Spring agNC Business Meeting NOTES
April 8, 2025

Fathom AI Recording and Summary

In Person Attendees: George Smith (MSU), Gary Pierzynski (OSU), Shibu Jose (Univ of MO), Héctor Santiago (UNL), Jane Schuh (KSU), Derek McLean (UNL), Troy Runge (UW-Madison), Danny Singh (IA State), Tala Awada (UNL), John Blanton (SDSU), Lucas Avilés-Rodriguez (Univ of PR), Maria Marshall (NCRCRD), Charlie Stoltenow (UNL, NCCEA Chair), Jeanette Thurston (agNC), Chris Hamilton (agNC, recorder)

Via Zoom: Joleen Hadrich (UMN), Rodney Johnson (UIUC), John McEvoy (NDSU), Frank Casey (NDSU), Richard Linton (KSU, panel speaker)

Agenda Item	Topic	Notes	Action(s) Taken
1.0	Call to Order and Introductions – Opening Remarks from Dr. Lucas Avilés-Rodriguez, University of Puerto Rico, Associate Dean & Deputy AES Director	agNC Chair Shibu Jose called the meeting to order and welcome everyone to the meeting, with a special introduction of our guest Dr. Lucas Avilés-Rodriguez from the University of Puerto Rico. He then led introductions around the room and the Zoom. Slightly later the meeting, Dr. Lucas Avilés-Rodriguez also provided opening remarks with the history of the University of PR's College of Agriculture, Experiment Station, and Extension and answered questions from the group.	None
2.0	Approval of Fall 2024 Minutes from Raleigh, NC: https://www.aginnovationnc.org/agendas-minutes	Shibu requested approval of the Fall 2024 agNC minutes.	Approved by consensus
3.0	Adoption of today's agenda	Shibu requested approval of the meeting agenda.	Approved by consensus
4.0	Interim Actions of the Chair (Shibu Jose, Jeanette) 4.1 Chair's Initiatives 4.2 agNC FY2026 Office Budget 4.3 Other Items, as needed – none identified.	Jeanette first provided a brief update on NIFA, indicating that Steve Zheng is our regional liaison and Josh Stull will be leaving NIFA to work with the House Ag committee on rural and energy programs. Major staff reductions and relocations expected at USDA. RFAs are likely delayed but may be released with short turnaround times when approved. New requirements for reporting foreign activities. Steve Lommel,	None

		agInnovation Chair, will be meeting soon with the new NIFA director and REE Chief of Staff. 4.1: Shibu presented his agNC initiatives through his slideshow (double click object),  agNC Initiatives Shibu Jose 20250408.pdf with a special focus on increasing regional additions to the National Impact Database (NIDB) and to work with Sara Delheimer for MRFImpacts, as well as encouraged everyone to keep adding impact stories to the NIDB. Shibu also discussed agNC's presence and our Impact Booklet from the February Ag Outlook Forum. He then informed everyone about recent meetings in DC and our plan to improve the value of the summer Mini LGU meeting, to be hosted by IA State this June 16-18, 2025. They have met with CARET, NCCEA, and APLU on plans for this meeting and conversations will continue going forward, with a session there on joint strategic plans with NCCEA. Shibu also reminded the group about our new regional awards that are being reviewed now by the agNC Nominations and Awards Committee (NAC). We received three each for the Early and Mid-Career Innovator Awards, but none this year for the Engagement and Accessibility one. Derek McLean, our incoming agNC Chair, suggested that we discuss as group what the future agNC initiatives will be for his term in 2026 on a later monthly call. Communication and sharing the impacts of our region and national agInnovation is critical and we should think of ways to expand this reach. 4.2: Jeanette (and Chris) reviewed the agNC budget, with a focus on the previously approved FY2026 amount (5% increase from FY2025) and where they have adjusted reduce	

		spending, going forward (travel, office supplies, etc.). Chris indicated that the FY2026 assessments will go out later in the spring/early summer and invoices will come from Kansas State in a few weeks. FY2027 proposed budget will be discussed for approval later, likely on one of our future monthly agNC calls.	
5.0	NCRCRD Update/Q&A/Discussion (Maria Marshall)	Maria Marshall, director of the NC Regional Center for Rural Development (NCRCRD, based at Purdue University) presented her update via slides, with activities and priorities, and then answered questions from the group. She also thanked the agNC directors for their support ($25,000 annually off the top of regional Hatch Multistate). FYI that NC1100 is the multistate project that serves as the funding mechanism for NCRCRD. Maria's slides (double click the object):  NCRCRD Update April 2025.pdf	None
6.0	Reflections on Serving as agInnovation National Chair (George Smith)	It's OK to strive to do better and be constructive by working within the system. Relationships matter and George worked to improve them and build trust wherever possible. There is an inherent bureaucratic structure of the APLU's FANR (Food, Ag, Natural Resources) groups, but through open communication, we can work with others to make constructive changes. LBA (Lewis Burke, our advocacy firm) needs our help and help from our stakeholders to share messaging and our value as much as possible. The leadership structures are complex and bureaucratic (BAC, Budget and Advocacy Committee, for example, along with agInnovation's standing committees). However, we should always question and think about better ways things might be done. How can we change things for the better and make sure our stakeholders know our value and impact, while being efficient and effective? Please consider serving on a	None

		committee regionally and nationally, if you have a chance – it makes a difference. Initial Research Roadmap development effort did a lot of good, met with many stakeholders that we never had before. The current iteration of the Roadmap (now includes Extension, academic and international programs with three additional pillars requested by Extension, so more conversation is happening now to make it an LGU Roadmap, not just a research one) is still in process but let's not let perfection get in the way of progress to share our value and message. Jeanette was incredibly helpful to George on the Roadmap and his meetings in DC and he thanked her for all her great work and efforts during his term as agInnovation chair.	
7.0	Lewis Burke Associates agInnovation National Advocacy Report and Q&A (Bridget Kreiger for Elizabeth Stulberg, LBA via Zoom)	Continuing Resolution (CR) is in place for the remainder of the federal fiscal year. In May, there will be more details on USDA and other agencies' operating plans. Lots of rumors, but no firm information yet. FY25 funds likely to be allocated at FY24 levels. Grants are still being reviewed, with capacity first, then competitive. New NIFA Director appointment of Dr. Jay Hamby, may affect grants and RFPs, but how is unknown. Reduction in force (RIF) for USDA is coming at the end of the month, so lots of uncertainty and they are unlikely to be able to share any information. Hoping that Secretary Rollins will go before Ag appropriations committee soon, so we can learn more. Bridget shared this link with more information on the RIF and relocations in the Zoom chat, which Jeanette also shared with agNC via email on 4/7.	None

		Reconciliation is underway, and cuts (very different numbers for House and Senate) are most likely to come from SNAP. Also, another CR is also likely if reconciliation takes a lot of time. Bridget recommends right now that we figure out trends across LGUs and share with LBA what you've been hearing. Q: Any information on capacity funding? Not aware of a plan to harm, but again, let LBA know what you're hearing/experiencing. 1890s previously frozen capacity funds have been released. Delays on competitive funding RFAs and processes and staffing for executing programs will be challenging. It's very important that we apply when released to show the importance of these programs. Q: What about proposals from last year? Compliance with new EOs making this challenging. Q: Status of Scott Hutchins, as REE Under Secretary? He's not on board yet. Ricky Schoeder serving as Chief of Staff for REE. Paperwork delays slowing the process down to get new nominees on board, such as FBI checks, etc., but otherwise it's generally moving forward. Q: Recommendations on talking points when engaging with USDA leadership? Secretary Rollins talks about "Laboratories of Innovation," so it's good to remind them of our research institutions and our role in US science innovation. We do need more information on Sec Rollins' goals, timeline, priorities and how LGUs can help with this, so these are all good questions to ask when engaging with USDA leadership. Q: Any information on USDA overhead rates? Currently, these are set in the Farm Bill and truly an example of what happens	

		when it's too low (old, out-of-date facilities, infrastructure, etc.) No firm information on overhead, but discussions are imminent on how F&A use will have to change. OMB is likely to release rules, which might not be favorable, so be prepared. Universities will need to be savvy on how they talk about F&A and be very specific on how it's used – don't just say lights and plumbing, that's too vague.	
8.0	Navigating Agricultural Research Through Times of Funding Uncertainty – Panel	Panelists (See below for detailed summary) • Dr. Richard Linton, Kansas State University, President • Dr. Lucas Avilés-Rodriguez, University of Puerto Rico, Associate Dean & Deputy AES Director • Dr. Shibu Jose, University of Missouri, Senior Associate Dean & AES Director • Dr. Gary Pierzynski, The Ohio State University, Associate Dean for Research & Graduate Education and AES Director	None
9.0	Best Practices Presentation I: Strategic Applications of Our Capacity Funding (Gary Pierzynski)	Gary Pierzynski reviewed his slides on the topic for the group and then answered questions. Double click the object below to open.  Capacity Gary Pierzynski 2020408.pd	None
10.0	Best Practices Presentation II: Role of AI in Agricultural Research (Tala Awada)	Tala reviewed her slides on this topic for the group and then answered questions. Double click the object below to open.  Tala NCRA 2025 F.pdf	None
11.0	MRC Report and Recommendations Approval Votes (Derek McLean, MRC Chair) • New/renewal multistate proposals • Midterm reviews • NC Multistate Research Award	Refer to MRC meeting minutes from 4/7/2025 below for details. Derek reviewed the MRC recommendations made during the 4/7/2025 MRC meeting and requested full agNC approval. All	All MRC project and award (NC246 as our region multistate winner) recommendations were

