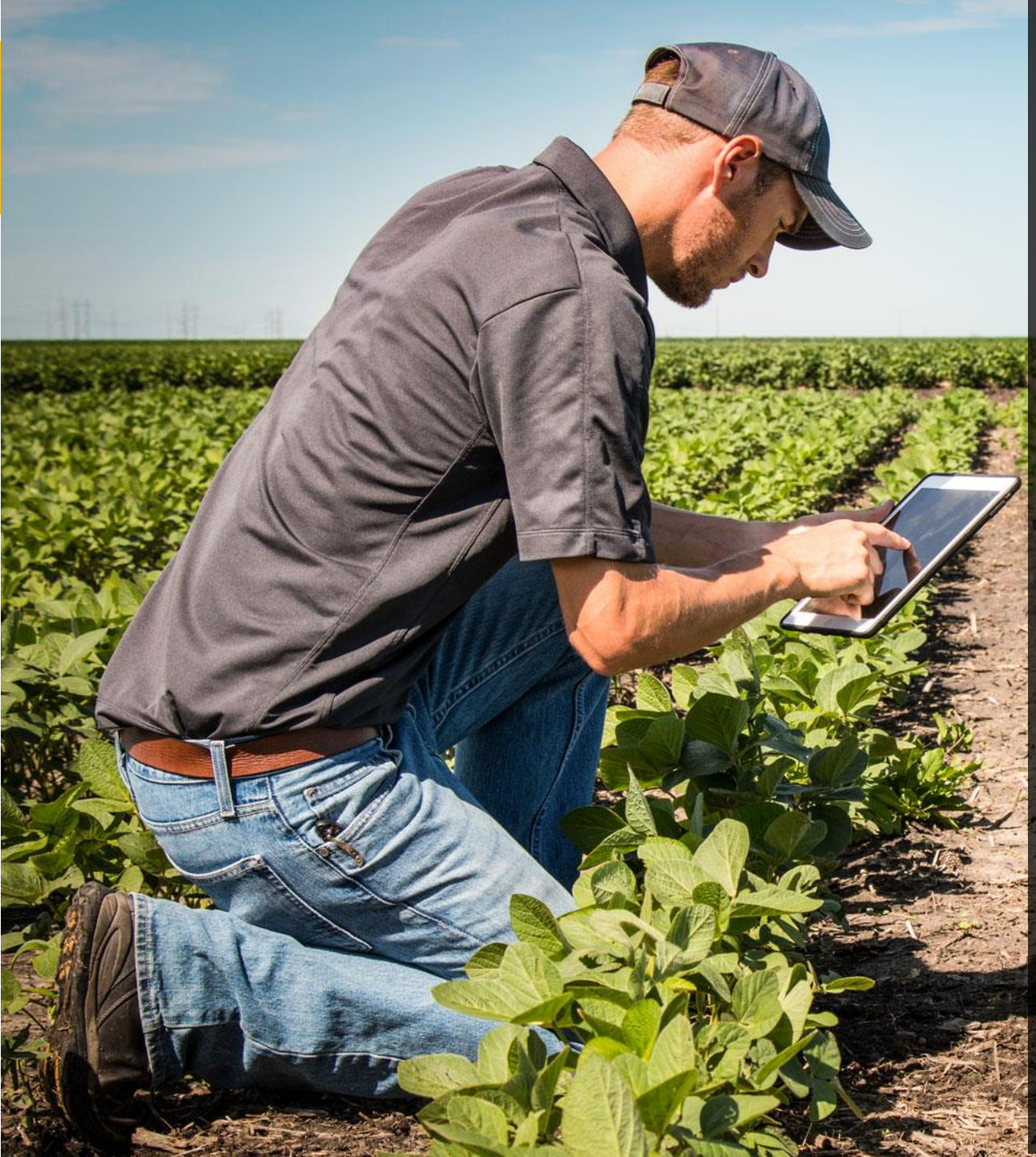


ABACO GROUP

VALUE FROM EARTH DATA

IMPROVING SOIL HEALTH WITH DIGITAL SOLUTIONS

Peter van der Veen, Sales Manager Europe

CAPIGI, 10th May 2023

ABACO MISSION: “DRIVE SUSTAINABILITY AND INNOVATION IN AGRICULTURE”

ABACO is one of Europe's leading developers of software solutions for the management and control of land resources.

