



Agricultural Genome to  
Phenome Initiative

# Building the Tools to Solve the Genome to Phenome Puzzle in Agriculture

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2021-70412-35233  
2022-70412-38454

*What is the*  
USDA-NIFA  
Agricultural  
Genome to  
Phenome  
Initiative  
Program?



2018 Farm Bill directed NIFA to establish a new competitive grant program to support research concerning genomes and phenomes of crops and animals of importance to US agriculture, authorizing up to ***\$40,000,000 annually 2019 - 2023.***

- <https://nifa.usda.gov/program/genome-phenome-initiative>
- U.S. Congress appropriated only ***\$1M in fiscal year 2020***  
***\$1M in fiscal year 2021***  
***\$2M in fiscal year 2022***  
***\$2.3M in fiscal year 2023***

**2020 RFA:** “NIFA’s AG2PI focuses on collaborative science engagement and invites innovative research proposals that intend to **develop a community of researchers across crops and animals** that will **lay the foundation for expanding knowledge concerning genomes and phenomes of crops and animals** of importance to US agriculture.”

# Project: "Creating a Shared Vision Across Crop & Livestock Communities"



## Initial project objective:

Assemble a transdisciplinary community, prepare it for an anticipated large-scale R&D effort in AG2P

### Executive Board Members



Dr. Patrick Schnable  
Iowa State University



Dr. Jennifer Clarke  
University of Nebraska-Lincoln



Dr. Jack Dekkers  
Iowa State University



Dr. David Ertl  
Iowa Corn Promotion Board



Dr. Carolyn Lawrence-Dill  
Iowa State University



Dr. Eric Lyons  
University of Arizona



Dr. Brenda Murdoch  
University of Idaho



Dr. Chris Tuggle  
Iowa State University



### Initial Project Activities across 3 years



Field Days

*28 field days*  
*2191 attendees*



Training Workshops

*24 workshops*  
*1639 attendees*



Community Surveys

*3 surveys*  
*587 respondents*



Conferences

*2 in-person conferences*  
*160 attendees*



Seed Grants

*13 grants awarded*  
*\$285,700*

## Additional awards added impact

2020 Award focused on community building.  
Next awards focused on funding research.

### 2021 Award

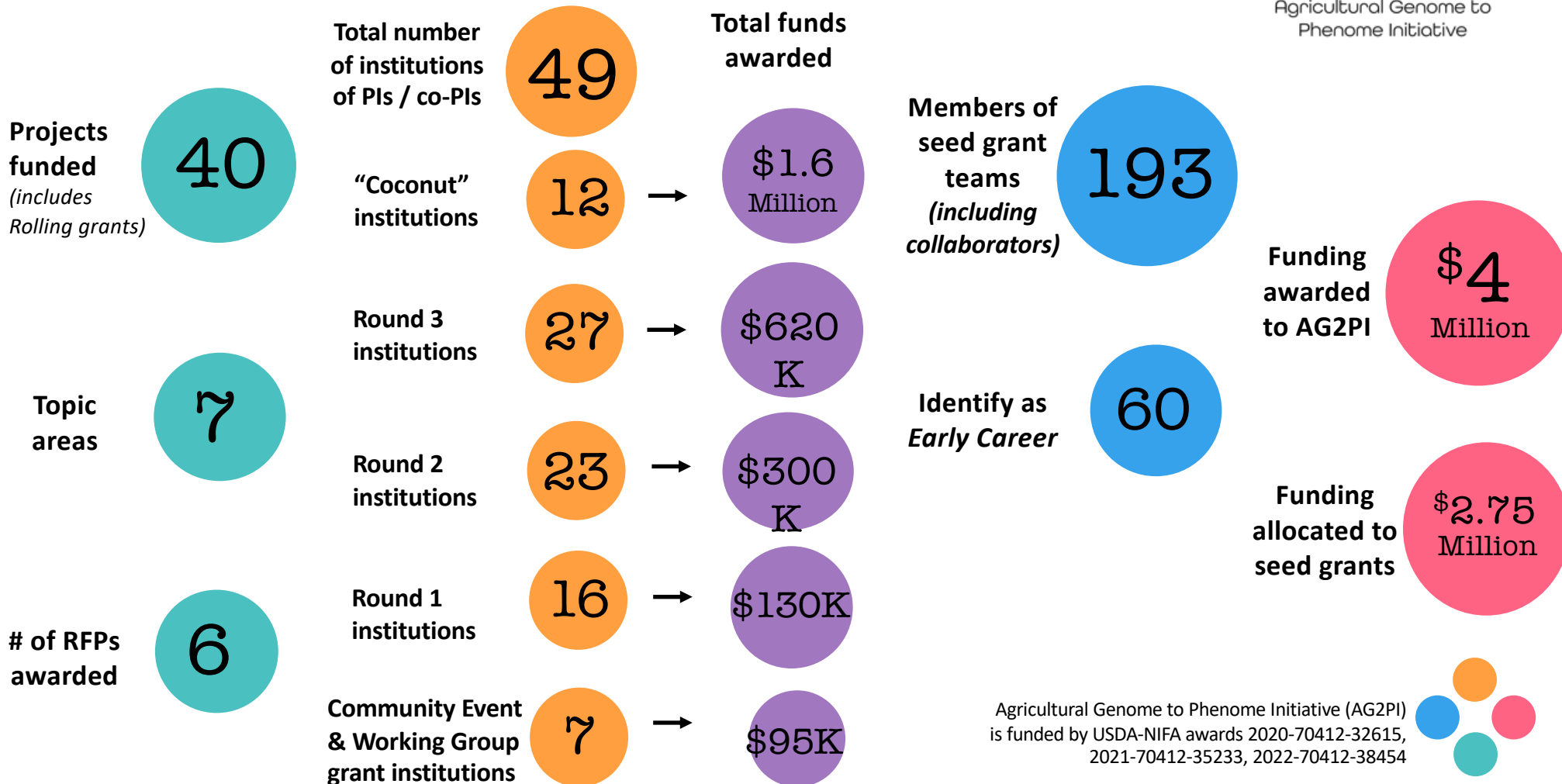
- **\$1 million**
  - Additional 20 seed grants awarded

### 2022 Award

- **\$2 million**
  - Additional 7 large seed (“coconut”) grants awarded



# Seed Grants Overview – By the Numbers



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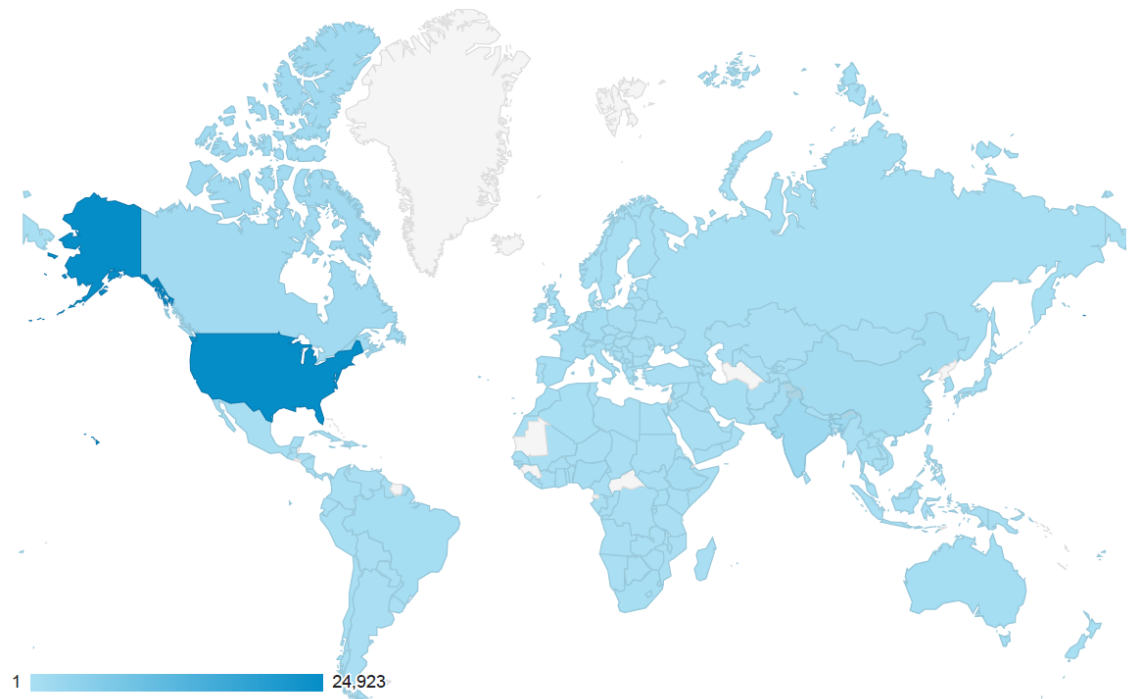
## Reaching the AG2PI Community