	• NC Agricultural Research Innovation Award of Excellence	new/renewal and midterm reviews are approved as presented in the MRC notes. Chris will encourage all new/renewal and midterm review projects to scan their proposals to make sure they comply with the recent Executive Orders. She will return them to draft in NIMSS, as needed, and have the MRC do a final review. Chris will also encourage all new/renewal projects to consider working with their AES directors and communicators to submit impacts to the NIDB. NC246's nomination was recommended for as our agNC nomination for the National Excellence in Multistate Research for 2025 and will be forwarded to the STC.	approved as presented by consensus. Danny Singh was approved as the new FFY26 MRC member to start on 10/1/2025.
12.0	agNC Nominations and Awards Committee (NAC) Report (Héctor Santiago, NAC Chair 2025) • Leadership Award • Innovator Award • Update on Regional Awards • Volunteer Needed for New MRC Member (effective 10/1/2025) • Volunteer Needed for NAC (effective 10/1/2025)	Héctor presented the recommendations of the NAC as presented in the agenda brief and requested approval. Rodney Johnson (IL) requested being copied on the award announcements that will go out to Drs. Bollero and Guan from our NAC Chair.	All NAC award recommendations were approved as presented. Dr. German Bollero (IL) will be our agNC Leadership Award winner. Dr. Kaiyu Guan (IL) will be our agNC Excellence in Research Innovation Award winner.
13.0	agInnovation NRSP Review Committee (NRSP-RC) Report (John Blanton, agNC NRSP-RC rep, with assistance from Chris Hamilton) **Presenter Schedule (all times are EDT/AST)**	All new/renewing NRSP speakers presented brief overviews in the order listed in the agenda. All NRSP proposals, reviews, and other materials for review are included in the links below and were sent to agNC several weeks ago. Chris also resent the links via email during the meeting.	Please send to Jeanette by 4/21 any additional feedback on these NRSPs so that she can submit it to NIMSS for each via our regional NRSP review forms.

	• NRSP_temp4: Jerry Baron via Zoom at 3:30 pm – confirmed
	• NRSP_temp9: Joleen Hadrich at 3:40 pm
	• NRSP_temp12: Brad Gaolach at about 3:50 pm – confirmed
	• NRSP_temp13: Alex Thomasson at about 4:00 pm - confirmed
		Discussion summary (Chris' notes and Fathom AI combined)
		• NRSP_temp4 (IR4 project)
		  ○ The NRSP-RC previously acknowledged the importance and productivity of NRSP4 but proposed a 15% ($72,000) reduction in funding at midterm review time.
		  ○ The project team proposed two budget options - one with the 15% reduction and one maintaining current funding levels.
		  ○ Directors discussed the value and return on investment provided by NRSP4, as well as the evolving nature of the project over time.
		• NRSP9 (National Animal Nutrition Program):
		  ○ There were questions about the large, $100,000/yr budget increase requested.
		  ○ agNC wanted more details on how the $37 million in leveraged funding was calculated.
		  ○ There were discussions around the sustainability and funding model for the extensive database and website maintained by NRSP9.
		  ○ Questions were raised about whether charging for access to the federally-funded data would be appropriate.
		• NRSP_TEMP_12: Building Collaborative Research and Extension Networks to Advance the Research & Application of Science with Urban Communities: https://nimss.org/projects/view/mrp/outline/19168
		  ○ The group had questions about the large number of personnel (11 faculty, 2 project managers, etc.) budgeted and whether the deliverables justified that level of staffing.
		  ▪ Brad indicated that staff time for professional development of the communities of practice. Data is mostly
			John Blanton, agNC NRSP-RC rep, will review and then discuss with the NRSP-RC at their summer meeting, prior to the agInnovation vote.

		available but needs to be refreshed and more easily available for projects to be funded extramurally. ○ How much is being asked from research vs Extension? Brad's salary and other centers are funded by Extension, so it's not directly quantifiable, but MRF is $2.49M over 5 years (from their Budget in NIMSS). agNC wanted more clarity on the funding breakdown between Ag Experiment Station and Extension contributions. ○ Justification is much better than the last iteration, but does it sufficiently support research? ○ Overall concerns about proposal text violating recent EOs – needs rewording throughout. ○ Other urban researchers were surveyed for the utility of the Objectives and what the needs are and questions needing to be answered. • NRSP_Temp13: Artificial Intelligence for Agricultural Autonomy: https://nimss.org/projects/view/mrp/outline/19198 ○ How is the group planning to address data sharing to build the program? Collected by researchers on the farms and approval will need to be standardized. In general, we have the commitment of the members to fully share the raw data for project success in an open source/website environment for storage. ○ Data infrastructure partner? Open-source website, perhaps the new ARS data center for storage or other free sites. Benchmarking of data sets? Many different systems, but early on will be specific to make initial benchmarks, like picking specific crops and situations.	

		○ agNC would like more details on how this project would complement and coordinate with existing multi-state projects in this area.	
14.0	What else is on your mind? Group discussion and conversation.	Nothing identified	None
15.0	Review of 4/9 Group Tour Logistics and Details	Hector reviewed the details for the evening's group dinner, as well as logistics and schedule for group tours on 4/9/2025.	None
Meeting adjourned at 4:54 pm AST.			

8.0: Navigating Agricultural Research Through Times of Funding Uncertainty – Brief Panel Notes (Chris). See recording for detailed discussion.

- Jeanette moderated the panel and began with: **What are the most pressing budgetary challenges currently affecting your institution's research enterprise?**
    - Dr. Richard Linton, Kansas State University
        - $129M reduction in USAID projects
        - Adaptation is key
        - Better and different advocacy required
        - Building out interdisciplinary teams and adapt to reductions in F&A/IDC.
        - Reaching out to donors and alumni
        - More student recruitment and be more competitive in and out of state, be strategic on which programs to build and grow to attract and retain students
    - Dr. Lucas Aviles-Rodriguez
        - Facing dire financial issues in PR for at least 15 years now.
        - 50% budget reductions with the biggest impact on salaries, running out of staff for basic operations and not enough professors for teaching and research, plus a loss of institutional memory. No salary increases in years.
    - Dr. Gary Pierzynski, The Ohio State University
        - There's often little strategy employed in a crisis when programs are cut, but there needs to be.
    - Dr. Shibu Jose, University of Missouri
        - When he started, the College was facing a 14% budget cut. Inability to hire faculty resulted in complaints from stakeholders about not having people in place for certain programs. Ended up meeting with these stakeholders and state department of natural resources and decided to "Dream Big." They launched a fundraising campaign to support the fisheries program and were able to hire two faculty members with two more planned.
        - Consolidated research and Extension farms and centers to regional ones. Shifted some activities also to shared services on campus.

- **What strategies have you implemented to address these challenges?**
    - Dr. Linton: Adapt, be resilient, advocacy. Keep the focus on the long-term and don't let acute challenges change that. Invest in people, programs, partnerships, facilities. Support staff/faculty! Playbook for external stakeholders and be able to show ROI frequently, especially when there are challenges. Make sure students are invested in the university – recruitment and retention through engaging programs. Support from university president. Commodity groups to help support IDCreductions. Fundraising, matching from the state, public and private partnerships.
    - Dr. Aviles-Rodriguez: Education, leading by example, communication. Involve everyone in processes, improve efficiencies, where can we cut back, consolidations (combine research and teaching farms, for instance), hire grad students to do farm work, retirees as part-time workers, focus on strengths, like promoting winter nurseries and having research produce seed for farming. What didn't work: integration of finance office of Extension and research; recruitment of president from outside the system, don't extend projects with low IDCs – ends up more expensive in the long run.

- Dr. Pierzynski: Having a strategic plan in advance for resource allocations, know your budget (ROI, where is it going, who is being served, etc.), alternative and diverse revenue sources (esp. in the long term), staffing plan (core vs. flexible), courage to re-direct when required, and proactively close low ROI things.
- Dr. Jose: Diversify funding sources (70% is federally funded now, so reductions will be a big hit to research enterprise). There's a perception that industry support of our ag research is much higher than it actually is – this could be an opportunity to build upon through intentional public/private partnerships. Dr. Jose has been facilitating a lot of connections between faculty and industry, especially start-ups to be proactive. Also, hiring consultants can be helpful. For example, MU wanted to put together a water center, so with approval, Dr. Jose hired a firm with strong ties to the state and DC; they helped mobilize diverse funding and better engage all players.

