NSF ENGINES
INAUGURAL AWARDS

North Dakota Advanced Agriculture Technology Engine

Engaging a global AgTech ecosystem

NSF'S OBJECTIVES FOR REGIONAL INNOVATION ENGINES

"Catalyze and accelerate innovation ecosystems across the U.S. to advance critical technologies, address societal and economic challenges, promote economic growth and job creation, and cultivate regional talent."

Potential for $160M in funding over 10 years (2 year rolling budgets).

Specifically for regions that have not had the same investment for tech-driven entrepreneurship and innovation.

Meet

The U.S. National Science Foundation's Regional Innovation Engines

NSF Engines will power research and workforce development, leading to new startup companies, new jobs, and new economies in a range of key technologies and sectors.

North Dakota Advanced Agriculture Technology Engine

Lead Organization:
North Dakota State University supported by a collaborative Core Partner Group: North Dakota Tribal College System, Greater Fargo-Moorhead EDC, Fargo Moorhead West Fargo Chamber, and Grand Farm

Primary Societal Challenge:
Amplify AgTech ecosystems and innovations by partnering with rural and Tribal communities to accelerate inclusive use–inspired innovation, economic development and workforce opportunities.

Innovations:
Predictive AgTech: Crop genomics, climate modeling,, advanced crop and land data, sensors, unmanned aerial vehicle (UAV);
Emerging Research: healthy world and food security and nutrition sustainable crop research

Key Facts:
- #1 U.S. producer of peas, beans, barley, canola, flax, oats & wheat
- Agriculture contributes $31 billion to the North Dakota economy and more than 110,000 jobs
- Activated AgTech ecosystem – test beds, broadband infrastructure, crop/land data
- Only statewide BVLOS (beyond visual line of sight) network through Vantis and the NPUAS Test Site

Example of Partners (65)

Academics (14)
Government Entities (8)
Tribal Entities (5)
Industry (32)
Non-profit (11)

University of North Dakota
Montana State University
State of North Dakota Government
Bank Of North Dakota,
Microsoft (Fargo)
RDO, AGCO, etc.
Nueta Hidatsa Sahnish College