**REACH US AT:**

<https://www.ag2pi.org>



@AG2PI



Visitors to AG2PI website October 1, 2020 – July 12, 2023  
(over 43,000 unique visitors from 171 countries)

### What's Required to Realize this Vision?

- A **community** of interactive biologists (crop + livestock), engineers, data scientists and members of the greater community
- More **data** (phenotypes, genotypes and environment/management practices) ideally from coordinated, multi-disciplinary, multi-location, multi-year projects

Genotype (G) + Environment (E) + G x E = Phenotype (P)

- New **technologies** and analysis methods
- Substantial new **R&D investments**
- Our newest paper with community **recommendations**





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White paper based on Sept 2022 Workshop now published:

Tuggle et al., *Genome Biology* 2024 25:8

“Current Challenges and the Future of Agricultural Genomes to Phenomes in the U.S.”

We recommend that AG2PI funding be used to address the following critical milestones:

1. Provide resources to evaluate and **improve Ag G2P predictive tools**, including generation of *benchmark testing datasets*.
2. **Remove current public-private barriers** for collaborating with commercial entities that maintain *large phenotypic datasets*.
3. Establish a **single comprehensive public genome/phenome knowledge base** that enables FAIR data sharing as a foundation for *building on Federal investments* in agricultural genomes.
4. Accelerate the **training of scientists required for agricultural G2P research**, including toward developing and evaluating *data analytics training programs*.
5. Expand the **diversity of people engaged in agricultural G2P activities**, including *researchers, students and producers*.
6. **Identify additional gaps** in knowledge, multidisciplinary team development, education/training, and analytical or quantitative methods relevant to agricultural G2P and *initiate actions to fill those gaps*.

**Send your thoughts and suggestions to AG2PI!**





What's next for the AG2PI program at NIFA?

### 2023 RFP

- **\$2,300,000 available**
  - 2 large projects awarded
  - One is an extension of an AG2PI project seed grant

### Future RFPs

- **Anticipate \$2,500,000**
  - Additional research projects to be funded
  - If included in next Farm Bill



# AG2PI

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# Thank you!

<https://www.ag2pi.org>



## Executive Board Members



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# External Stakeholder Member Organizations



Agricultural Genome to Phenome Initiative



National Cattlemen's Beef Association



## Role of Stakeholder Organizations

- Link communication between AG2PI, organization employees and members, including sharing AG2PI news and events
- Participate in AG2PI activities, including contributing materials or expertise
- Provide feedback through surveys and one-on-one communication with AG2PI executive board members



Poultry Breeders of America

# Partner Organizations



## Role of Partner Organizations

- Provide feedback to AG2PI executive board regarding project activities & next steps
- Link communication between AG2PI, organization employees and members, including sharing AG2PI news and events
- Participate in AG2PI activities and surveys, including contributing materials or expertise



**National Animal  
Genome Research  
Program  
NRSP-8**



**AgBioData**

Toward enhanced genomics, genetics, and breeding research outcomes through standardization of practices and protocols across agricultural databases