- We developed and enhanced our software over **30 years of experience** which provides a **proven and comprehensive solution**.
- ABACO is **based in Italy and England** and operates in a growing number of countries around the world.
- We are driven by our values:
  - **Sustainable development** and reduction of environmental impact.
  - **Food quality and safety** throughout the entire supply chain
  - **Yield resilience and productivity optimisation** against climate change
  - **Transparency and simplification** of administrative processes regulating agriculture.
- ABACO is an 80% subsidiary of Taste of Italy, an Italian fund specialised in the food production sector owned by DeA Capital Alternative Funds.

ABACO GROUP

ABACO FARMER IS THE MOST COMPLETE AND INNOVATIVE MANAGEMENT, ANALYSIS AND MONITORING SYSTEM FOR THE PRIMARY SECTOR.

WE ENHANCE TERRITORIAL AND AGRONOMIC DATA TO IMPROVE **SUSTAINABLE** PRODUCTION

- **A large customer base** in the agro-industrial sector; proven functionality
- **Specialisations and partnerships for different sectors**: fruits, vegetables, cereals, wine etc.
- **Indices dedicated to**: agro-weather indices, satellite indices, consumption, crop quality and productivity, also soil health + CO2 emission
- **AI algorithms and machine learning**: for auto-matic crop recognition, process optimization
- **IoT integration**: with all existing sensors
- **Management of the entire supply chain**
- **Dashboards and DSS**: for Agriculture 4.0

ABACO GROUP

WE INNOVATE TOGETHER WITH CUSTOMERS, PARTNERS AND RESEARCH INSTITUTES

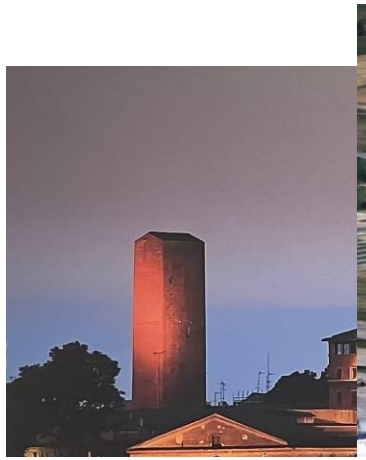
COLDIRETTI
Department for Environment Food & Rural Affairs
EcorNaturaSì prodotti biologici e biodinamici
RegioneLombardia Organismo Pagatore Regionale
PRINCES INDUSTRIE ALIMENTARI
Earthworm
esa
vodafone
mipaaf ministero delle politiche agricole alimentari e forestali
Agea Agenzia per le Erogazioni in Agricoltura
mywakes
AIRBUS DEFENCE & SPACE
geocledian spatial architects
meteoblue
REGIONE ABRUZZO
Deutsche Bank
Dŵr Cymru Welsh Water
PANGUANETA Plywood For Life
PIERALISI CIRCULAR THINKING
evja
MAXAR TECHNOLOGIES
netsens
Pessl INSTRUMENTS
MEZZACORONA
trapview
FAMIGLIA ZONIN DAL 1821
NIAB
GENAGRICOLA
NIVA NEW IACS VISION IN ACTION
JOHN DEERE
SEMETICA TRANSFER INNOVATION
Timac AGRO
EMILIO MORO BODEGAS
gmv INNOVATING SOLUTIONS

ABACO GROUP

We monitor **49.400.000** Hectares of farmland
We manage **2.800.000** farmers' dossier
We register **93.168** On-field activities