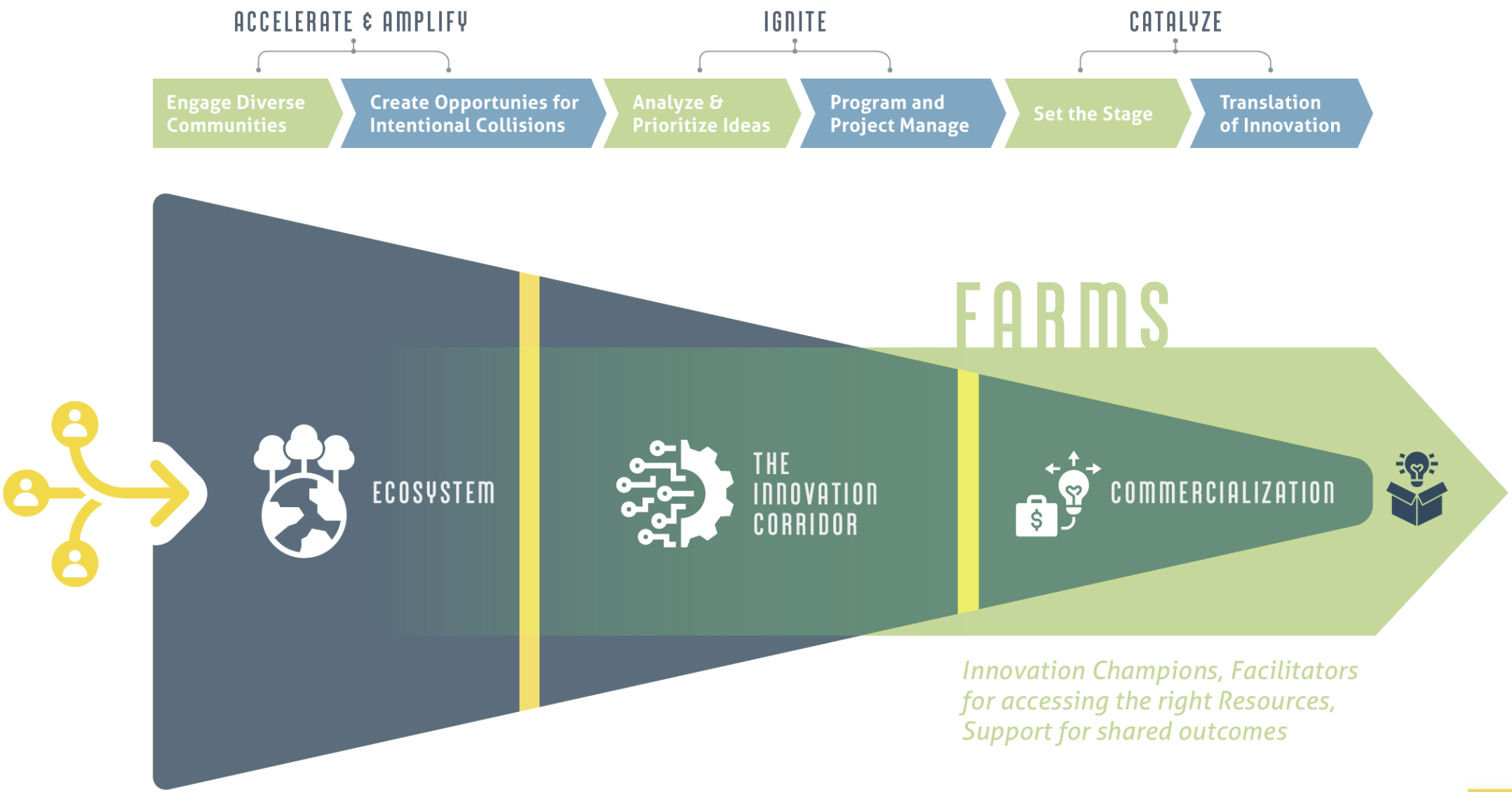
Learn More:
www.FARMSfeedstheworld.com

NSF ENGINES MUST INCLUDE:

- Use-inspired R&D (market pull)
- Translation of Innovations to Practice
- Workforce Development
- Diversity, Equity, Inclusion and Accessibility intertwined throughout all functions.

NSF
FARMS
NSF Engines: North Dakota Advanced Agriculture Technology Engine
POWERING IDEAS THAT FEED THE WORLD
RIGHT PARTNERS
RIGHT TIME
RIGHT MODEL
RIGHT ENVIRONMENT

