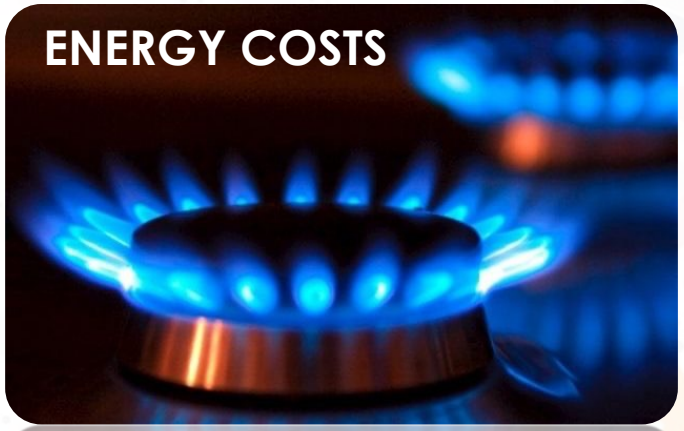
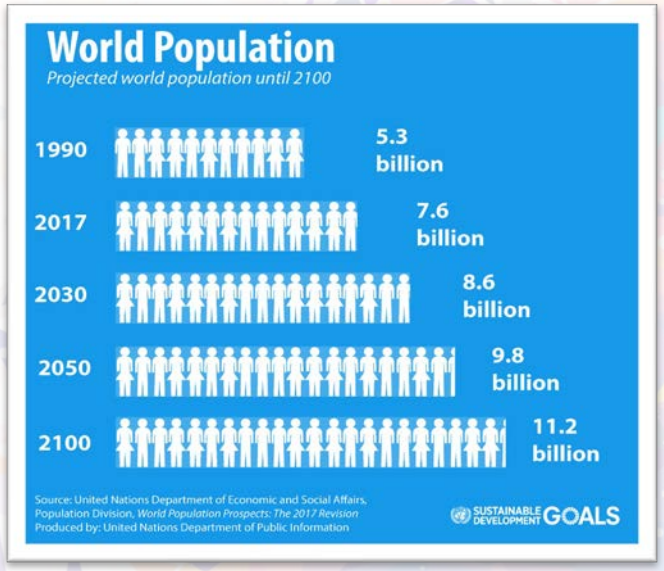
BAMAAi

FOR A MOST SUSTAINABLE PRODUCTION

21.05.23

INDUSTRIAL AND AGRICULTURAL PRODUCTION FACE MULTICOMPLEX PROBLEMS





NEW AGRICULTURAL SOLUTIONS LIKE CEA/VIF ARE ON THE RISE

- CARBON EMISSIONS
- WATER CONSUMPTION (1-5%)
- USE OF FERTILIZER
- SKILLED WORKERS
- LAND CONSUMPTION (20%)

+ YIELD / m² (2.500%)
+ BIO-DIVERSITY
+
+ CROP PROTECTION
+ CROP VARIETY

$171.1 bn Market Size 2026*

*Global Indoor Farming Market Outlook Report 2017-2019 & 2026
Research & Markets, 2019, https://www.prnewswire.com/news/research-and-markets/

HOW WE SOLVE IT

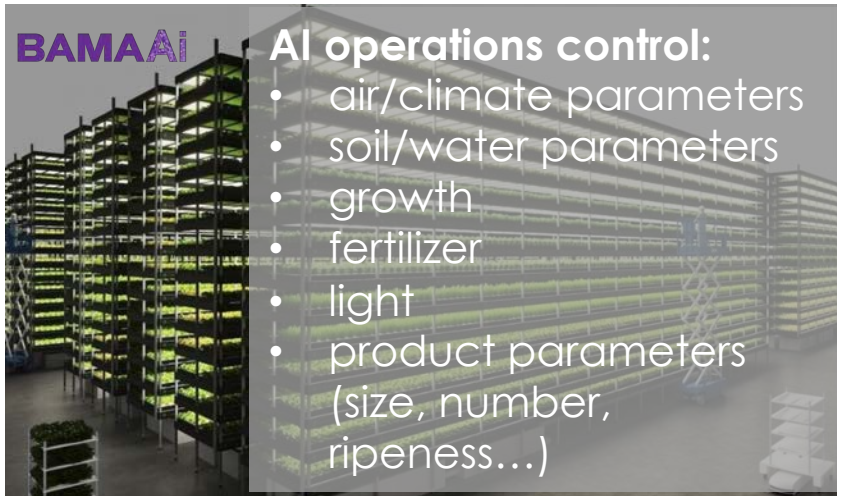
Significantly reduced amount of required data points