Every day **3.250.000** Kmq of HiRes satellite images
An Archive of **20 years** of imagery up to **30cm** resolution
Access to **over 200.000** weather stations all over the world

ABACO S.p.A
MANTOVA



140
Employees

+30
Countries

50 millions
Hectares managed

+200
Clients



THE EARTH HAS LOST A THIRD OF HIS ARABLE LAND IN THE PAST 40 YEARS

- **Intensive agriculture** have depleted soils worldwide, reducing their productive capacity.
- **Climate change** lead to a large decrease of arable land worldwide whilst the demand for food will increase.
- **Consumers demand healthy foods rich of nutrients and free from harmful chemicals but also sustainable**. This requires traceability up to the soil.
- **Regulations are imposed to adhere to the ESG and promote biodiversity** forcing new practices to be applied like regenerative agriculture.

SOIL HEALTH IS AT THE **BASIS** OF ALL THESE TRENDS AND ACCELERATE THE DISCUSSION ON IMPROVEMENT AND COMPLIANCE

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IS MANAGING SOIL HEALTH REALLY THE ANSWER?

IF SO HOW DO WE MANAGE INVESTMENTS, BENEFITS, REGULATIONS, AND POLICIES BETWEEN THE DIFFERENT PARTIES?

THE AGRI ECOSYSTEM NEEDS TO COOPERATE TO REALISE BENEFITS THAT JUSTIFY INVESTMENT IN SOIL HEALTH

Soil Health impacts ……..

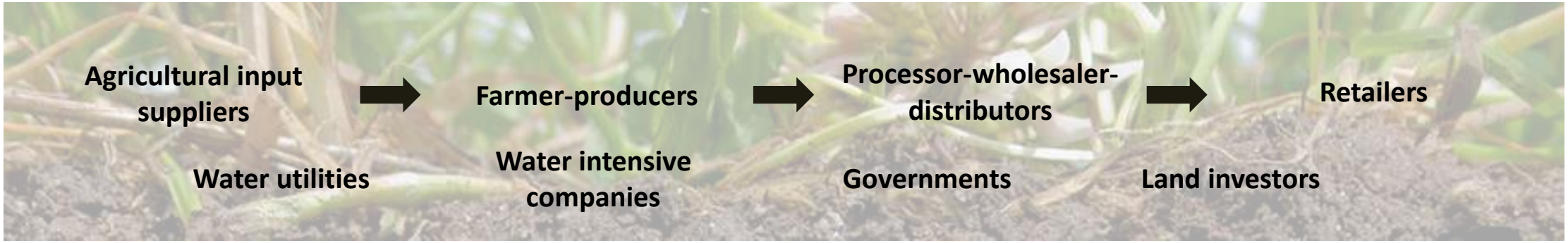
- Crop productivity, crop health, crop quality
- Water quality, water availability
- Biodiversity and conservation of arable and non arable habitats.
- Livelihood and a sustainable living environment

Are current measures enough?…..

- Farmers/ producers' soil improvement mostly based on private short term benefits with traditional agriculture practices.
- A shift takes place towards regenerative agriculture where conscious use of agrochemicals and sustainable practice improves the soil.

So how do we realise and accelerate soil improvement for the benefit of all and who pays for it?…..

MOVING FROM INDIVIDUAL MEASURES TO DEFINING AN INTEGRATED STRATEGY AT SCALE FOR MANAGING SOIL HEALTH WITHIN THE ECOSYSTEM TO BE ABLE TO DEAL WITH THE CURRENT CHALLENGES



HOW DOES INVESTING IN SOIL HEALTH AFFECT THE BOTTOM LINE?