- **Looking ahead, what emerging financial hurdles do you anticipate, and how are you preparing to address them?**
  - Dr. Linton: Less federal and state funding, so we need to be more strategic and listen to stakeholders to provide communities with what they truly need. Less IDC, so be very specific when preparing grants. Build a strong philanthropic effort. Better, non-biased partnerships with private industry. Think about efficiencies and consider downsizing where possible
  - Dr. Avilés-Rodriguez: Reduction of population of PR and loss of federal funds. Must think about ways to downside.
  - Dr. Pierzynski: Selective admission – hard to recruit when you don't know if they'll be accepted.
  - Dr. Jose: International student reductions likely, costs of hiring faculty due to increased salaries and need for large start-up packages – makes things very competitive.
- Overall, the panel session speakers emphasized the need for strategic planning, resource prioritization, diversifying funding sources, supporting personnel, and adapting to acute challenges - all while maintaining a long-term vision.

- **Group Q&A:**
  - How do we communicate the value of higher education?
    - Long term quality of life is typically better with a college education, but affordability is a huge issue, so we need to raise funds to address this.
    - Thinking also about certificates and ways to support non-degree seeking individuals to help them prepare for careers.
    - Three-year BS/BA degrees instead of four, using summers, as well to reduce time to confer a degree.
  - Entrepreneurial training for students, are we doing this, how can we improve?
    - Engagement with foundations, make a one-stop shop to help,
    - Change the culture/mindset of faculty and let them know it's good to be involved, include it as a factor for promotion and tenure.
    - Opportunities for graduate students to be involved and learn how to navigate the process as part of their program. Get them started early to feel more comfortable as they proceed with their careers.

agInnovation North Central
Multistate Research Committee (MRC) Meeting

Monday, April 7, 2 pm to 5 pm AST
1st Floor TACTIC Meeting Space, Marriott Aloft, San Juan, PR

MRC FY25 Members:
Derek McLean, MRC Chair FFY25
Joleen Hadrich
Troy Runge (did not join meeting due to travel delays)
Jane Schuh
Tala Awada
Ex-Officio (agNC ED) Jeanette Thurston

Meeting Agenda:

Item	Topic	Presenter	Action Requested
1.0	New/Renewal Projects	Derek, All	Briefly discuss each review and when all are done, pass an MRC seconded motion to approve all review recommendations as presented. This motion will then be voted upon for full agNC approval on 4/8 during the business meeting.
2.0	Midterm Reviews	Chris	Discussion, then pass an MRC seconded motion to approve all review recommendations. This motion will then be voted upon for full agNC approval on 4/8 during the business meeting.
3.0	Discussion of language to share with projects on aligning with recent EOs.	Derek, All	For discussion and consensus on what information to share with our renewing multistate projects.
4.0	agInnovation Multistate Research Award 2025 Winner Selection	Derek	Discuss NC246's nomination (only one received this year) and pass a seconded motion of approval for full agNC vote on 4/8.
5.0	MRC Next Steps	Chris	For information
6.0	New MRC Member Nominations for FFY26	Derek	For discussion, MRC suggestion/nomination of new MRC member to start on 10/1/2025. Any nominations made will be brought forward during agNC business meeting for approval.
7.0	Other Business, as needed	TBD	TBD

Meeting Notes

MRC Meeting Notes, April 7, 2025, 2-5 pm AST:

Attendees: Derek McLean, Joleen Hadrich (via Zoom), Tala Awada, Jane Schuh, Danny Singh, Shibu Jose, Jeanette Thurston, Chris Hamilton (recorder)

Derek first led introductions around the room and explained how the MRC meeting will run.

Item 1.0: New/Renewal Multistate Project Proposals:

- Derek began by discussing his submitted project reviews of NC_temp1184 and NC_temp1209. NC_temp1184 requires minor revision, as does NC_temp1209.

- Shibu suggested that we remind renewing multistate committees about the national impact database and encourage the project lead(s) to work with their AES directors to submit impact statements related to the project to improve communications about the impacts of multistate projects. **Action: Chris will include this when she reaches out to each committee.**

- Jane then discussed her reviews of NCCC_temp134 and NCERA_temp197. For NCERA_temp197, we will later discuss language they can use to comply with the recent executive orders, such as instead of digitally underserved, just say, "Those without broadband access."

- Jeanette next discussed her reviews of NC_temp1183 and NC_temp1187.

    - Action: For both, she recommended restating climate change language to align with new administration priorities. She suggested reframing reference to climate change to "higher temperatures", "increasing humidity", and/or "more frequent extreme weather" as appropriate.
    - Action: International work funding through USAID for NC1183 mentioned in the proposal needs to be addressed. Will this work continue with the funding cancelation of many of these USAID projects? If the work will proceed with alternative funding sources, please include.
    - **Action: She suggested adding NC1183 to NCAC22's review portfolio moving forward.**

- Joleen discussed her reviews of NC_temp1210 and NC_temp246 and suggested removing the word diversity and replacing it with crop systems for NC246 and in the future, perhaps combining crops into a single project versus multiple multistate ones. Both projects approved as is, though.

- Tala discussed her reviews of NC_temp1186 and NCCC_temp31; both recommended for approval as is.

    - **Action: For NC_temp1186, more information on how water quality is being tested and whether it is comparable between crops, locations, projects, would be useful or if it's needed. Are methods coordinated? Is that needed? Request they comment on this. Also, replace climate change with more specific terms like excessive heat, drought, etc.**

    - **Action: Also, NCCC_temp31 needs to take out climate change and perhaps diversity, so change to approve pending minor revisions. Look into AI as a tool to strengthen the committee.**

- Derek for Troy, reviewed Troy's reviews and recommendations. NC_temp1023 is likely good to go. NCCC_temp211 needs minor revision, should also be scanned for anything around climate change.

Item 2.0: Midterm Reviews: Chris discussed a few highlights from the midterm review recommendations provided with the MRC table.

Item 3.0: Discussion of language to share with projects on aligning with recent EOs.

- Intent is compliance with recent EOs and to make things simpler for NPLs when they review state level projects – reduce admin burden/expedite review and increase approval rate. Increase efficient approval.
- Suggest not using terms such as: Climate change, DEIA, immigrant, climate, migrant, underserved, minorities, protected classes, social justice, environmental justice, etc.
- Chris will include these suggestions when she reaches out to all new/renewing projects and midterm reviews, with the option to return all to draft status in NIMSS make changes as needed.

Item 4.0: NC246 was unanimously approved with a seconded motion to be put forward as our regional nominee for the Excellence in Multistate Research Award for 2025. Excellent nomination and hopefully will win the national award, too!

Item 5.0:

- Action needed: None, for information only.
- MRC Chair (Derek) presents seconded motions to full agNC membership on 4/8/2025.
- Once agNC approves the MRC motions, Chris will send approvals/revisions to all renewing projects.
- Projects have until 6/1/2025 to complete revisions, then revised proposals are sent back to MRC lead reviewer for review and approval.
- Once approved, projects are marked as Approved in NIMSS. Approved renewals start 10/1/2025.
- Derek rotates off MRC 9/30/2025, then Joleen takes over as MRC Chair on 10/1/2025.

Item 6.0: Suggestions for new MRC member to start 10/1/2025

- Danny Singh volunteered to serve and was approved as a seconded MRC motion.

Meeting adjourned.

Item 1.0: New/Renewal Proposals:

Recommendation Summary:

1. Derek:
    a. NC1184 (NC_temp1184), Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation - **Approve pending minor revision.**
    b. NC1209 (NC_temp1209). North American interdisciplinary chronic wasting disease research consortium - **Approve pending minor revision.**
2. Jane:
    a. NCCC134 (NCCC_temp134), Applied Commodity Price Analysis, Forecasting, and Market Risk Management – **Approve as-is.**
    b. NCERA197 (NCERA_temp197), Agricultural Safety and Health Research – **Approve pending minor revision to text as needed to be compliant with EOs.**
3. Jeanette:
    a. NC1183 (NC_temp1183), Mycotoxins in a Changing World – **Approve pending minor revision.**
    b. NC1187 (NC_temp1187), The Chemical and Physical Nature of Particulate Matter Affecting Air, Water and Soil Quality – **Approve pending minor revision.**
4. Joleen:
    a. NC1210 (NC_temp1210), Frontiers in On-Farm Experimentation – **Approve as is.**
    b. NC246 (NC_temp246), Ecology and Management of Arthropods in Corn – **Approve as is**. (Multistate Excellence nominee for agNC)
5. Tala:
    a. NC1186 (NC_temp1186), Water Management and Quality for Ornamental Crop Production and Health - **Approve as is.**
    b. NCCC31 (NCCC_temp31), Ecophysiological Aspects of Forage Management - **Approve as is.**
6. Troy:
    a. NC1023 (NC_temp1023), Engineering for food safety and quality – **Approve as is.**
    b. NCCC211 (NCCC_temp211), Cover crops to improve environmental quality in crop and biofuel production systems in the Great Lakes and Upper Mississippi basins – **Approve pending minor revision.**

Details of New/Renewal Project Reviews:

1. **Derek: NC1184 (NC_temp1184), Molecular Mechanisms Regulating Skeletal Muscle Growth and Differentiation**
    a. Recommendation: Approve pending minor revision.