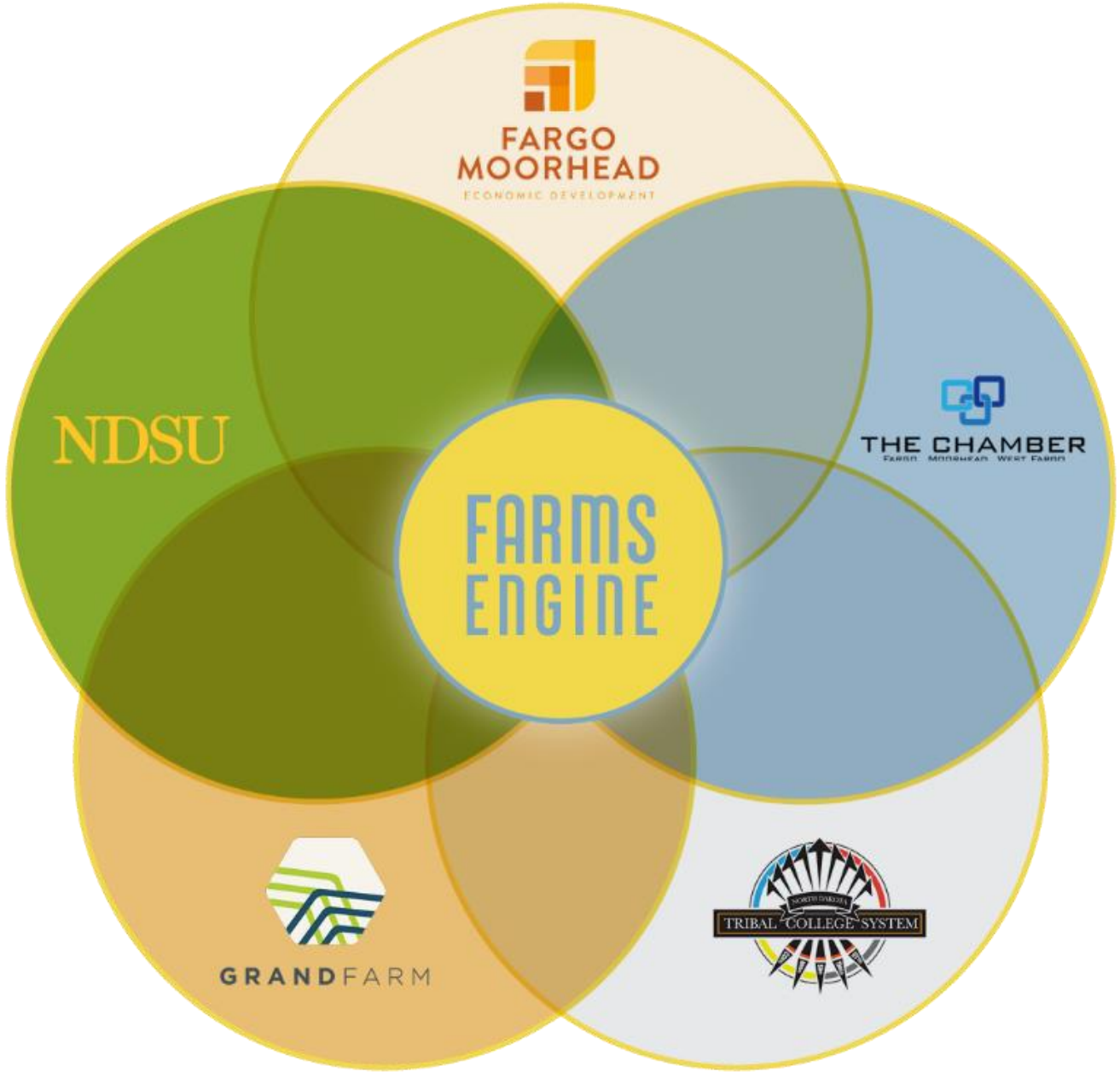
POWERING IDEAS



FARMS YRS 1 & 2: BUSINESS OBJECTIVES

1. **Amplify the AgTech ecosystem** around FARMS objectives and market opportunities. Build brand!
   - ✓ Intentional collisions program – events, thought leadership, engagement
   - ✓ Ideation Programs – specific to FARMS priorities
2. **Accelerate the Innovation Corridor**.
   - ✓ Formalize the innovation process by facilitating engagement between innovators, start-ups, capital, industry, Tribes, key stakeholders and university led, use-inspired researchers.
   - ✓ Identify ease of engagement through IP ownership and management
   - ✓ Create pathways for R&D to be leveraged across the ecosystem
3. **Catalyze** AgTech economic development and workforce activities to drive successful execution of
   - ✓ AgTech Statewide Network
   - ✓ Information, Education Alignment
   - ✓ Data Baseline – capital, resource bank, and market metrics
4. **Operational Excellence** to engage a sustainable FARMS mission
   - ✓ Start-up phase of FARMS organization, infrastructure, systems
   - ✓ Team development and innovative culture enablement
   - ✓ Legal/Operational Structure research and plan for Year 3

CORE PARTNERS



FARMS: MATRIX ORGANIZATION

FARMS is a matrix organization where employees have dual reporting relationships.

1. **Dual Reporting Relationships**:
    1. Employees report to the FARMS CEO and strategically are accountable to core partner organizational Workstream Leads in each functional area – workforce, DEIA, stakeholders/partners, R&D and technology transfer.
        - This will foster a cooperative environment where information and resources are shared more freely across projects and functions.

