



California-Dutch Collaboration Opportunities for AgFoodTech

December 13, 2018



Introduction

The Netherlands and California have alignment on a global vision for food and agriculture

- Our regions are **top global exporters** of specialty food and agriculture products
- Significant parts of our **economies and land use** are for food production
- We face **common critical challenges** for the future of our food and agriculture industries
- We have globally-leading visions to transition to **holistic approaches to manage and sustain** agriculture
- Both regions are home to **top agricultural science and technology** industries and knowledge institutions
- California and the Netherlands are **leading AgriFoodTech innovation** in the US and Europe, respectively
- **Global innovation ecosystems** in our regions such as Silicon Valley and Food Valley can support our efforts

Therefore....

We desire to work in **close collaboration** on AgriFoodTech innovation so we don't **duplicate solutions** and **accelerate** them to market faster for healthy **people**, a sustainable **planet**, and **prosperous economies**.

Partners On the Journey to Collaboration



Ministerie van Landbouw,
Natuur en Voedselkwaliteit



Rijksdienst voor Ondernemend
Nederland



WAGENINGEN
UNIVERSITY & RESEARCH





THE VINE

THE VERDE INNOVATION NETWORK
FOR ENTREPRENEURSHIP

The Mixing Bowl
CONNECTING INNOVATORS IN FOOD, AGRICULTURE & TECHNOLOGY

Berkeley
UNIVERSITY OF CALIFORNIA

qb3
UNIVERSITY OF CALIFORNIA

TERRA
INSTITUTE FOR RESEARCH & EDUCATION



THRIYE
AGRICULTURE

WESTERN CAMPUS
Center for Innovation
and Technology

HARTNELL
COLLEGE

SAN LUIS OBISPO
HOTHOUSE
Powered by San Community and Cal Poly

CB | CBE @ UCI

ChicostArt

AgStart

UCDAVIS
UNIVERSITY OF CALIFORNIA

UC Davis-HM Clause
Life Science
Innovation Center

UCMERCED
VENTURE LAB

WET CENTER
The Institute of Water, Energy, and Technology

WEST HILLS
COLLEGE

UNIVERSITY OF CALIFORNIA
UCRIVERSIDE

EKCITE

UC
CE
170 Cooperative Extension
Researchers and Farm
Advisors
in 57 counties
across the state

RECS
9 Research and Extension
Centers spanning all
relevant climate zones

Food-Origins

cdfa



THE VINE²

How We Got Here

Karen Ross visits
Netherlands – first
Letter of intent



Martijn van
Dam visits
California



NL
Innovation
Mission



NL
Fact Finding
Trip



CA
Fact Finding
Mission

2015

Nov 2016

March 2018

Jul - Aug 2018

December 2018



**Identification of LOI
themes**

- Agtech
- Water
- Climate
- Foodtech



**Visit followed by
several webinars on**
Saline Agriculture
Dairy Farming
Soil Management
Greenhouse Horticulture
Manure Management



**Identifying Smart Food
production cross-over:
robotics, ICT + agri.**



**Deeper exploration of
California AgFoodTech
ecosystem**



**Market study to
pinpoint concrete
cooperation**



Similar Government Vision and Initiatives



A news article from the Ministry of Agriculture, Nature and Environment of the Netherlands. The title is "Circular agriculture: a new perspective for Dutch agriculture". It includes a circular diagram illustrating a "Circular agrofood system" with four main components: CROPS (crops, food, energy), LAND (land, water, biodiversity), CATTLE (cattle, meat, manure), and PEOPLE (people, jobs, culture). The text discusses the goal of reducing waste and increasing efficiency in the food chain by 2050.