Predictive models and deep analysis results already achievable after 5 batches

Intuitively visualized predictions and alerts based on batch result fluctuations – in real-time with deep/root cause analysis

AI input control:

- natural resources
- energy
- production resources



AI output control:

- yield (crops/animals/fungi in numbers/size/weight)
- timing/output planning
- waste

Cloud and/or on-prem capable/operable

Connectable to any marketable IoT data collection platform

Analysis of historical data (if any) is not limited to periods/intervals

OUR „CEA“ ARCHITECTURE

Production Management Dashboard

IoT Process Data

IoT

Batches

Vertical Farm

Local Data Platform with AI

Ai

Plant Control

Cloud based Management Platform with AI

Ai

Vertical Farm 2

Vertical Farm n

OUR HIGH PERFORMING SOLUTION LEADS TO STRONG IMPACT

Python-based artificial intelligence, in a local and a cloud instance

+

Usage of Neural Networks to generate feature maps

+

Neural Networks + batch fingerprinting for regression/ pattern recognition and prediction

+

Comprehensive production and system optimization using AI algorithms

+

Result: planning, management, controlling and optimization from one system

=

OUTPUT planning & control

Significant energy SAVINGS

SHORTENED process CYCLES

SAVE input resources

ZERO WASTE production

Multi-/cross-site MANAGEMENT

OUR CONTRIBUTION – 11/17 UN-SDGs

Our vision

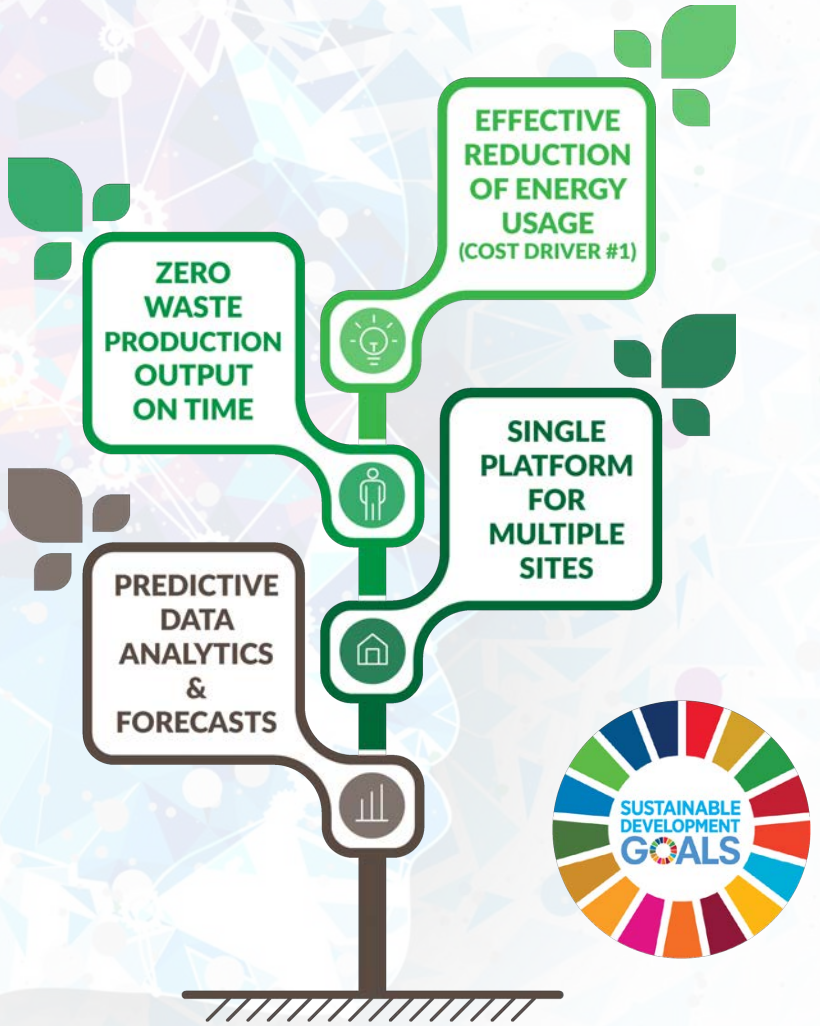
We will achieve most sustainable production using AI for a better future for all.