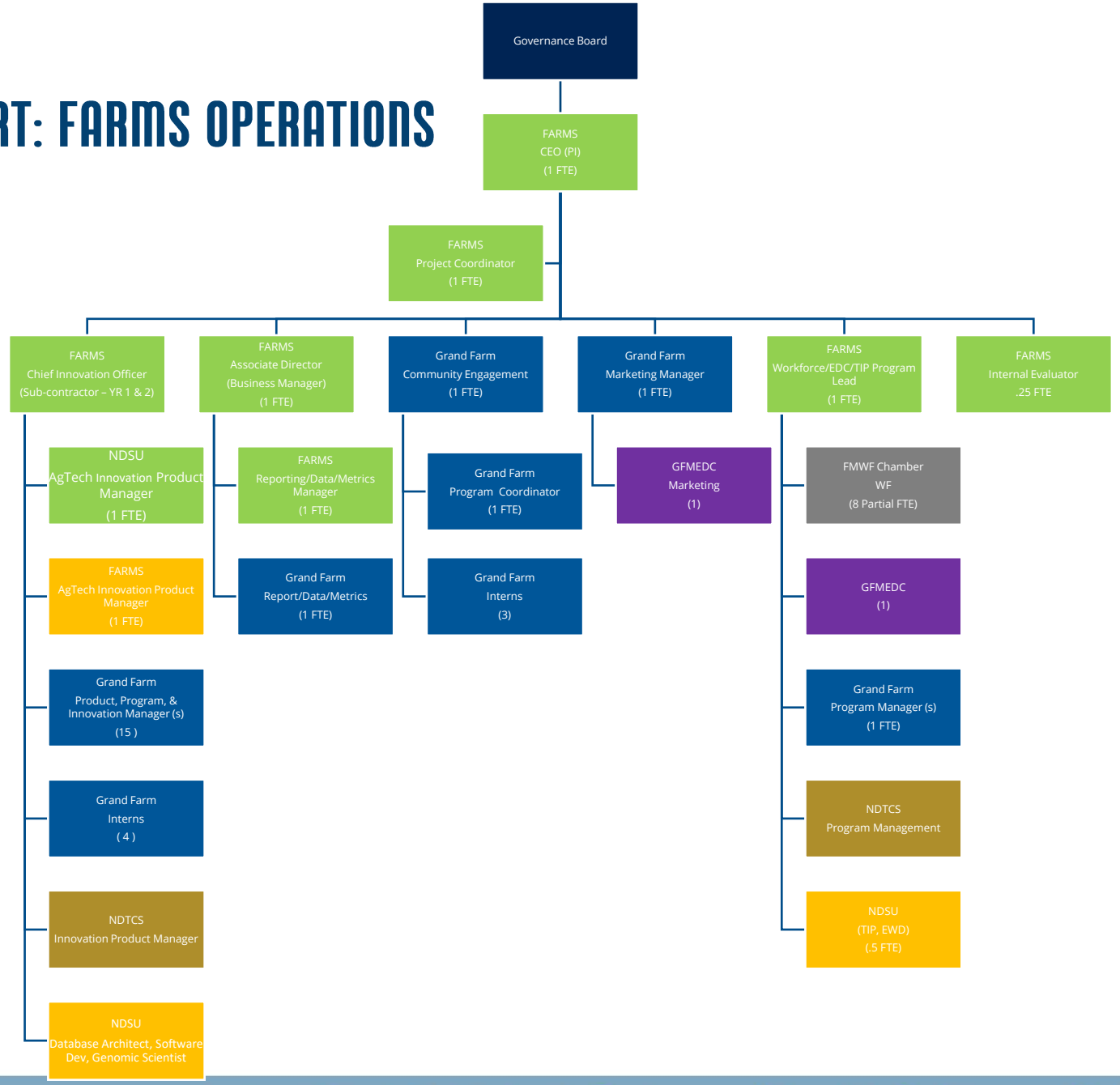
2. **Flexible Resource Allocation**:
    1. Resources, including staff, can be allocated more flexibly and efficiently.
        - Allows for a better balance of workload across different teams and projects.

3. **Cross-Functional Teams**:
    1. Teams are composed of members from various organizations or functions and aligned to innovation projects prioritized by FARMS Leadership Team, encouraging a more collaborative approach.
        - Facilitates the sharing of expertise and knowledge across the organization.

4. **Dynamic 'Innovation' Project Management**:
    1. Projects can be managed more dynamically, with the ability to adapt to changing circumstances more quickly.
        - Encourages innovation and problem-solving by bringing diverse perspectives together.