The Netherlands as a leader in circular agriculture

News item | 19-11-2018 | 14:08



Key Learnings from Study Missions



California

- Strong entrepreneurship ecosystem
- Large tech sector
- Massive scale of food and ag
- Highly diverse crop mix
- Focus on efficient outdoor production



Netherlands

- Triple-helix approach is a differentiator
- Well-developed industry clusters
- Maximum efficiency and resource reuse
- Emphasis on innovation and tech adoption
- Focus on highly productive indoor production

Both regions are applying their deep expertise in high tech, ICT and science to innovations and solving challenges in food and agriculture

Strategic Alignment

GLOBAL VEGETABLE + FRUIT + DAIRY PRODUCTION LEADERS



Netherlands –
European Leader in
Dairy, Fruit, Vegetable
Production

Economic Impact:

Dairy #1 Ag Commodity in NL
NL Food accounts for 28% of EU exports
#2 Exporter of Food and Ag Globally

Knowledge Centers:

- TU Eindhoven
- Wageningen UR
- TU Delft



California –
North American Leader in
Dairy, Fruit, Vegetable
Production

Economic Impact

Dairy #1 Ag Commodity in CA
2/3 U.S. Fruit and Veg from CA
\$46B in Ag Production value (2016)

Knowledge Centers:

- University of California
- CalPoly
- Fresno State

Common Critical Challenges



People



Planet



Prosperity

Workforce Availability Farmers and Workers



Sustainability Requirements Regulations and Certifications



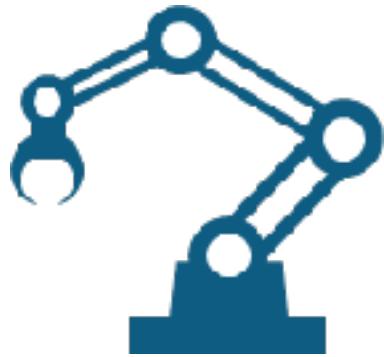
Food Access and Safety Traceability, Quality, Security



Impacts of Climate Change Waste, Loss, Soil Depletion



Areas of Collaboration



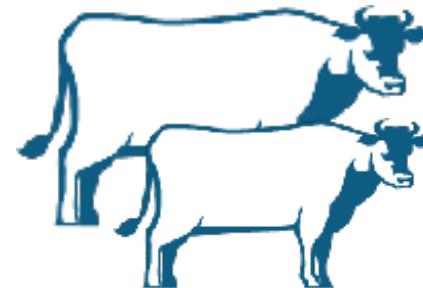
Ag Robotics & Automation



Digital + Precision Farming



Greenhouse of the Future

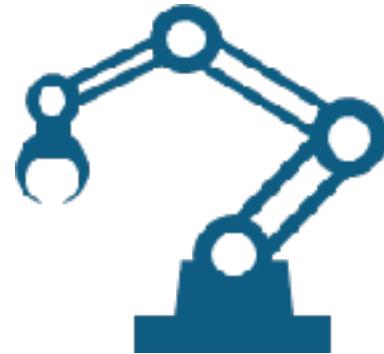


Livestock & Dairy Innovation

1. Ag Robotics & Automation

Coordinate a consortium of industry, academic and government players to develop ag robotic and automation solutions.

- Potential areas for collaboration:
 - Orchard harvesting robotics and automation
 - Orchard spray innovation to reduce chemical drift by 99%
 - Indoor soft fruit harvesting robotics
- High level project roadmap:
 - Analysis of stakeholder needs and CA + NL technologies
 - Create a triple-helix CA + NL innovation consortium
 - Develop a gap analysis and roadmap of the technology to meet the needs of both CA and NL
 - Develop specifications and prototype with new and existing technologies
- **Potential NL Partners:** RoboValley, TU Delft University, TU/e, ABB, Moog, Munckhof, Wageningen UR, Netherlands Fruit Growers Association (NFO), KWH Holland, OostNL, BOM, ARIS
- **Potential CA Partners:** University of California (UC Merced, UC Davis, UCANR), Western Growers, CA Fruit Commodity Boards, various robotics and equipment manufacturers
- **Challenges met:** Address workforce challenges and reduce environmental impact of spraying