We will be the world market leader for AI-controlled batch processes by 2028.

BAMAAI

OUR OFFERING: BAMAAI technology supports industries in reaching their sustainability goals

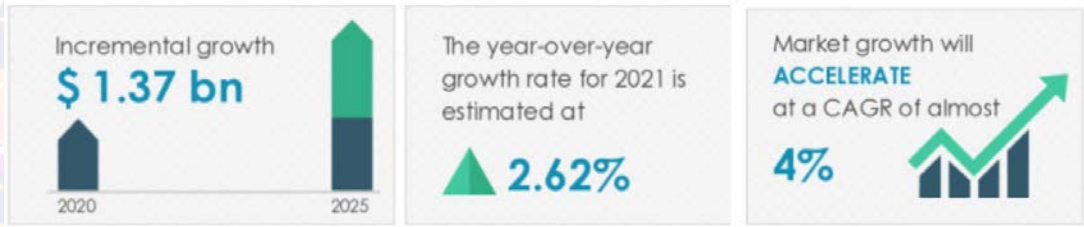
- We are the industry solution supplier delivering proven neural network AI to manage, optimize and predict **BATCH production with limited data points**
- **BAMAAI´s** goal is to save at least 15% of energy, water, raw materials, carbon foot-print and waste for a more sustainable industrial production
- BAMAAI offers their customers a **hybrid product (SaaS AI-platform) & services portfolio**
- Our cloud-connected BAMAAI solution will be the **new batch industry standard**, helping in **getting substantially better in the sustainable development goals** (SDG)



COMPETITION

INDUSTRY

- ABB Ltd.
- Automated Process Equipment Corp.
- Azbil Corp.
- Emerson Electric Co.
- Hitachi Ltd.
- Honeywell International Inc.
- OMRON Corp.
- Rockwell Automation Inc.
- Siemens AG
- Yokogawa Electric Corp.
- ….
- Process Specialist Tools (partially using AI/ML, but still **no batch-specific solution offers**): Trendminer, Ferolabs und Seeq.
- General Tech & Consulting Firms not active yet, but may jump on topics at any time: IBM, CapGemini, Accenture, etc.



The market for batch process optimization is used here as an indicator of strong market growth.

Current figures indicate that the market for "Batch Control Systems" will **increase by USD 1.37 billion** by 2025, with a compound annual growth rate (CAGR) of 4% from 2021-2025.

PROOF OF CONCEPT & LEADING CUSTOMER: Corbiota

- **BAMAAI** conceptualizes, develops and implements **Corbiota's CEA earthworm farms** fully according to the shown specifications and architecture since early 2023, delivering healthy animal nutrition for chicken, piglets & more, and even fertilizer for crop... see **www.corbiota.com**

- **Pilot production in NRW/Germany is operative**, ramping up to full production output (1 ton/a) in Q3/Q4 2023 with extended automation, fully AI controlled by BAMAAI