FARMS matrix structure is designed to increase flexibility, agility, and communication within the organization, particularly in our complex and dynamic environment.

ORGANIZATIONAL CHART: FARMS OPERATIONS



Governance
NDSU Core
FARMS Core
Grand Farm
NDTCS
FMWF Chamber
GFMEDC

NDSU HAS 3 ROLES

Prime

- ✓ COOPERATION AGREEMENT
- ✓ FIDUCIARY/ADMINISTRATIVE OVERSIGHT
- ✓ THREE PI'S

Core Partner

- ✓ R&D
- ✓ TRANSLATING INNOVATION TO PRACTICE (TIP)
- ✓ EDUCATION AND WORKFORCE DEVELOPMENT

FARMS Operations

- ✓ ECOSYSTEM BUILD
- ✓ COORDINATE ACTIVITIES ALIGNED TO OUTCOMES
- ✓ INNOVATION CORRIDOR

FARMS OPERATIONAL CORE IS ACCOUNTABLE FOR:

1. Strategic Leadership of FARMS innovation portfolio and ecosystem engagement

2. Programmatic and execution management in all four outcomes outlined by NSF: ecosystem build, Innovation Corridor, Education and Workforce Development, and operational set-up of FARMS

3. Engaging the FARMS AgTech ecosystem and telling the innovation story – to drive equity in action and achieve our mission and vision of equitable food security

4. Governance, NSF and Legal Compliance and general operations

Sampling of initiatives to be launched

R&D	Translation	Talent + Economic Impact
• **Advanced Genomic/Phenomic** data structure and crop characteristic identification for predictive modeling and sensor optimization. • **Climate modeling** and data structure for predictive modeling to enable crop and land management optimization. • **Last acres connectivity** for crop and land management optimization and data reporting. • **Integration** of data, sensors and UAV to enable grower adoption.	• **Formalization of FARMS Innovation Corridor** 1. Directed ecosystem engagement activities - that bring industry, innovators, R&D, and capital together 2. Creation of a cross-ecosystem Project Management Office (PMO) 3. Prioritization of use-inspired R&D projects with a focus on short-term and long-term commercialization	• **AgTech Knowledge Network** – the development of a statewide, integrated, inclusive AgTech network with a focus on education, information, and innovation input that formalizes our ecosystem network. • **Base-line economic development survey** that identifies our starting point for AgTech capital investments and deal pipeline. • **Community-based engagement** to identify use-inspired research opportunities for commercialization

Last acres connectivity for crop and land management optimization and data reporting.

Timeline of upcoming activities

Competitive process to move to next gate of 10-year program

January:
- Operational Launch
- FARMS Team Recruit/Hire
- Day 1–30 Communication, announce preparation
- Ecosystem updates, feedback, and formalizing engagement

February:
- Operational Launch
- FARMS Team Recruit/Hire
- NSF Engagement T&C's
- Ecosystem updates, feedback, and formalizing engagement