Revenue increase

- Increased productivity of land
- Increased quality of crops
- Increased margins in the supply chain
- Increased consumer demand for healthy, traceable, sustainable goods

Cost reduction

- More efficient use of agrochemicals
- Less irrigation costs
- Avoiding future costly expenditures
- Favorable financing options

Less tangible benefits

- Good soil practice increases **carbon sequestration, reduces erosion, increase fresh water availability**, decreases flood risk.
- Demonstrable support of good soil practice will increase **reputation** by taking corporate responsibility.
- Increased **supply chain resilience**.
- Good soil health practices will **benefit livelihoods and the environment** of communities.

Committing to long-term investment within the supply chain is critical*.

THERE IS A CLEAR BUSINESS CASE ON THE LONGER TERM FOR THE ENTIRE ECOSYSTEM. HOW ARE INVESTMENTS AND BENEFITS BALANCED?

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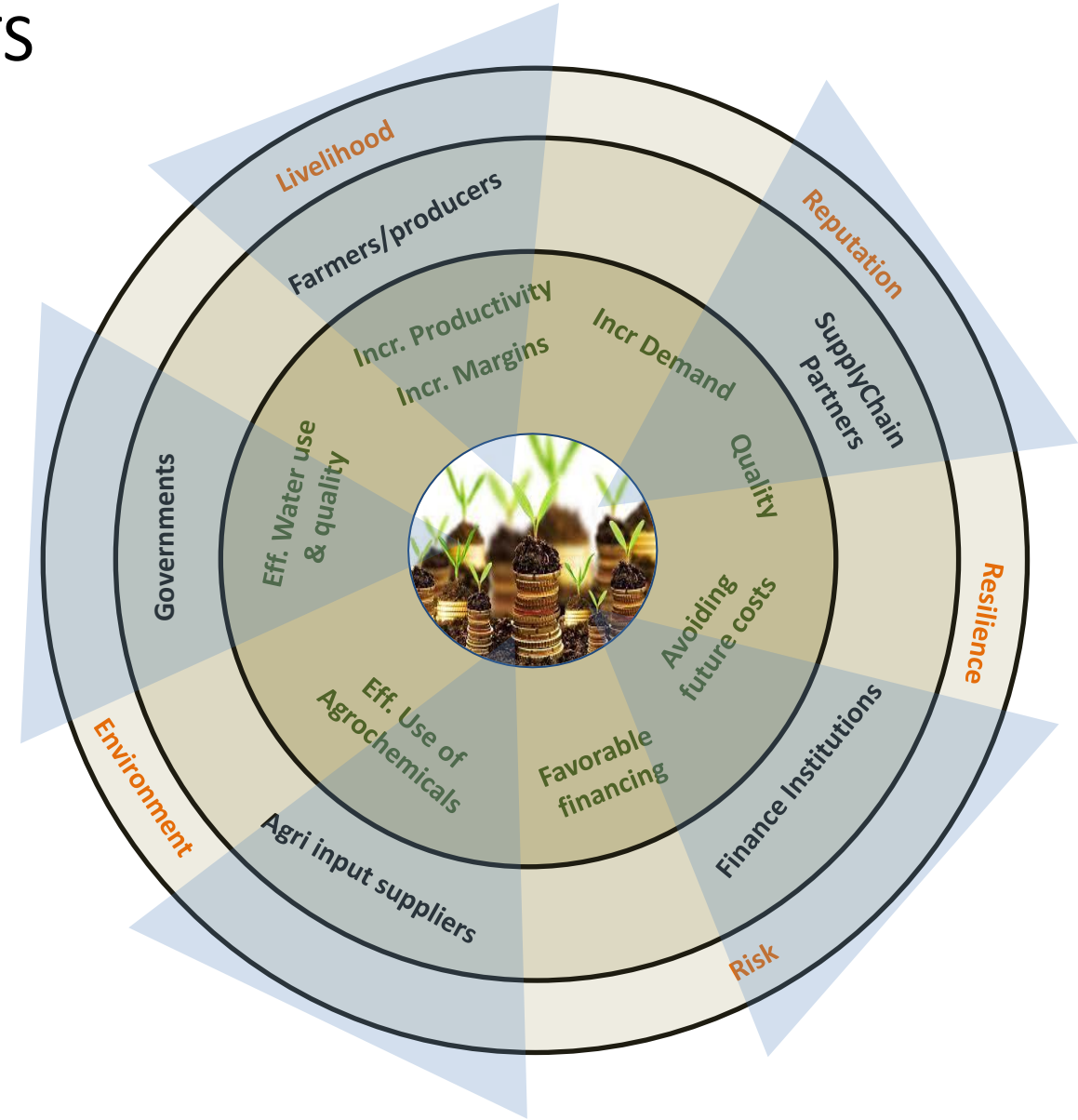
*WBSCD report: "The Business Case for investing in Soil health" - 2018