b. The focus of the NC1184 multi-state group is to optimize animal growth efficiency by understanding the molecular and cellular processes involved in skeletal muscle growth and function. This will help ensure the viability of the meat industry amid challenges like rising energy costs and environmental concerns. Global demand for animal protein is increasing, this group focuses on improving the efficiency and sustainability of meat production to meet the increasing global demand. The group meets annually, most recently at LSU (hybrid) with plans for the 2025 meeting in Hawai'i and 2026 in Arkansas. The project aligns with NIFA research priority of Animal Health and Production of Animal Products, including several subcategories including animal management, animal genetics, stress response in animals, and improved animal products before harvest. The group has a strong core of research scientists that partner on grant submissions and demonstrate collaborative success with numerous publications that include participants from multiple states. Collaboration is a strength, the collaborative efforts that have led to significant contributions to fundamental knowledge, extramural funding, publications, important advances in the field and some clearly defined practical approaches utilized by industry partners. The management plan is in place with organized coordination of collaborative efforts and meetings. The recent reports do not provide specific details on the engagement strategy with stakeholders. However, the most recent report suggests that the team could increase engagement with stakeholders for feedback. This implies that the team recognizes the importance of involving stakeholders in the project and needs to develop a more structured or formal strategy for ongoing interaction and feedback collection. The report mentions the need for a clear data management/data sharing protocol, but it does not specify that a detailed data sharing plan is included. The recommendation is for the team to develop or improve such protocols to enhance data sharing practices. The report does not explicitly mention mentoring early career or new scientists. Productivity of graduate students is included in the report, a strength of this group. The large, multidisciplinary team and its collaborative nature suggest opportunities for mentoring within the group. With over 50 scientists from more than 25 states, it is likely that less experienced or new scientists could benefit from the guidance and expertise of senior researchers. Although mentoring is not directly stated, the collaborative environment could inherently provide such opportunities for early career scientists. The recommendation is for the team to develop or improve informal or formal mention of early career scientists.

2. Derek: NC1209 (NC_temp1209), North American interdisciplinary chronic wasting disease research consortium

a. Recommendation - Approve pending minor revision.

b. The North American Interdisciplinary Chronic Wasting Disease (CWD) Research Consortium is a large, cross-jurisdictional group including academic, state, not-for-profit groups, and federal agencies. The group is a unique example of collaborative research to manage a species and disease that do not respect geographic and species boundaries. The overall aims and goals of the group will improve the likelihood of success within and across jurisdictions. The group focuses on investigation of CWD, a prion disease affecting cervids such as deer, elk, and moose. This project involves a consortium of collaborators with a strong history of success, addressing key aspects of CWD management, transmission, and ecological impacts. The scope of work is well-justified, the approach reasonable, and aligns with NIFA goals for Animal Health and Production, including the subcategory of internal parasites. The workshop in 2019 was a comprehensive approach and provided important guidance for the group. The balance of basic, applied, and sociological research is distinctive strength and rare combination for a multistate project. The key objectives are well reasoned, using the workshop outputs, the perspective of progress and success of the group in the past and a mindset that new advances will rely upon

the use of novel, innovative technology and elevated social science approaches. The ambitious scope of the project is impressive, raising concerns that the goals are too broad, and the lack of specific metrics to measure outcomes in specific areas may result in challenges to track progress and determine specific contributions of individual members of the group. The proposal would benefit from prioritizing key research areas and developing clearer, more specific work plans and measurable outcomes for a more successful project implementation. This approach is recommended to enhance accountability and progress assessment. The recommendations include specific milestones and measures of productivity for the following objectives: disease transmission and pathogenesis – determination of impact and value of the tissue bioarchive to share CWD-positive tissue for strain identification and research; research facilities for controlled CWD transmission – metrics to demonstrate improved access to facilities for effective CWD research with state and federal partners; improving diagnostic testing – developing alternative strategies and assay for tests. Outcomes of the remaining objectives provide appropriate and measurable metrics to evaluate progress. The size, overall scope, and multi-disciplinary nature of this project needs an organizational leadership structure. The subcommittee structure is a strength, more detail is needed to provide confidence the subcommittees provide the structure required to effectively monitor research, identify success and gaps in the strategy, mediate potential conflicts, and identify emerging opportunities for new approaches.

3. **Jane: NCCC134 (NCCC_temp134), Applied Commodity Price Analysis, Forecasting, and Market Risk Management**
    a. Recommend Approval.
    b. This coordinating committee renewal seeks to address rising commodity market volatility while supporting producers and agribusiness managers through collaboration among trusted sources. The project is dedicated to fostering the exchange of ideas and research in applied commodity price analysis, forecasting, and market risk management while aligning educational efforts in agricultural economics. The committee organizes annual conferences attended by 40-80 participants, including researchers, students, extension personnel, government workers, and industry professionals, encouraging mentorship and collaboration. This is their main means of work. These conferences facilitate robust peer reviews and support the development of future economists. These efforts are strengthened by industry-provided data and collaboration across institutions and regions. With over 40 years of established relationships, the group has tackled key issues in commodity markets, including risk management tools, forecast accuracy, basis predictability, farm program impacts, food safety events, globalization, and trade. With widespread participation across the U.S., Canada, and the European Union, as well as dissemination of conference materials via a website and the University of Minnesota libraries, the group continues to innovate. Notably, they have addressed suggestions to increase Land-Grant University (LGU) involvement since their last review. Overall, the committee and its annual meetings remain highly valuable to participants.

4. **Jane: NCERA197 (NCERA_temp197), Agricultural Safety and Health Research**
    a. Recommend approval pending minor revisions to be discussed and suggested by the agNC MRC during our April 7 meeting.
    b. NCERA197 is a multistate initiative with a 25-year history of addressing the inherent risks within agricultural occupations. It has minimal redundancy with other similar programs. With the renewal the project has refined its collaborative approach, transitioning from isolated efforts to better integrate activities across research, teaching, and outreach. Despite its broad scope, the project now articulates more cohesive goals: (1) addressing emerging hazards and opportunities in agricultural safety and health, (2) cultivating

partnerships to enhance outreach and program impact, (3) reaching unserved and underserved agricultural communities, and (4) mentoring the next generation of agricultural safety and health professionals. While the project's ambitious breadth presents challenges for collaborative research, strong institutional participation and alignment inspires confidence that the objectives will be effectively achieved in both extension and academic domains. Through annual meetings, comprehensive reporting, and impressive outputs, the group upholds a high standard of excellence. The active involvement of Land-Grant Universities (LGUs) continues to be a fundamental pillar of its impact and success.

5. **Jeanette: NC1183 (NC_temp1183), Mycotoxins in a Changing World**
    a. Recommend approval pending minor revision.
    b. Brief Overview: The primary goal of this project is to enhance understanding of mycotoxins in food and feed crops and mitigate risks to food safety, human health, and food security through research and outreach. The proposal effectively justifies the need for data collection, research, and outreach, emphasizing the advantages of multistate collaboration. The four clearly defined objectives are well-aligned with the overall goals. Furthermore, the committee comprises experts from diverse geographic regions, essential for evaluating mycotoxin presence and production under varying weather and environmental conditions. The benefits of a multistate approach to address this critical food safety and security threat are well articulated.
    c. Strengths
        i. Scientific Approach: NC1183 maintains a robust scientific strategy that integrates and synergizes research efforts across participating institutions.
        ii. Research Methods: The project leverages both applied and basic research strategies, including: Biotechnology and conventional breeding to reduce fungal infection and mycotoxin production. Microbial detoxification techniques. Screening methods for mycotoxin resistance and susceptibility. Collection of human and animal health exposure data to support risk assessments. Identification of factors influencing mycotoxin production and host resistance.
    d. Potential Areas for Improvement
        i. Milestones: Current section is very vague. Detailed milestones in alignment with the objectives are needed.
        ii. Annual Reporting: Include specific examples of collaboration and integration of efforts across states.
        iii. Publication Management: Organize publication lists to highlight collaborative works involving multiple institutions.
    e. Summary and Recommendation: APPROVED with Minor Revision-- The proposal is well-constructed, with specific and achievable objectives that will advance the impactful work of this multistate research committee. Minor updates needed, including milestones section, re-terming “climate change”, and support of and possibly scope of international work.
    f. Additional Comments for MRC Consideration (In Light of New Administration’s Priorities)
        i. Climate Change Terminology: Reframe references to climate change to align with other sections of the proposal. For example, use terms such as "higher temperatures," "increasing humidity," and/or "more frequent extreme weather."
        ii. International Work under Objective 1.2: Given recent administrative actions, clarify whether USAID-supported work will continue. If the work will proceed with alternative funding sources, update this section accordingly.