2. Digital + Precision Farming

Develop a global open platform to accelerate digital agriculture

- Potential Areas of Collaboration:

- Global data & safe sharing standards for agriculture
- Refining the public and private partnership model for the marketplace
- Develop a joint CA + Dutch marketplace
- Collaborate on the development of several core applications (e.g. irrigation, pest, nitrogen)

- High level project roadmap:

- Analysis of digital ag standards and market offerings in the CA + NL
- Explore collaboration between Wageningen Akkerweb and UC ANR/Agralogics partnership
- Develop a marketplace and ecosystem for developers to build applications to
- Provide high-quality standardized data for developers to build with
- Put funding in place for marketplace developers

- Potential NL Partners: Akkerweb, Fruit 4.0, Internet of Food & Farm 2020, IBM, Bayer, Rabobank, Wageningen UR, TU/e, BOM

- Potential CA Partners: IBM, Agralogics, Bayer, University of California, Rabobank

- Challenges met: Meet sustainability requirements, food access and safety, workforce availability, and impacts of climate change.



3. Greenhouse of the Future

Adapt Dutch greenhouse technologies for California climate

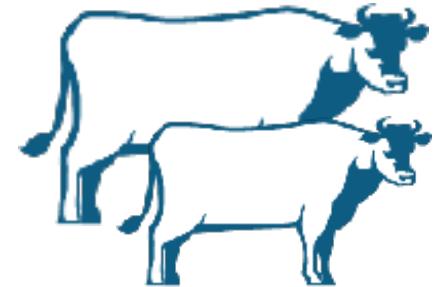
- **Potential Areas of Collaboration:**
 - Analyze which high-value crops to test on
 - Prove or disprove economic viability of indoor growing in Northern CA with Dutch tech and guidance
- **High level project roadmap:**
 - Pilot new greenhouse and vertical farming methods in California
 - Evaluate indoor technology for different use cases (e.g. transplants, ultra-high value, season extension)
 - Create economic decision support models for greenhouses in varying conditions.
 - Use circular, low-waste methods in the pilots
 - Develop sister farms for WUR to share data and do cross globe collaborations, data sharing and competitions
 - Partner with a food company like Koppert Cress for potential full to-market analysis
- **Potential NL Partners:** Ridder-Hortimax, Priva, Hoogendoorn, Certhon, Alumat-Zeeman, Botany, iTelligence, MPrise, Rabobank, WUR, Koppert Cress, Innovation Quarter, Philips GrowWise
- **Potential CA Partners:** Top indoor CA farmers, University of California (UCANR)
- **Challenges met:** Water conservation, chemical input reduction, labor reduction, waste reduction



4. Livestock and Dairy

Optimize dairy operations through waste re-use and data-driven insights

- **Potential Areas of Collaboration:**
 - Manure and bi-product processing
 - Methane reduction via feed additives
 - Dairy cross-border best practices community group NL and CA
 - Dairy operation data capture and benchmarking
- **High level project roadmap:**
 - Further analysis of those working in the space, including startups
 - Explore collaborations between key partners and bring on partner dairies and associations in NL and CA
 - Extend OptiCow dairy community and insights gathering to CA
 - Develop tests for methane reducing additives
 - Develop pilot for whey use on a CA dairy
- **Potential NL Partners:** Dairy Campus, WUR, Smart Dairy Farming (TNO), TU/e, NOM, OptiCow
- **Potential CA Partners:** UC Dairies, Scott Brothers Dairy Farms, Pharm Robotics, CalPoly
- **Challenges met:** waste reduction, economic viability of dairy



Impact Areas for Each Project



People



Planet



Prosperity

Ag Automation & Robotics

- harvest automation for tree fruit
- spray technologies to reduce usage & drift



Digital & Precision Agriculture

- to increase efficiency & create new value
- to reduce inputs and waste, improve soils
- to leverage increasingly-scarce workforce



Greenhouse of the Future

- to reduce water use in water-starved regions
- to explore efficiencies of inputs & labor