DIGITAL SERVICES ARE ESSENTIAL ENABLERS FOR PROVIDING INSIGHTS AND REALISING SOIL HEALTH BENEFITS

Different "angles" depending on type of company imposes challenges to the approach

- An **integrated technical solution that can use the available data** in the ecosystem.
- **Take advantage of enabling financing and policies**. Digital solutions are key to providing insights and evidence
- **Build partnerships** to share knowledge and costs



BEING ABLE TO INTEGRATE, ANALYSE AND OPTIMISE THE USE OF AVAILABLE DATA IN THE SUPPLY CHAIN IS CRITICAL FOR THE SUCCESS OF DIGITAL SOLUTIONS

ABACO

THE DATA CHALLENGE: ACHIEVING SUPPLY CHAIN OPTIMISATION WITH INTEGRATED SHARED DATA VS. OWNERSHIP

***McKinsey**: Providing seamless, real-time access to data involved in supply chain planning is key . Many organizations lack deeper visibility throughout their entire supply chain due to underutilization of the available external data.*

The ABACO platform is designed to protect the owner of data but also to optimise the value of shared data within the Supply Chain. The farmer however determines access to and usability of his data. Other considerations:

- **Trade-off between ownership and returns on investment**?
  - Who owns the data: will others monetise it or will it be used for external control of farmer practices (this will be more and more imposed by regulation)
  - It should be clear in the Supply Chain who benefits and how from sharing data For that cooperation and integration is needed

- **Data completeness** determines the value of the insights. Lacking data means suboptimal insights. But also ability of the digital solution to analyze and optimise the use of the data throughout the supply chain.

- **Governments/authorities impose strict regulation to provide evidence data**.

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EXAMPLE: THE SIEX PROJECT IN SPAIN

SIEX WILL PURSUE INTEROPERABILITY BETWEEN THE DIFFERENT SOURCES OF AGRICULTURAL INFORMATION

Objectives:

- Efficient management of the CAP following the system of indicators of the "New Delivery Model" and compliance and monitoring of the strategies "from farm to table" and biodiversity, within the green pact (GREEN DEAL)

- Simplify the management for the farmer and rancher, allowing them to reuse all the available information in their business management.

- Analysis of information for policy orientation.

MANAGING SOIL HEALTH EFFICIENTLY, IMPOSES REQUIREMENTS TO TECHNOLOGY USED…..

Measure
- Soil sampling efficiency (optimize number of samples)
- In-field app access to sampling functionality (locations)
- Integrated data and analytics

EO data Based soil zoning | App Guided soil Sampling | Geolocated Soil Health Checklist | Tracked lab Sampling

Manage
- Recommend Soil strategy based on benchmarked ”good soil content” given the the type of soil
- Recommend Best Agricultural practices (use of cover crops, no tillage, etc)
- Retrieve insights from (aggregated) analysis of data throughout the supply chain

Lab outputs uploaded into App & Dashboard | Store maps & Soil data In cloud platform | Analysis; create task maps, update Land Mgt Plan Actions

Monitor
- Benchmarking
- Adhering to ESG by evidenced practice
- Verification of Best Agri practice through remote sensing KPI’s