6. **Jeanette: NC1187 (NC_temp1187), The Chemical and Physical Nature of Particulate Matter Affecting Air, Water and Soil Quality**
    a. Brief Overview: NC1187 consists of a group of experts who are focused on identifying, developing, assessing, and utilizing advanced analytical tools to investigate particles in air, soil, and water. The proposal does a good job demonstrating the importance of foundational and applied research in better understanding particulates and their impact on food production, food safety, and environmental health (soil health, water and air quality).
    b. Strengths:
        i. Important and Critical Areas of Research for Safe and Sustainable Food Production, Environmental Health
        ii. Strong, experienced, and active research team
        iii. Solid reasoning for the need for a multistate research project to address these areas of research (leveraging expertise, facilities, samples, and data to address objectives and achieve goals, including benefits of collaboration and networking)
    c. Potential Areas of Improvement/Annual Report Recommendations:
        i. Important but Ambitious Objectives, Consider Growing Team of Experts: Important and ambitious objectives considering the official membership of this team. It may be that, for example, Dr. Pachepski, USDA-ARS scientist (listed as an author in the reference section) and other members currently participate in this project, but they need to be added to the official membership. If not, it is recommended to consider expanding the membership of this committee.
        ii. Highlight multistate work and impacts, including which publications are from multistate research collaborations (could use an asterisk for those publications with 2 or more states) in future annual reports.
    d. Summary and Recommendation: FOR Discussion with MRC—Approve with Minor Revision to align with new Administration priorities? The only area that should be addressed is the references to climate change throughout this proposal.

7. **Joleen: NC1210 (NC_temp1210), Frontiers in On-Farm Experimentation**
    a. Recommend approval.
    b. Frontiers in on-farm experimentation proposes to combine data from multiple sources to provide informed decision-making guidance for agricultural producers that are based upon scientific research coupled with everyday technologies used by farmers. The methods proposed as well as the project team are well-positioned to achieve the goals with expertise across multiple disciplines. Automating recommendations and communication of these results to decision-makers will advance production agricultural-both from an efficiency and competitiveness standpoint, as outlined in the “likely impacts of successfully completing the work” section. This group has prioritized engagement with other stakeholders by completing 135 interviews with farmers, professional crop consultants, and extension personnel to help guide the goals and outcomes of the project. The farmer testimonies further demonstrate how this research is anchoring on the land grant mission by combining research, outreach, and education in one multi-state project for truly integrated approach.

8. **Joleen: NC246 (NC_temp246), Ecology and Management of Arthropods in Corn**
    a. Recommend approval.

b. Ecology of Arthropods in Corn proposes to study the impacts of several insects that negatively impact corn yield in the Corn Belt and southeastern U.S. The methods and objectives proposed in the project focus on relevant topics associated with prevention, management, and control of negative insect pressure across the biological cycle of corn as well as the insect studied. Potential outcomes of this work included improved IPM /IRM recommendations, identification of genetic markers for management, and updating bioeconomic models. The members of this committee include faculty and research professionals at LGUs, University of Guelph, and USDA-ARS sites in the Corn Belt and southeastern U.S. Included the milestones and organization/governance document was appreciated – this group has a clear path forward with the technical expertise to achieve the goals. The project team acknowledged there are similar multi-state groups, but they are focused on soybean. A plan to build collaboration between these groups was discussed – in the future, we may want to consider if there is a reason to combine the soybean and corn multi-state projects, especially knowing that many of these areas focus on a corn-soybean rotation.

9. Tala: NC1186 (NC_temp1186), Water Management and Quality for Ornamental Crop Production and Health

a. Recommend Approval.
b. The proposed project aims to address water management and quality issues in specialty crops production, emphasizing the need for improved-quality water, under the challenge of climate change and urban competition for resources. The proposed project addresses 4 well defined objectives: quality of irrigation sources, irrigation management and efficiency, runoff management, and substrates and soilless culture. The objectives are appropriate and address the challenges faced by specialty crop producers, ensuring that the research is targeted and actionable. The proposed project is comprehensive and involves various institutions and stakeholders, the team and institutions have had a long history of successful collaborations with impactful impacts. The project has an engagement and dissemination plan and includes face-to-face presentations, workshops, and online training courses targeting growers and educators. It would have been beneficial to expand on the water quality monitoring protocols, and eventually incorporate economic analysis. The team has active collaborations, and meets annually. Participation is diverse. I recommend the renewal.

10. Tala: NCCC31 (NCCC_temp31), Ecophysiological Aspects of Forage Management

a. Recommend Approval.
b. I agree with excellent assessment of this working group “this group remain to be a model CC.” The committee, established in 1966, facilitates collaboration among forage scientists to address critical challenges in forage management and ecosystem services. The committee identified priorities related to research coordination, science communication and publications, team building, engagement with stakeholders, grants submission, conducting workshops and developing educational materials for stakeholders. This is a very active committee, meets annually, and has been successful in seeking federal funding. I recommend the renewal.

11. Troy: NC1023 (NC_temp1023), Engineering for food safety and quality

a. Recommendation: Approve

b. The proposed renewal builds upon a highly successful past 5 years and is well-positioned for continued success. The group will continue to work on the development and characterization of novel foods and processing methods but will also broaden its scope to include:
    i. (i) Sustainable food materials and processing methods.
    ii. (ii) Mechanistic and data-driven modeling to enhance food manufacturing processes.
    iii. (iii) Integration of cutting-edge food engineering research into educational and extension programs.
c. The project has in the past engaged participants meaningfully in achieving objectives with both multi-state collaborative research and HEC grants as tangible outcomes. It remains a multistate and multidisciplinary effort, primarily involving engineering disciplines and food scientists from across the country. The project has undergone thorough review and outlines clear outcomes and impacts, with specific milestones identified throughout the proposal. Notably, the project has also provided a platform for the development of an international food engineering professional society, the Society of Food Engineering, which organizes and hosts the Conference of Food Engineering (CoFE), a bi-annual event. CoFE was successfully held in September 2022 and again in August 2024, further strengthening collaboration and knowledge exchange in the field. The previous iteration of this project successfully leveraged resources from multiple sources to achieve its goals. Lastly, the project aligns well with NIFA's priorities.

12. Troy: NCCC211 (NCCC_temp211), Cover crops to improve environmental quality in crop and biofuel production systems in the Great Lakes and Upper Mississippi basins

a. Recommendation: Approve with minor revision.
b. This is a well-established collaborative group has a strong track record in education and outreach that focuses on monitoring environmental quality and developing new cover crop varieties. The team meets regularly in conjunction with the Midwest Cover Crops Council, though participation could be broadened. Reports from the previous iteration demonstrate a high level of coordination and sharing of information and significant multi-state accomplishments. This 5 year proposal has a good background and clear objectives including: 1. Evaluate the impacts of cover crops on ecosystem services and agronomic production and profitability, and develop adaptive management practices to improve the performance of cropping systems that include cover crops. 2. Develop new and update existing cover crop educational and outreach products and programs for a variety of audiences, and work with partners (farmers, conservation agencies, ag industry, crop advisors, and non-governmental organizations) to facilitate more rapid adoption and successful management of cover crops across the US Midwest.
c. Revisions Requested: The proposal lacks details and specificity both for plans against the objectives in the procedures and activities sections and I note it's fairly similar to the previous iteration 5 years ago. Greater clarity here on the work and most importantly on dissemination strategies would strengthen the proposal.

Midterm Reviews:

Proj #	Title	NCRA AA	Chris' Comments	MRC Recommendations
NC7	Conservation, Management, Enhancement and Utilization of Plant Genetic Resources	K. Lamkey, IA (24)	Excellent AA review, excellent NCAC1 and 4 reviews	Recommend continuation.
NC1200	Regulation of Photosynthetic Processes	C. Benning, MI (11)	Excellent AA review, good reporting and meeting activity.	Recommend continuation.
NCCC215	Potato Breeding and Genetics Technical Committee	J. Blanton, IL (24)	No AA or NAC reviews submitted, so Chris went through past activity and reports.	Functional, active group with good meeting attendance. They publish quite a bit and have received significant external funding. They host workshops and go successful outreach, so overall, a good coordinating committee. Recommend continuation of this good work.
NCERA103	Specialized Soil Amendments and Products, Growth Stimulants and Soil Fertility Management Programs	C. Rosen, MN (09)	Excellent AA and NCAC4 reviews, good reporting and meeting activity.	Recommend continuation.
NCERA184	Management of Small Grains	K. Lamkey, IA (06)	Excellent AA review, excellent NCAC1 and 14 reviews	Recommend continuation.

NCERA180	Precision Agriculture Technologies for Food, Fiber, and Energy Production	K. Muthukumarappan (Muthu), SD (22)	Good AA review. Small group decent reporting, but could improve linkages. Also, can they combine with S1069 since many members are on both? Fair NCAC1 review, with a request to improve collaborations and communications/impacts to stakeholders. Excellent NCAC16 review.	Recommend continuation.
NC1202	Enteric Diseases of Swine and Cattle: Prevention, Control and Food Safety	M. Saqui Salces, MN (23)	Excellent AA review, good reporting and meeting activity. Good NCAC6 review, with suggestion to continue to work on true multistate collaborations and include these and their efforts in future reports. Same review comments for NCAC2.	Recommend continuation.
NC1206	Antimicrobial Resistance	J. Averill, MI (23)	Excellent AA review, active project with good reporting. Excellent NCAC2 review.	Recommend continuation.
NCERA224	IPM Strategies for Arthropod Pests and Diseases in Nurseries and Landscapes	S. Jose, MO (23)	Good AA review, but future reports must reflect the multistate nature of the committee. Chris and Shibu are working on this with them. Good NCAC15 review that concurs with Chris' assessment.	Recommend continuation with the stipulation that they improve linkages, and future reports must reflect the multistate nature of the committee. They are proactively working on this, and I am excited to see what they look like, going forward. Great attendance on the improvement discussion Zoom Chris had with them, so there's clear dedication.