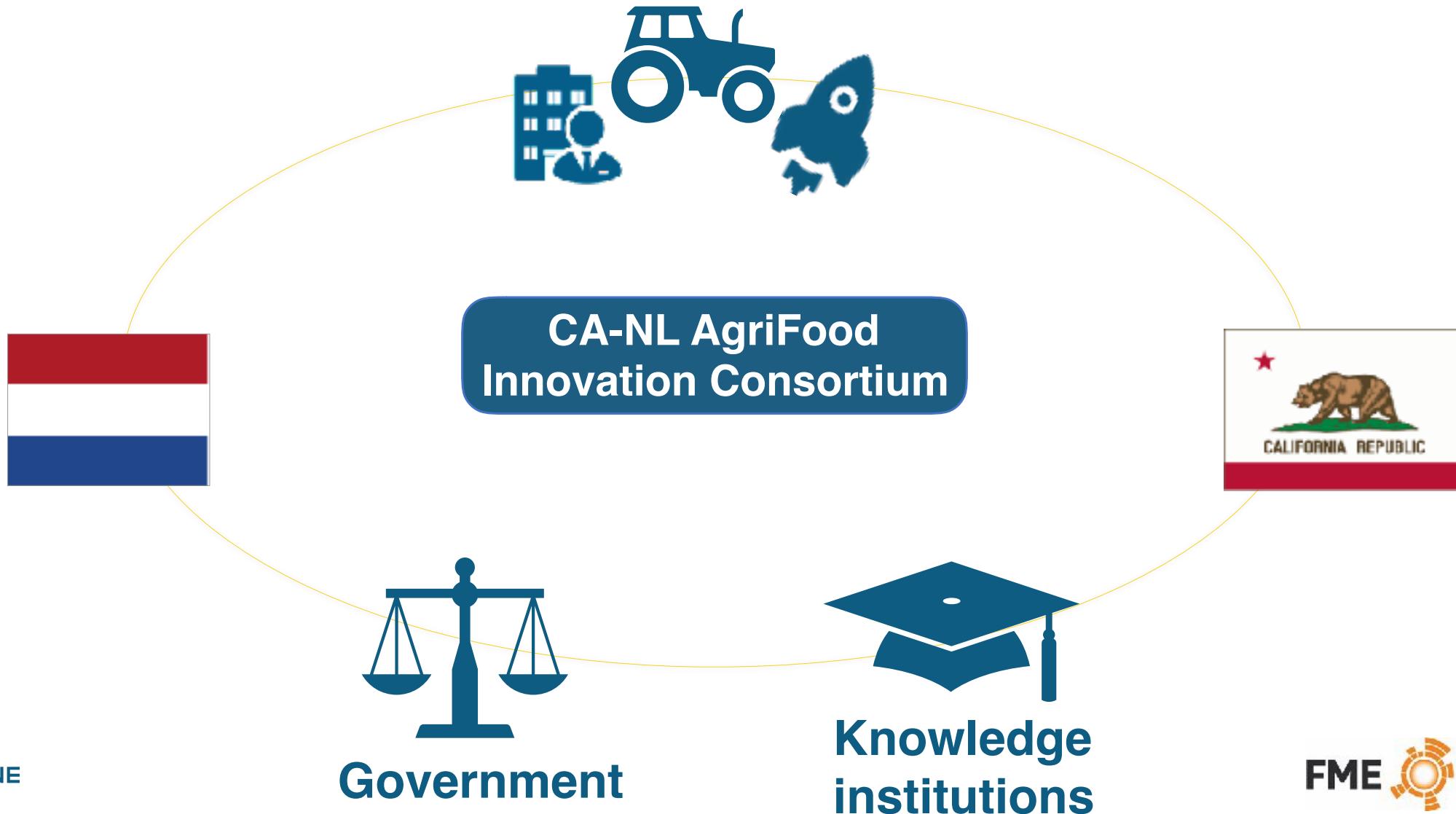
Livestock & Dairy

- reduce waste
- strengthen economic viability

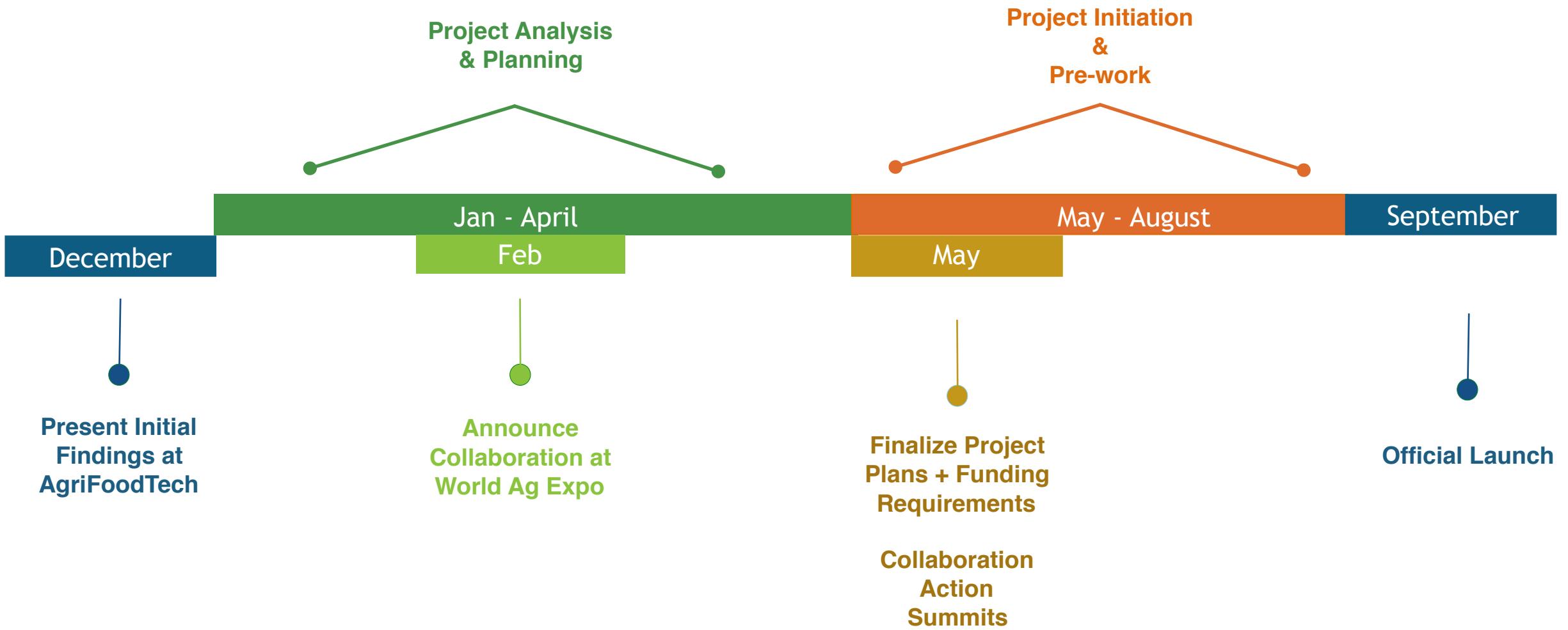


Triple-Helix is a Core Value

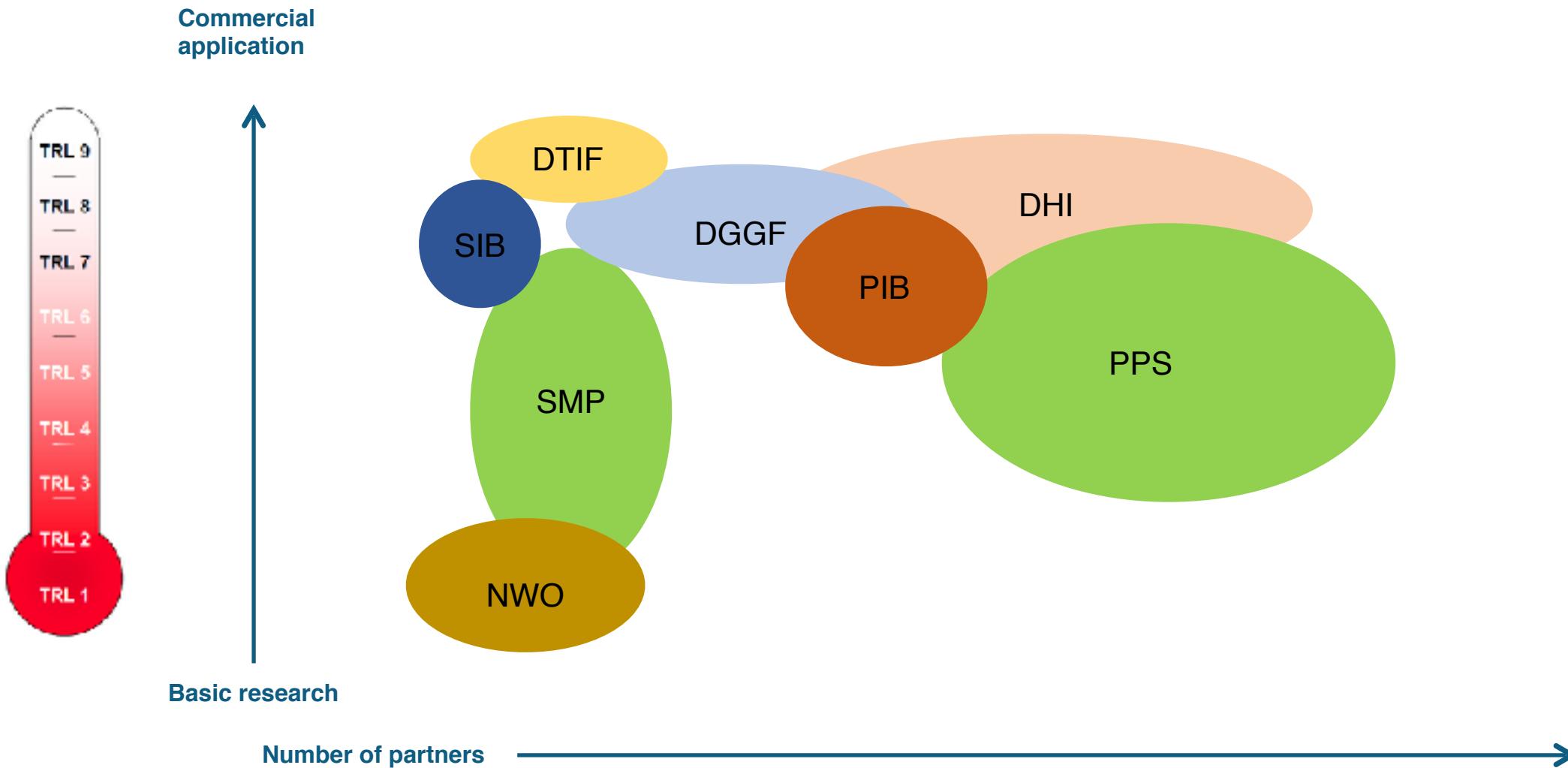
Industry + Farmers + Entrepreneurs



Launch Roadmap



Dutch Funding & Support Opportunities



Next Steps and Engagement



- Subscribe to our newsletter: bit.ly/NLCAAGFOOD
- Look out for the action summits in CA & NL
- Follow us: @VINE_io + @FMEAgrifood
- Email marcel.van.haren@fme.nl if you are interested in any of the projects

An aerial photograph of a vineyard showing numerous parallel rows of grapevines. The vines are dark green, and the ground between them is a lighter, yellowish-green color. The rows curve slightly across the frame.

THANK YOU