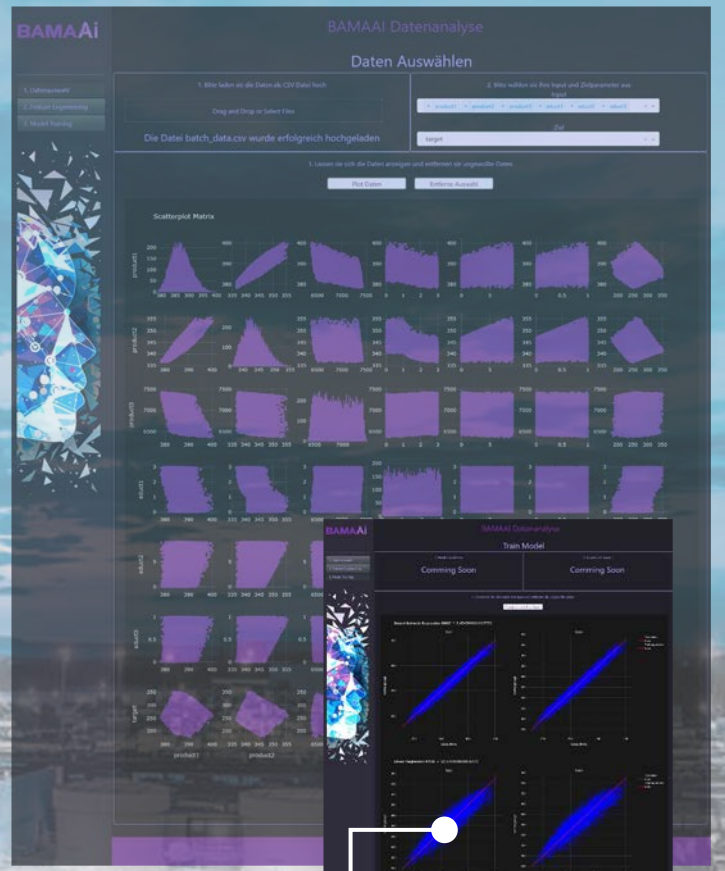
- BAMAAI transfers the AI-controlled concept to the **commercial production site in Brandenburg/Germany** which is planned by Corbiota to start in 2023/2024 (100 tons/a)

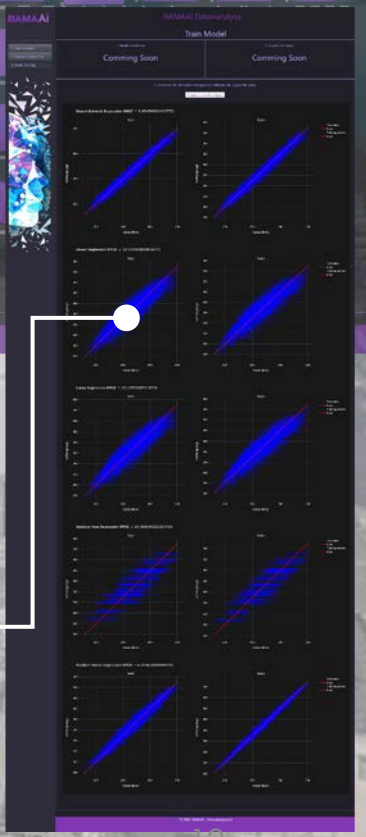
- Next step is BAMAAI builds a cross-connected and integratively managed concept for Corbiotas next planned production sites in the **US, Latin America and UK**

ONE MORE THING…

…we do not only deal with inhouse farming…

BAMAAi IN INDUSTRY



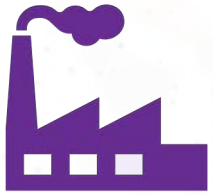


Works with any discontinuous production processes („batch“)

- Chemical Industry
- Food & Beverage Industry
- Pharmaceuticals
- …

CUSTOMER SEGMENTATION

BAMAAI primarily focuses on two customer segments, using the same knowledge, technology and resources:



INDUSTRY
(Chemical, Pharmaceutical, Food…)

Customer benefits
Energy savings, (cycle) time reduction, waste avoidance, product quality enhancement, predictions/forecast

Regional focus
Europe (DACH)

Product portfolio
Process engineering, IoT & AI-driven Data Analytics, Prediction models for Batches

AGRITECH
(VIF/CEA Inhouse Farming)

Customer benefits = Industry benefits, PLUS
Carbon footprint reduction, water & fertilizer saving, on-time production & delivery, labour & error reduction, multi-/cross-site mgmt., non-seasonal cropping