NC140	Improving Economic and Environmental Sustainability in Tree-fruit Production Through Changes in Rootstock Use	T. Runge, WI (24)	Good AA review. Good NCAC4 review.	Recommend continuation.
NC1201	Methods to Increase Reproductive Efficiency in Cattle	G. Smith, MI (17)	Excellent AA and NCAC6 reviews.	Recommend continuation.
NCERA225	Implementation and Strategies for National Beef Cattle Genetic Evaluation	J. Bormann, KS (24)	Excellent AA and good NCAC6 reviews.	Recommend continuation.
NC1198	Renewing an Agriculture of the Middle: Value Chain Design, Policy Approaches, Environmental and Social Impacts	W. Nganje, ND (21)	Excellent AA review, good reporting and meeting activity. Working towards objectives, good linkages, and significant external funding. Good NCAC12 review.	Recommend continuation.
NC170	Personal Protective Technologies for Current and Emerging Occupational Hazards	L. Boorady, OK (23)	Excellent AA review, good reporting and meeting activity. Working towards objectives, good linkages, and significant external funding. Good NCAC6 review.	Recommend continuation.

NC1189	Understanding and managing scale and connectivity in inland and marine fisheries as coupled human and natural systems	D. Infante, MI (21)	No AA review, but good NCAC24 review.	Recommend continuation: The project is successfully addressing its objectives, with strong accomplishments, collaboration, and knowledge-sharing efforts. Moving forward, focusing on securing external funding and documenting impacts in detail will strengthen the project – why is the work you're doing changing lives/making a difference, etc. Missing the 2024 annual report, so Chris reached out with a reminder.

Item 4.0: agInnovation 2025 Excellence in Multistate Research Award – NC Winner Selection

(Double click on nomination objects below to open full document.)

STC 2025 Award Call

STC_RESEARCH_AWARD_CALL_2025_FIN

NC246's Nomination Packet

NC-246 Multistate Award nomination 2

Item 5.0: MRC Next Steps – Chris

- Action needed: None, for information only.
- MRC Chair (Derek) presents seconded motions to full agNC membership on 4/8/2025.
- Once agNC approves the MRC motions, Chris will send approvals/revisions to all renewing projects.
- Projects have until 6/1/2025 to complete revisions, then revised proposals are sent back to MRC lead reviewer for review and approval.
- Once approved, projects are marked as Approved in NIMSS. Approved renewals start 10/1/2025.
- Derek rotates off MRC 9/30/2025, then Joleen takes over as MRC Chair on 10/1/2025.

Item 6.0: New MRC Member Nominations:

- New MRC member suggestions for FFY26 start.
- Ideas: Frank Casey, John McEvoy, Ron Turco, Danny Singh

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agNC Initiatives

1. Showcasing Our Impact
2. Strengthening Partnerships
3. Celebrating Our Excellence

Launched in September 2024

1. Showcasing Our Impact

Highlighted impacts from 1862, 1890 and 1994 institutions

1. National Impact Database (landgrantimpacts.org)

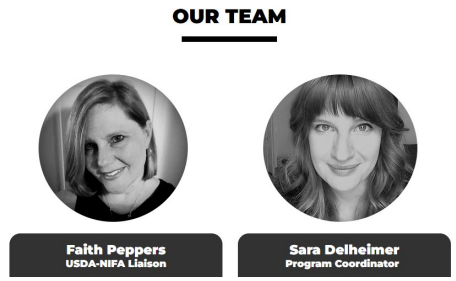
a. There have been 70 agNC research stories uploaded in the past 12 months

b. 28 in the last quarter

c. Purdue leads with 21 stories (only 13 in September ‘24)

d. MU has 5 (0 in Set ‘24)

2. Multistate Research Fund Impacts (mrfimpacts.org)



Participation in the USDA Ag Outlook Forum 2025, February 27-28, Washington DC

2. Strengthening Partnerships

Highlighted impacts from 1862, 1890 and 1994 institutions

Visit to Lincoln University of Missouri (March)

- **Continuing our discussion around our shared vision and priorities for our region with NCCEA** (extension directors in our region). Robin and Jeanette planning a joint planning session during mini-LGU in June.
- **Strengthening our relationship with CARET, including reimagining our mini-LGU meeting** to strengthen its impact and value for all participants. Chairs of agNC (Shibu) and NCCEA (Charlie), Jeanette and Robin are working with CARET leaders Ben Steffan (UNL) and Connie Kays (K-State); Met at APLU with AHS Chair Chris Daubert and Doug Steele

3. Celebrating Our Excellence

- Three new regional awards:
  - Early and Mid Career Excellence in ag Innovation
  - Engagement and Accessibility Award
- Nominations have been solicited (March 30, 2025)
- NAC will be reviewing the nominations

Thank you to the Nominations and Award Committee for their thoughtful and hard work on the development and delivery of these important regional awards. Hector will share more info later

CFAES

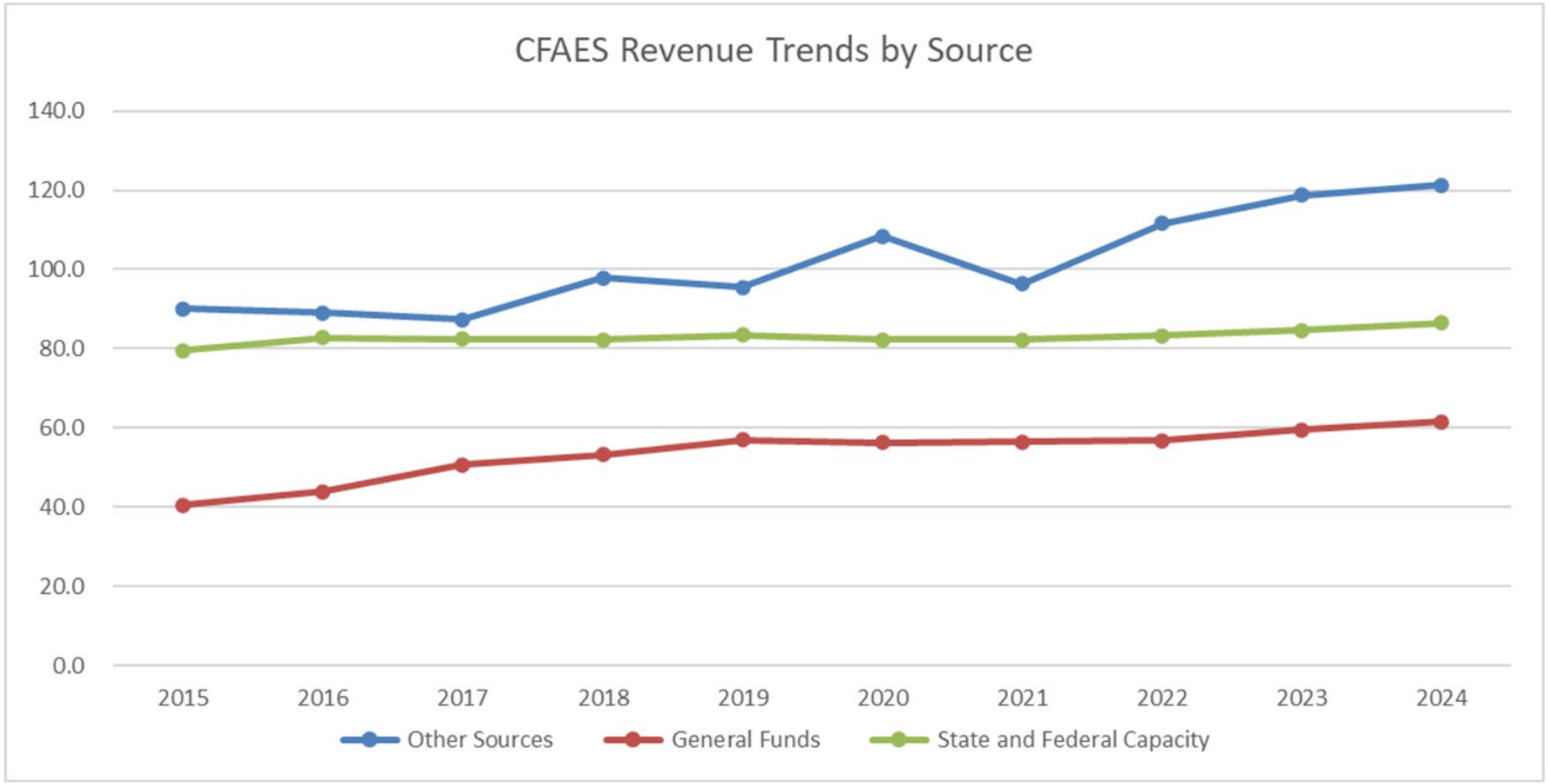
Defining our Funding Obligations: State and Federal Capacity Funds

agInnovations North Central April 2025

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

Goals for Project

- Educate on how capacity funds are currently used with the associated limitations
- Identify a process by which we can determine our obligations for allocating state and federal capacity funds
- Gather input on a preliminary framework as a starting point