EO based KPI

ABACO HAS DEVELOPED A SOLUTION THAT IS DESIGNED TO PROVIDE FUNCTIONALITY FOR DIFFERENT ROLES IN THE ECOSYSTEM

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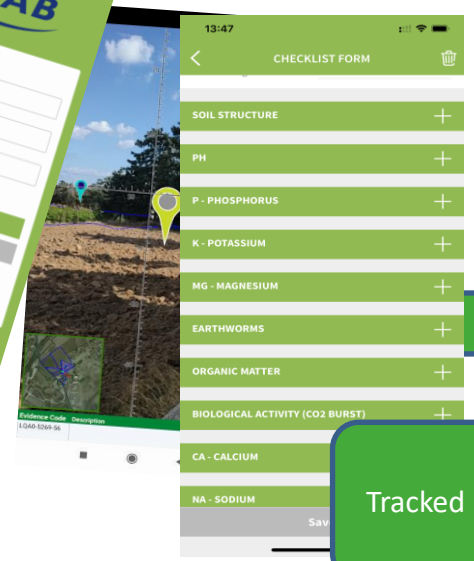
ABACO - SOIL HEALTH SCORECARD

Business model Process FLow

EO data
Based soil zoning

Guided soil
Sampling

Geolocated Soil
Health Checklist –
Texture, Worm, soil
sample

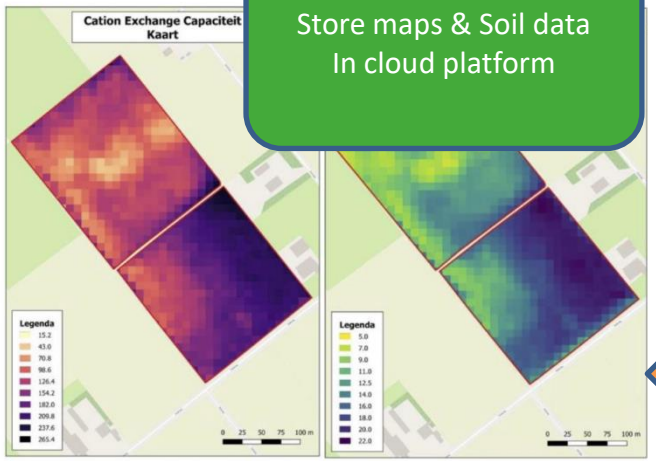


Tracked lab Sampling

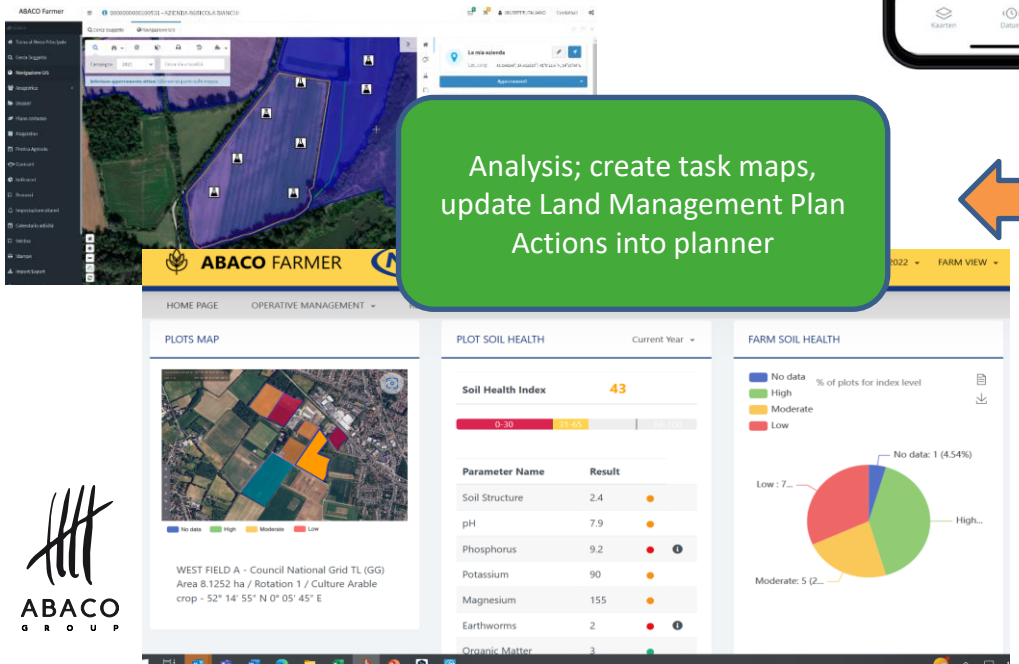
Lab outputs uploaded
into App &
Dashboard

