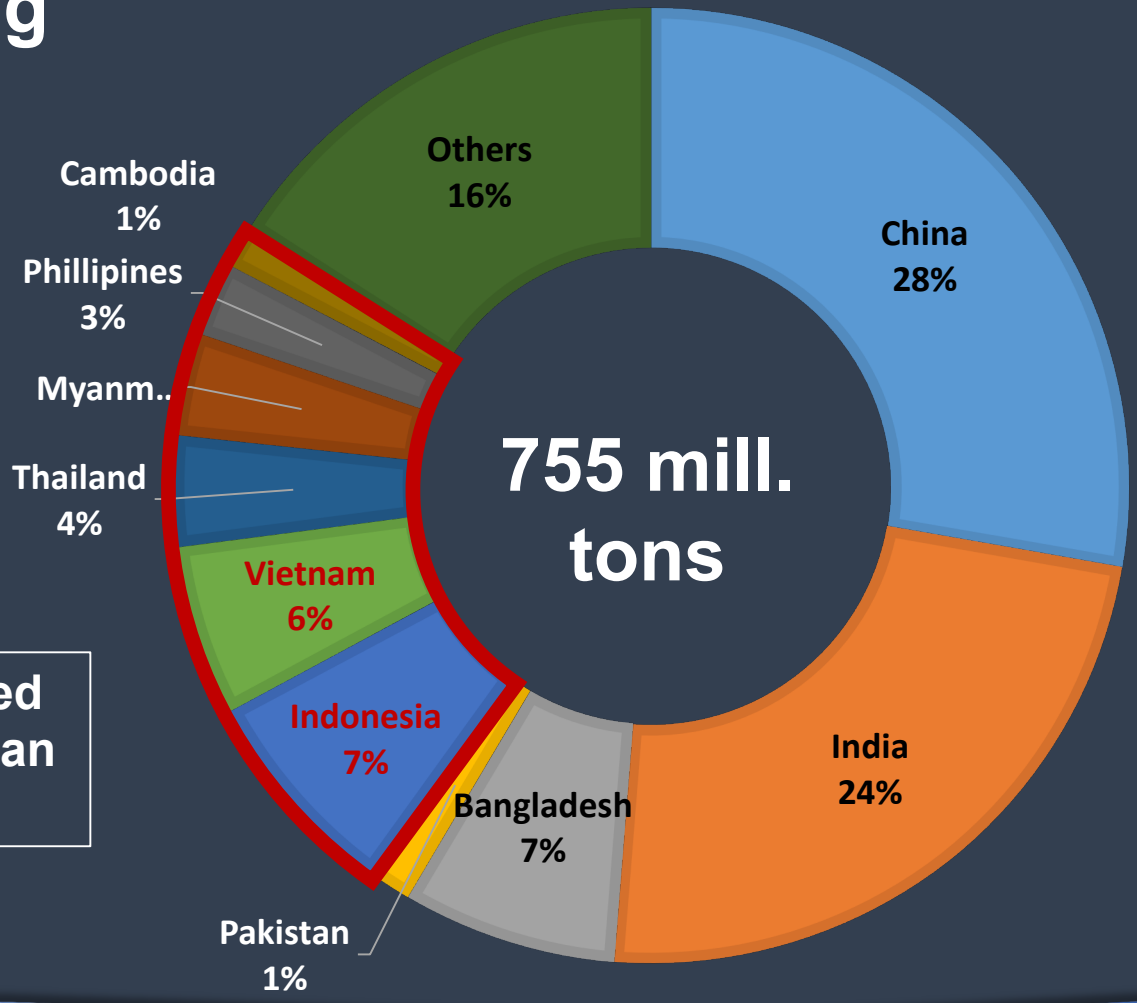
Objective of Asian agricultural information system:

Optimizing irrigation infrastructure management to realize good production



RESEARCH BACKGROUND

Rice Producing Countries

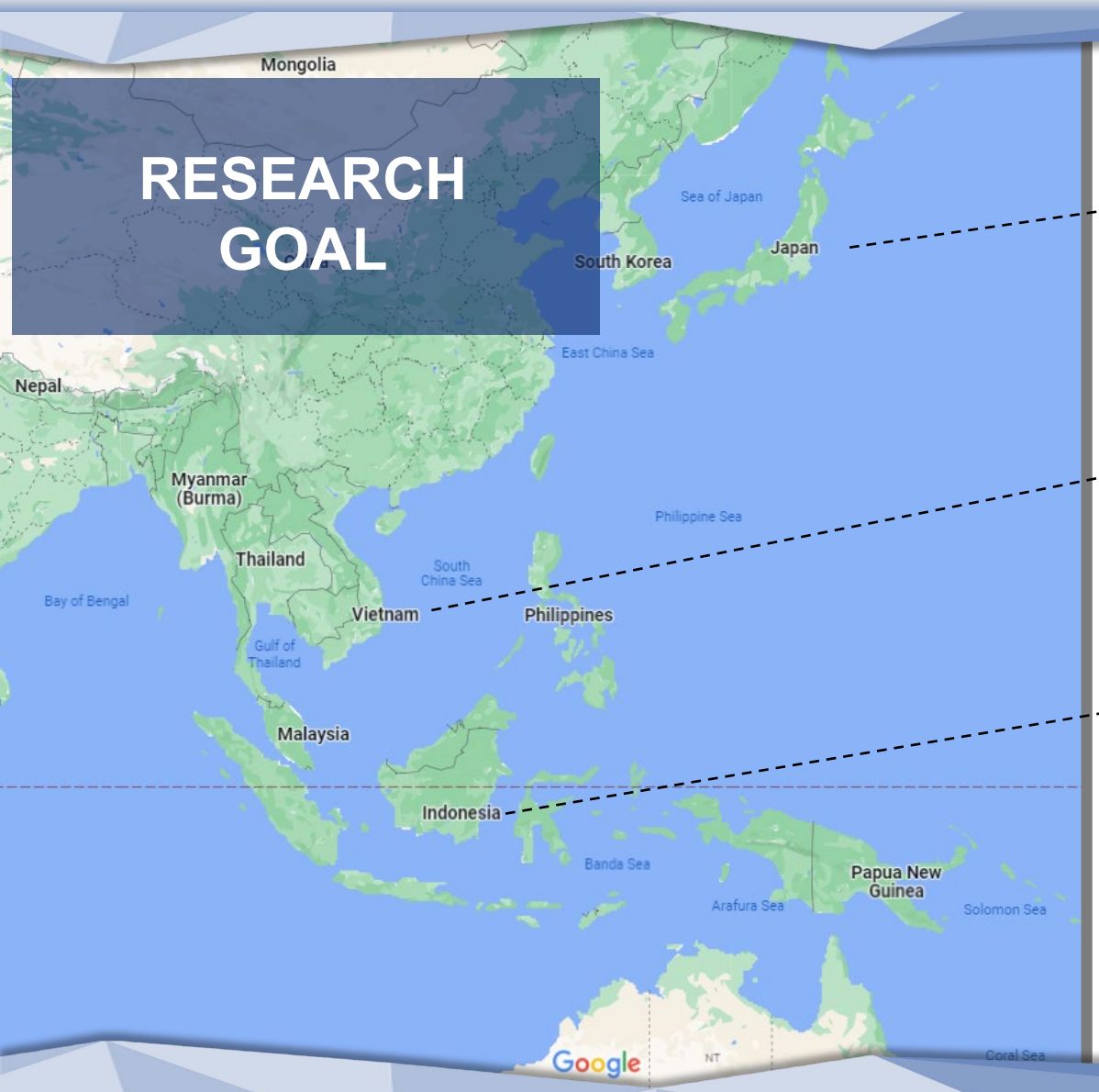


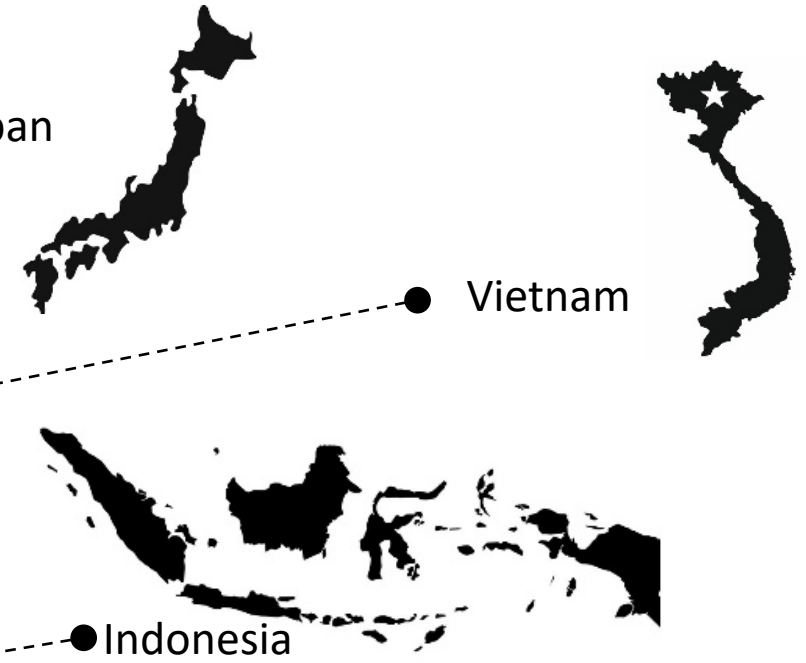
1/4 was produced in Southeast Asian countries

RESEARCH BACKGROUND

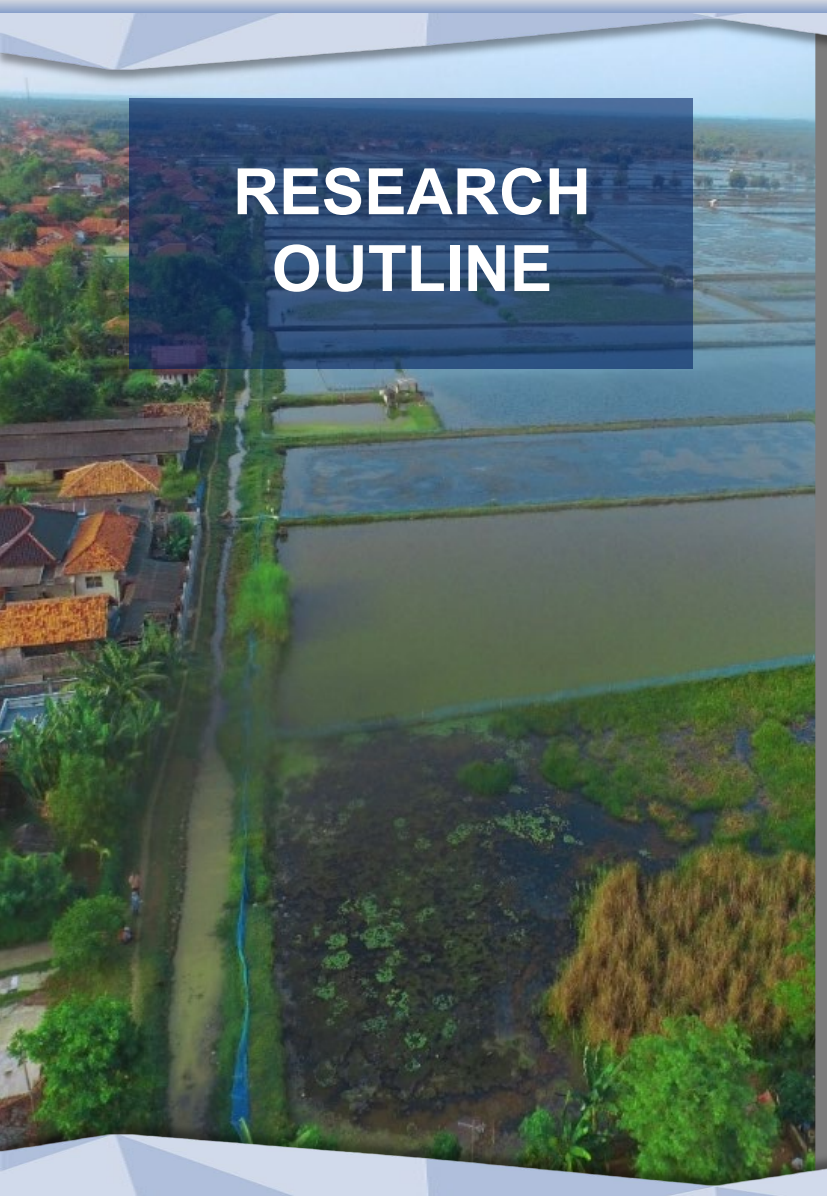
- River deltas are vulnerable to water-related risks such as flood drainage and saltwater intrusion
- In recent years disaster risk management has become more important in the deltas due to rapid urbanization and increased frequency of extreme weather events
- Facility management based on experiences may not work in future with less workers in future
- Integration of real-time observation and more sophisticated facility operation and maintenance is essential