CFAES Revenue Trends by Source
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
Other Sources
General Funds
State and Federal Capacity

CFAES

	CFAES Capacity Funds Distribution			
	State Line for Research $37.1M	State Line for Extension $25.5M	Federal Line for Research $8.8M	Federal Line for Extension $12.2M
Academic Departments				
Centers (Piketon $ Stone Lab)				
OSU Extension				
CFAES Operations				
Research and Graduate Education				
Central Units				

Capacity Funds

- State and Federal funds for research and extension
- State: OARDC and OSUE
- Federal: Hatch, Hatch Multistate, Smith Lever, McIntire-Stennis, Animal Health
- Legislative language
  - Federal government gives latitude to the states
  - State language is broad

Federal Legislative Language: Research

SEC. 2. 7 U.S.C. 361b

It shall be the object and duty of the State agricultural experiment stations through the expenditure of the appropriations hereinafter authorized to conduct original and other researches, investigations, and experiments bearing directly on and contributing to the establishment and maintenance of a permanent and effective agricultural industry of the United States, including researches basic to the problems of agriculture in its broadest aspects, and such investigations as have for their purpose the development and improvement of the rural home and rural life and the maximum contribution by agriculture to the welfare of the consumer, as may be deemed advisable, having due regard to the varying conditions and needs of the respective states.

State Legislative Language: Research

Ohio Revised Code 3335.56 Ohio agricultural research and development center. There is hereby created the Ohio Agricultural Research and Development Center (OARDC), for the pursuit of basic and applied research in agriculture, natural resources, and related subjects essential to the continued development of the state's agricultural industry and natural resources.

. . . OARDC shall be under the custody and control of the board of trustees of the university and shall consist of all moneys appropriated, given, granted, or bequeathed to the center or to the university for the center's use by the United States, this state, any political subdivision of this state, or any person.

Federal Legislative Language: Extension

SEC. 2. ø7 U.S.C. 342

Cooperative agricultural Extension work shall consist of the development of practical applications of research knowledge and giving of instruction and practical demonstrations of existing or improved practices or technologies in agriculture, uses of solar energy with respect to agriculture, home economics, and rural energy, and subjects relating thereto. . .

. . . and this work shall be carried on in such manner as may be mutually agreed upon by the Secretary of Agriculture and the State agricultural college or colleges . . .

State Legislative Language: Extension

Ohio Revised Code 3335.36 The employees shall cooperate with the department of agriculture, the Ohio agricultural research and development center, the department of education and workforce, and the United States department of agriculture, for the purpose of making available the educational materials of OSU extension. The employees shall represent the university and shall conduct educational activities related to agriculture, natural resources, community development, family and consumer sciences, and 4-H programs for the citizens of this state through personal instruction, bulletins, practical demonstrations, mass media, and otherwise, subject to such rules as may be prescribed by the board of trustees of the university.

Sequence

- Committee developed preliminary framework
- Chairs/cabinet retreat
- Committee/individual meetings with unit leaders
- VPAC
- Focus Groups; six, invitation only
- VPAC
- Chairs/cabinet retreat

Capacity Funds

- Publicly appropriated dollars are getting increased scrutiny; budget actions at federal level are filtering down to the states
- Are we supporting appropriate activities relative to our obligations for receiving these funds?
- Is our support of stakeholder interests aligned properly and adequately prioritized?
- Are we maximizing the return on investment for public funds relative to the needs of Ohio?
- Does our staff and infrastructure align with these needs?

Capacity Funds

- Preliminary framework: Define core areas to support while still maintaining sufficient flexibility. Determine relative level of support for research and extension.
- Goals:
  - Defensible process: Elected officials and external stakeholders
  - Useful for hiring decisions/resource allocation
- Will not define all that we do, but rather our core activities serving capacity funding
- Cannot be everything to everyone

How do you define core areas?

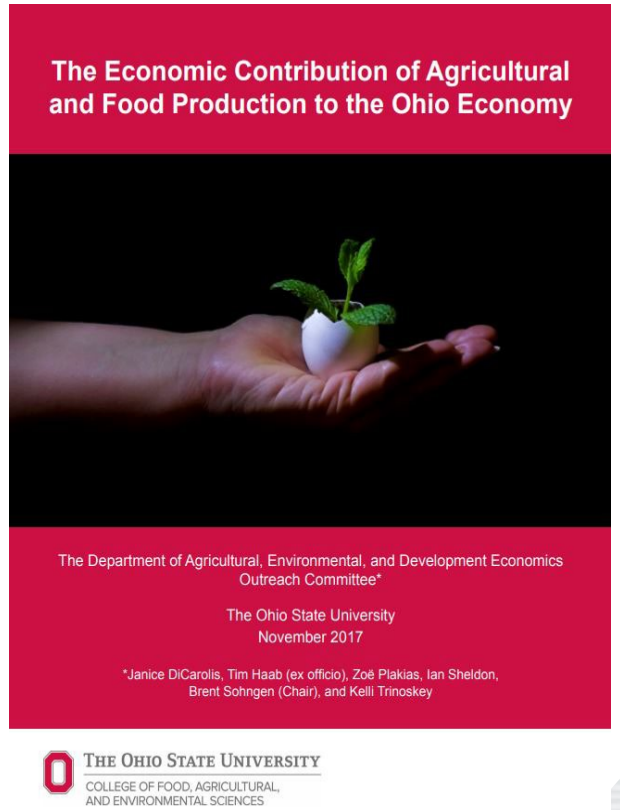
- Federal and state legislation
- What components of ANR have the greatest impact on the state economy?
- Stakeholder needs
- Demographics and human resources
- Natural resources of the state
- Land use, urban/rural distribution
- Industry base serving ANR
- Capabilities: Talent and infrastructure

Data Sources

- Agricultural census
- Report: Economic Contribution of Agriculture and Food Production to the Ohio Economy
- Stakeholder assessments
- Report: Economic Valuation of Natural Areas in Ohio
- Report: Ohio's Forest Economy
- Professional judgement

Core Areas

1. Economic Drivers from Agriculture and Food Production
2. Environmental Issues
    a) Climate
    b) Water quality
3. Natural Resources
    a) Forest
    b) Wildlife
    c) Fisheries
    d) Soil



Core Areas

4. Human Nutrition
    a) Food access and health
    b) Nutrition security health
    c) Macro/micronutrients
    d) Absorption and microbiome
5. Economics
    a) Marketing
    b) Finance
    c) Financial literacy
6. Legislation and Policy
    a) Farm Bill
    b) Farm programs
    c) Nutrition programs

Core Areas

7. Workforce and Leadership Development
    a) Create, sustain and retain a viable workforce
    b) Foster leadership development
8. Youth Development
    a) STEM
    b) Agriculture and natural resources
    c) Healthy living
9. Family and Consumer Sciences
    a) Financial literacy
    b) Healthy people and relationships

Core Areas

10. Education and Communication
    a) Advance effective communication
    b) Enhance educational practices
    c) Engage stakeholders
11. Emerging Needs and Opportunities
    a) Unforeseen challenges
    b) Emerging trends: AI, biomanufacturing, alternative protein sources, OSU initiatives, etc

Factors to consider in determining relative levels of R & E support

- Value added to GSP, jobs
- Vertical integration within industry
- Amount of processing within Ohio
- Research/Extension opportunities/needs
- Extramural funding opportunities
- Economic driver or has an impact on drivers