PLOT	SH Index	Soil Texture	VESS	pH	Phosphorus	Potassium	Magnesium	Earthworms	Org. Matter	CO2 Burst
WEST FIELD A	46	2,4	2	7,9	9,2	90	41	2	3	59
WEST FIELD B	36	1,9	3	7,3	11,2	69	45	2	2,4	59
EAST FIELD	44	2,5	3	7,8	11,2	67	37	1,3	2,5	44
POT FIELD	21	2,4	2	6,9	11,8	100	51	6,3	3,4	71

Store maps & Soil data
In cloud platform



Analysis; create task maps,
update Land Management Plan
Actions into planner



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ABACO - SOIL HEALTH SCORECARD

We developed together with NIAB (National Institute of Agricultural Botany):

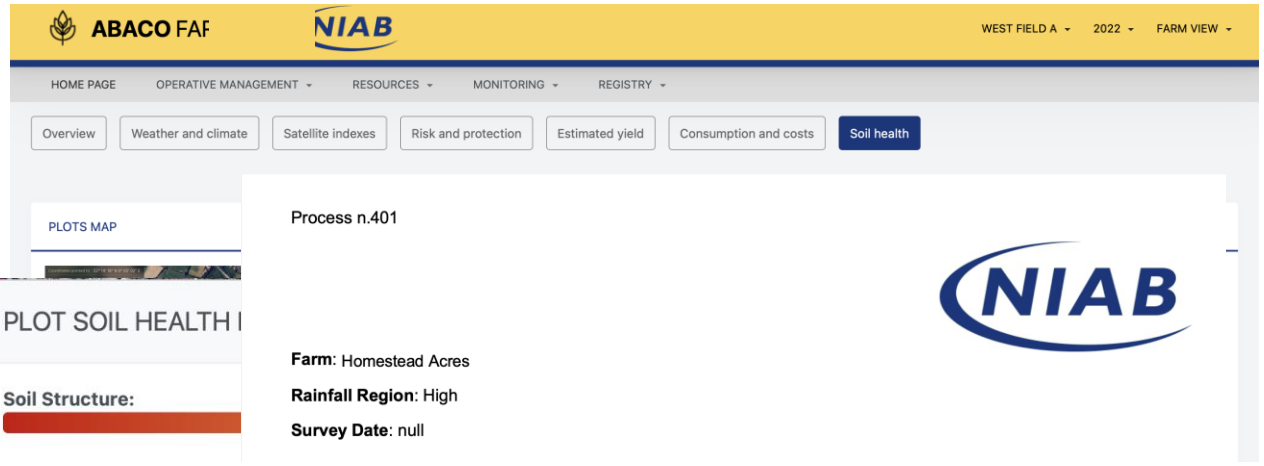
Open, accessible, and data-driven solution that supports

- **data collection,**
- **benchmarking and**
- **the creation of a soil health management pl**