Regional focus
Europe (Non-DACH: NL, FRA, ESP, ITA, Nordics), North America, South America, Africa, Middle East, Far East (Singapore, Japan, China)

Product portfolio = Industry portfolio, PLUS
Full farm planning, management & controlling via Cloud Based BAMAAI SaaS

OUR LEADERSHIP TEAM

Claus-Andreas Boche
Chairman of the Board

Phillip Rühl
CTO

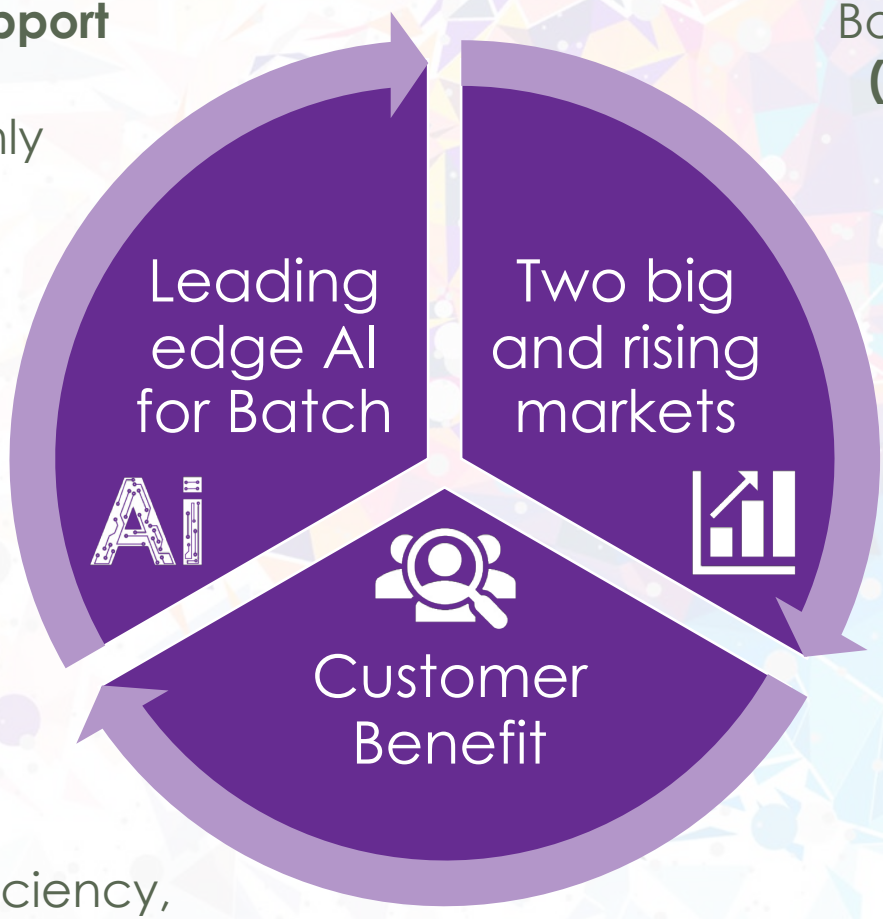
Alexandra Schneider
Commercial lead

PARTNER

Vitagora
agronov PÔLE D'INNOVATION EN AGROÉCOLOGIE
FBN
poul pharm
eit Food
Westsächsische Hochschule Zwickau University of Applied Sciences
Corbiota
monogutthealth Optimal gut function in monogastric livestock
MANNA European Joint Doctorate in Molecular Animal Nutrition
European Commission Horizon 2020 European Union funding for Research & Innovation
Bundesministerium für Wirtschaft und Klimaschutz
Stiftung Tierärztliche Hochschule Hannover

WHY INVEST IN BAMAAI?

BAMAAI is **first player to fully support batch production** and optimize it with true AI data analytics, only needing limited datapoints



Both markets, **Industry and Agritech (CEA/VIF),** still emerge and grow – and are both future markets with future global relevance

BAMAAIs customers are now and will stay under **high and rising pressure** to gain more efficiency, saving energy and producing more sustainably

BAMAAI´s products and services support up to 11 of 17 UN-SDGs

CONTACT

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