RESEARCH GOAL





To realize smart water management in deltas to minimize flood, saltwater and other water related damages to secure sustainable agricultural production.



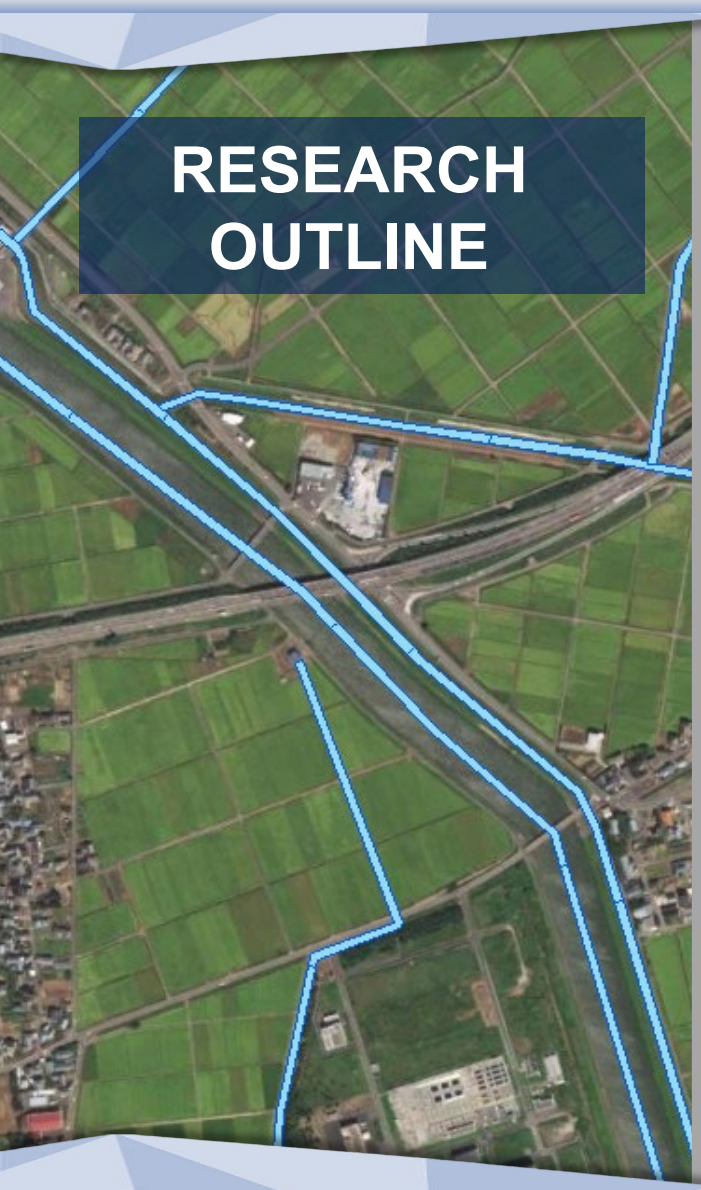
RESEARCH OUTLINE

Establishment of an "Integrated Water Management Platform" to support the management of facility operators

Elemental Technologies to be adopted:
(1) Combination of Numerical and Machine Learning Models
(2) Remote sensing Technologies
(3) Information and Communication Technologies