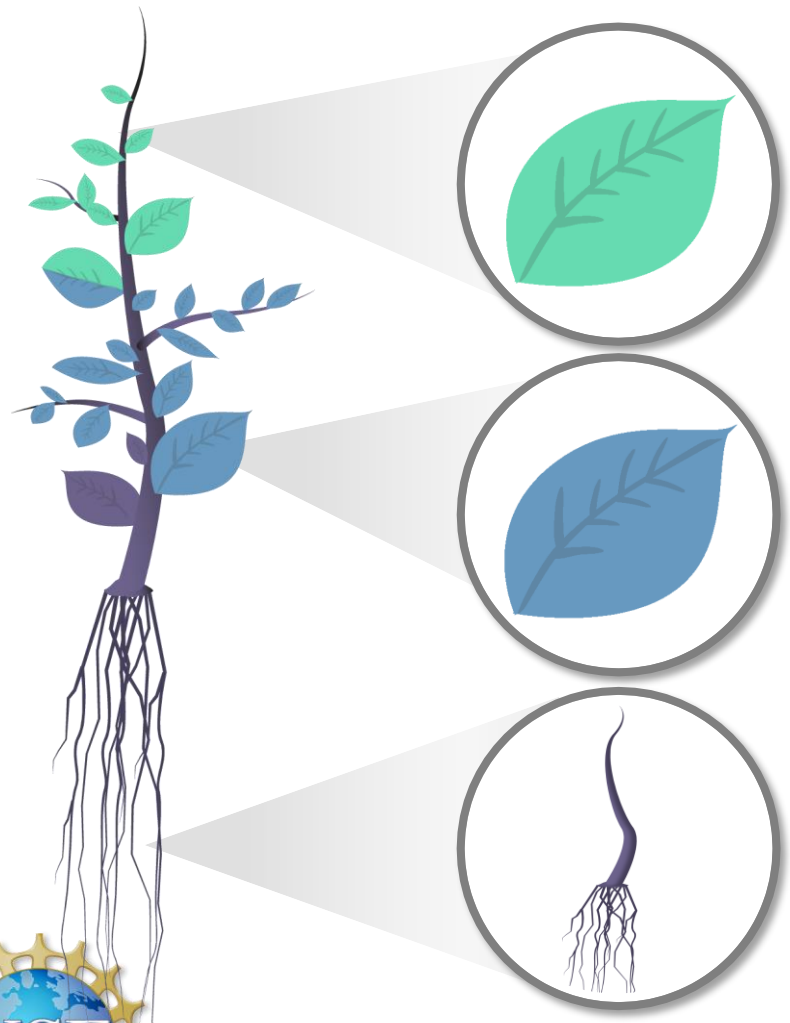
March - May 2024:
- Operational Launch (continues)
- FARMS Team Recruit/Hire – CEO, Operations Mgr locked
- NSF Engagement T&C's
- Ecosystem updates, feedback, and formalizing engagement
- Finalize 5-yr strategic plan

Spring 2024:
- Operational Launch (continues)
- NSF T&C execution
- Ecosystem Engagement – Ideation Engines, Innovation Corridor Framework
- R&D – TRL 1
- Data Structure Framework
- Test Bed – launch
- Capital baseline survey launch (EDC)
- Launch AgTech Knowledge Network (EWD)

Fall 2024 - Spring 2025:
- Operational Maturity
- Organization Legal Structure
- R&D – TRL 2-3; TIP – Sensor prototype test
- Innovation Corridor maturity – define commercialization roadmap
- Test Bed pilot/data acquisition
- Capital Investment metric share
- Inter-Tribal Convening

February 2026:
Two-year period ends for first NSF Engines (cohort #1)

The Engine's capital stack



Direct investments

- Private capital – 50 South Capital, 1889 Fund, Wonder Fund, Badlands Capital, Homegrown Capital, Lewis & Clark Agrifoods, etc. Committed
- State-lead start-up funding programs -(LIFT Fund, ND Development Fund, APUC, Bioscience Innovation Grant, Ag Diversification Development Fund (ADDF), Angel Match Program, ND Department of Commerce Innovate ND
- Engagement/CoHort with accelerators
- Innovator/Startup Hackathon with seed funding
- Private AgTech Sector – people, technology, space to accelerate commercialization efforts. For example, RDO – 3 FTE, Microsoft – space and technology resources & cloud storage

R&D focused economic development

- Predictive AgTech
- Emerging Ag research – nutrition, small, sustainable environments
- Data capture, structure modeling – crop and climate
- Sensor enablement
- Industry lead test beds (Grand Farm)
- UAV advancement

NSF Engines Program

- Advance AgTech ecosystems and innovations by partnering with rural and Tribal communities to accelerate inclusive, use–inspired innovation, economic development and workforce opportunities.