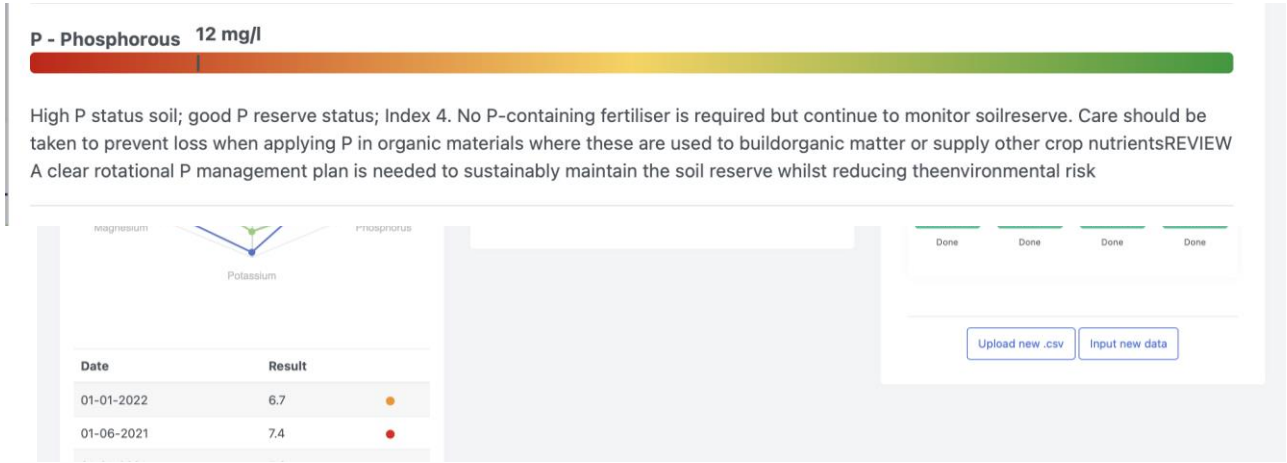
Some of the further expected benefits include:

- More efficient use of nutrients
- Increased yield resilience
- Reduction of fertilisers
- Support for biodiversity
- Providing an Enterprise view and benchmarking of soil health within the Agri Supply-chains

It does require local data and soil analysis to function. In the UK this expertise has been provided by NIAB



			Physical	Chemical				Biological									
Site	Characteristics	Soil texture Class	VESS	pH	P	K	Mg	Earthworms	OM	CO2 burst	Ca	Na	% adult earthworms	Active C	% Sand	% Silt	% Clay
POLICE.SPEAK. STICKLER	Cropping	SALO	2.44	7.9	90	9.2	41	2,3	3.0	59	2141	17	100	399	76.0	13.0	11.0
LAWNS.AXED. PATCHING	Cropping	SALO	1.87	7.3	69	11.2	45	2,0	2.4	59	1523	19	50	407	74,0	14.0	11.0
UNROLL.JUSTOFFER.DRIPPING	Cropping	SALO	2.51	7.8	37	11.2	37	0,0	2.5	44	2082	21	50	320	73.0	14.0	11.0



WE BRING IT IN PRACTICE: CONSORTIUM WITH SUPPLY CHAIN PARTNERS IN THE UK TO VALIDATE DIGITAL APPROACH OF THE SOIL HEALTH SCORECARD

ABACO and the NIAB

- Development of a Soil Health Scorecard (SHSC).
- 5 years of research by NIAB with the Abaco Farmer platform, to support, consolidate and manage soil sample information.
- Partnering with key industry players in the ecosystem, to gain an understanding of their specific needs and challenges.
- Defining critical success factors for all parties in the supply chain and business benefits from investments

ABACO GROUP + NIAB

Tier 1 companies:

- *Retailers*
- *Global Potato processor*
- *Water company*
- *Agri Research (NIAB)*
- *Agri Digital services supplier (Abaco)*

And Farmers

EXAMPLE: RETAILER PAYS LESS INTEREST IF EVIDENCED ADHERENCE TO ESG. CAN ONLY DO WITH DIGITAL TOOL PROVISION FOR THE FARMER

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THANK YOU!

ABACO
GROUP

VALUE FROM EARTH DATA