Real-time (or quasi-real-time) monitoring and forecasting system for water, farmland, and crop conditions

Reduce agricultural damage caused by flooding and saltwater intrusion and improving agricultural productivity through **ADAPTIVE WATER MANAGEMENT**



RESEARCH OUTLINE

Work Packages

WP1 Development of a numerical model for inundation analysis and saltwater intrusion

WP2 Development of ANN (machine learning) models for inundation analysis and saltwater intrusion

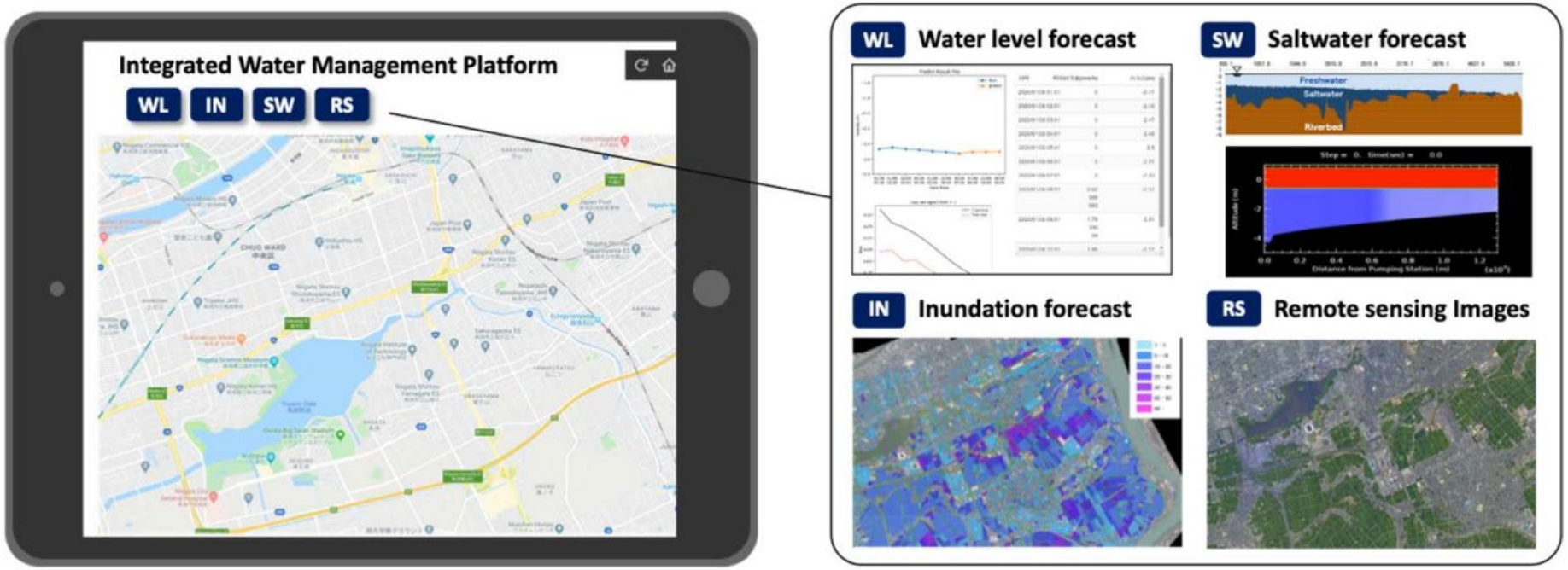
WP3 Development of a quasi-real-time situation monitoring system using remote sensing

WP4 System Design for Unmodern Regions

WP5 Development of sensor, ICT, and network technologies

EXPECTED PROJECT OUTPUT

Image of "Integrated Water Management Platform”



- Water facility managers, farmers, etc. can check the current status and forecasts using information terminals (PC, tablet, smart phone).
- Operate water facilities adaptively according to the situation

culation
ime

CLOSING REMARKs

- The project's approach is effective to adapt to climate change, since physical models can run with extreme scenarios and then used to train ANN model
- Flood and saltwater management using this platform will profit urban area as well as agricultural area.
- The project now develops the platform for Vietnam and Indonesia.