Examples of Funders + Activities

Microsoft

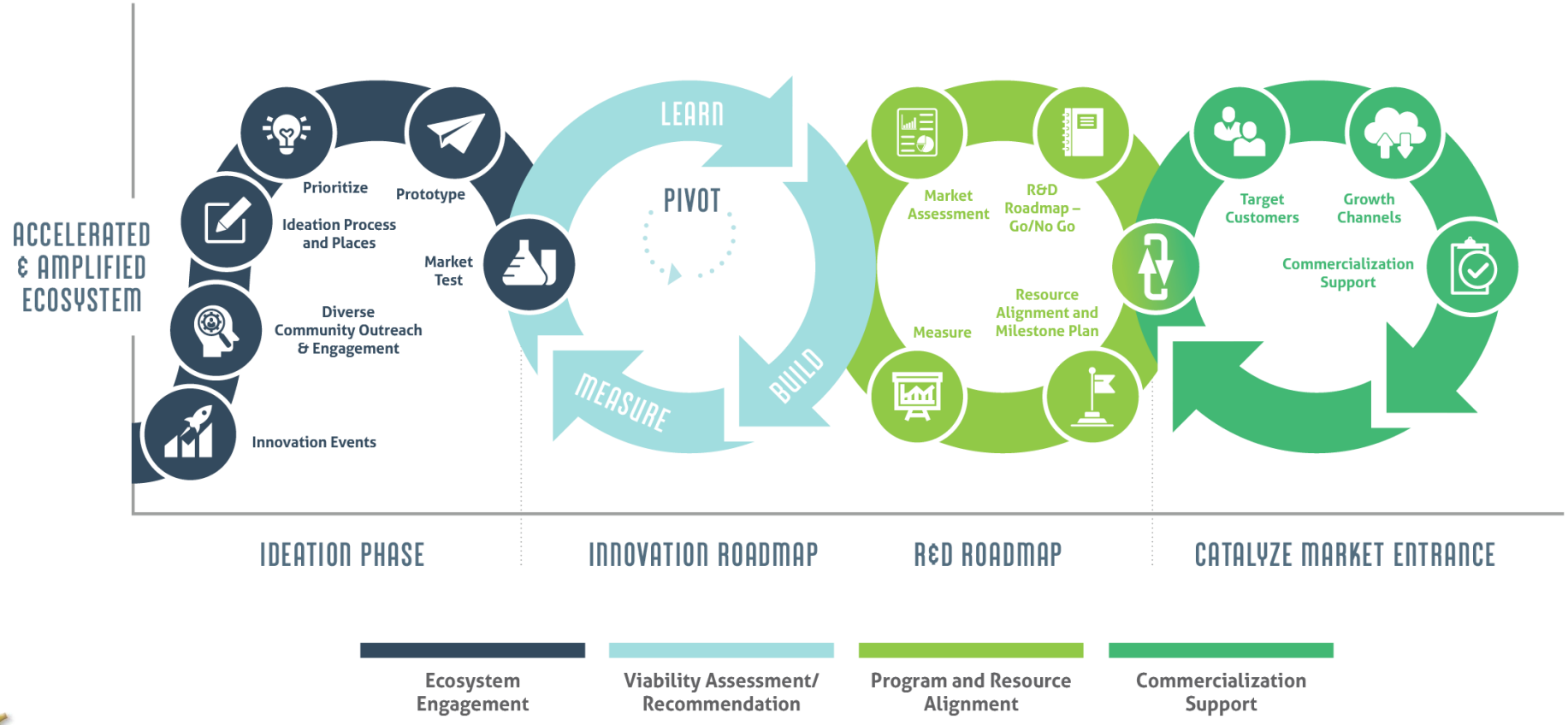
RDO EQUIPMENT CO.

DCN

TECH HUBS
U.S. Economic Development Administration

Transformative Impact in 10 years

Build 500 businesses in 5 years, driving AgTech innovation, growth, and talent development.



What's Next

- Access to Scientific Thought Leaders
- Partner agreements
- Greater connectivity with VC
- Leveraging the various public institutions/organizations funded as awardees to solve for challenges facing us
- Specific plan/mandate/funding/vision for the Engine-allied contributions made by other federal agencies and released by White House in Engine announcement
- Philanthropic resources
- Support and resources for the administrative, reporting and regulatory burdens
- Feedback loop with NSF to co-implement Engines for maximal success
- Facilitating strong connections between Cohort 1 Engines

NSF
F·A·R·M·S
NSF Engines: North Dakota Advanced Agriculture Technology Engine
RIGHT
MODEL
RIGHT
ENVIRONMENT
RIGHT
TIME
RIGHT
PARTNERS

Questions?