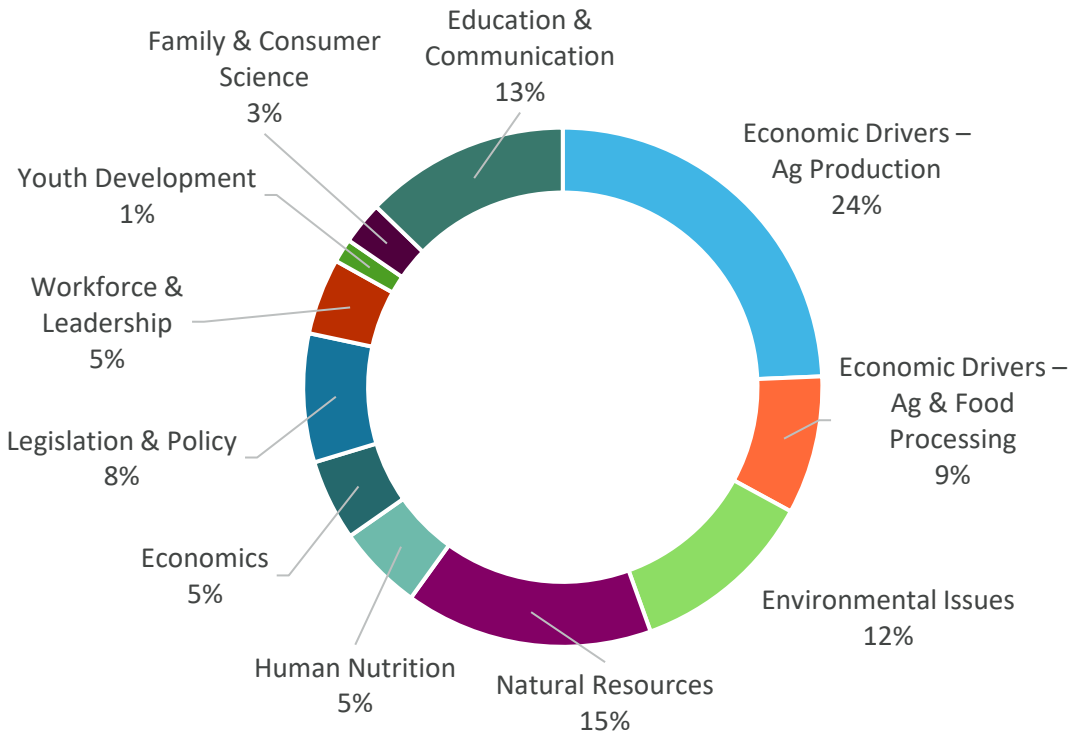
Example: Economic Drivers – Ag Production

	Summary Needs			
Economic Driver	**Research**		**Extension**	**Additional Notes**
	Topics	Funding		
Dairy	H	M	H	Small dairies rely on Extension
Hogs	H	L	L	Industry supplies many of their own needs, health issues
Beef	M	L	M	Mostly small operations, cow-calf
Poultry	H	M	M	Industry Extension needs low, backyard flock and 4-H needs for Extension high, significant health issues
Soybeans	H	H	H	Highest value and acreage cash crop in Ohio
Corn/Wheat	M	M	H	Strong Extension needs; corn >>> wheat; breeding for wheat only
Hay/Forages	H	L	H	Wide variety of species and production systems
Fruits/Vegetables	H	L	H	8 crops @ >1000 acres; 11 crops @ 200-1000 acres; individuals will need to cover multiple crops; includes grapes for wine production; urban agriculture and Master Gardeners
Greenhouse/Nursery Floriculture/Turf	M	L	H	Strong Extension needs in urban areas; Master Gardeners; commercial horticulture
Forestry/Hunting/Fishing	M	M	M	Extension needs for small landowners, supports tourism industry

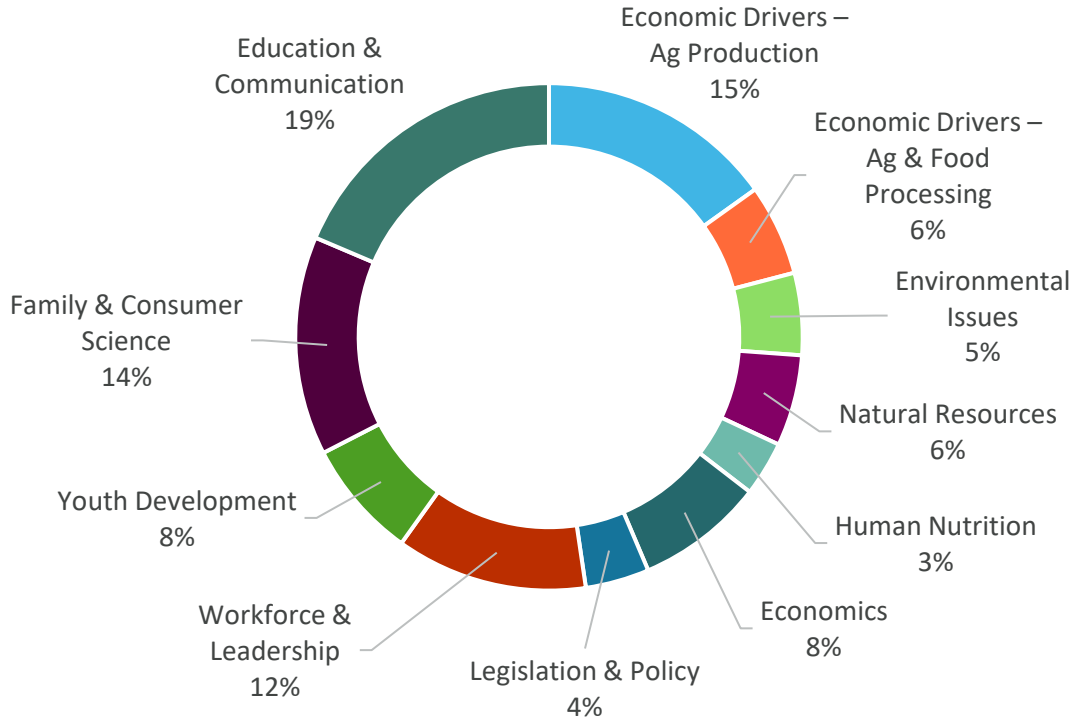
Example: Youth Development and FACS

	Summary Needs		
Core Area	Research	Extension	Additional Notes
Youth development			
STEM	L	H	Pipeline for academic programs
Ag and natural resources	L	H	Small ruminants, equine important for youth development and teaching, backyard flocks
Healthy living	L	H	Healthy habits transition to adulthood
Family and consumer sciences			
Financial literacy	L	H	Significant impacts on household finances and individual/family stability
Healthy people and relationships	L	H	Economic impact through disease prevention/management, mental wellness, family and community resiliency

Percentage of Non-EXT Faculty Mapped to Each Core Area



Percentage of EXT Faculty* Mapped to Each Core Area

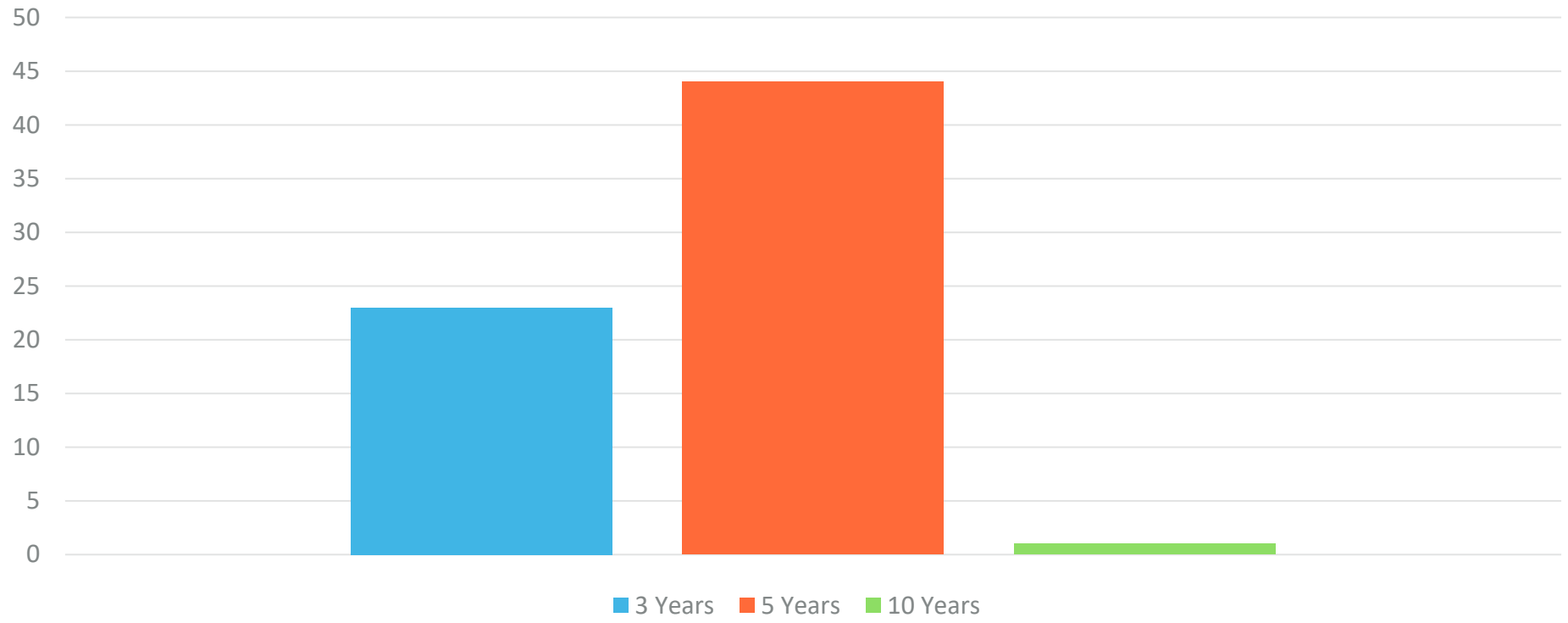


*EXT Faculty include all faculty with EXT appointments of 50% or greater.

What other forms of data should we consult to guide a process?

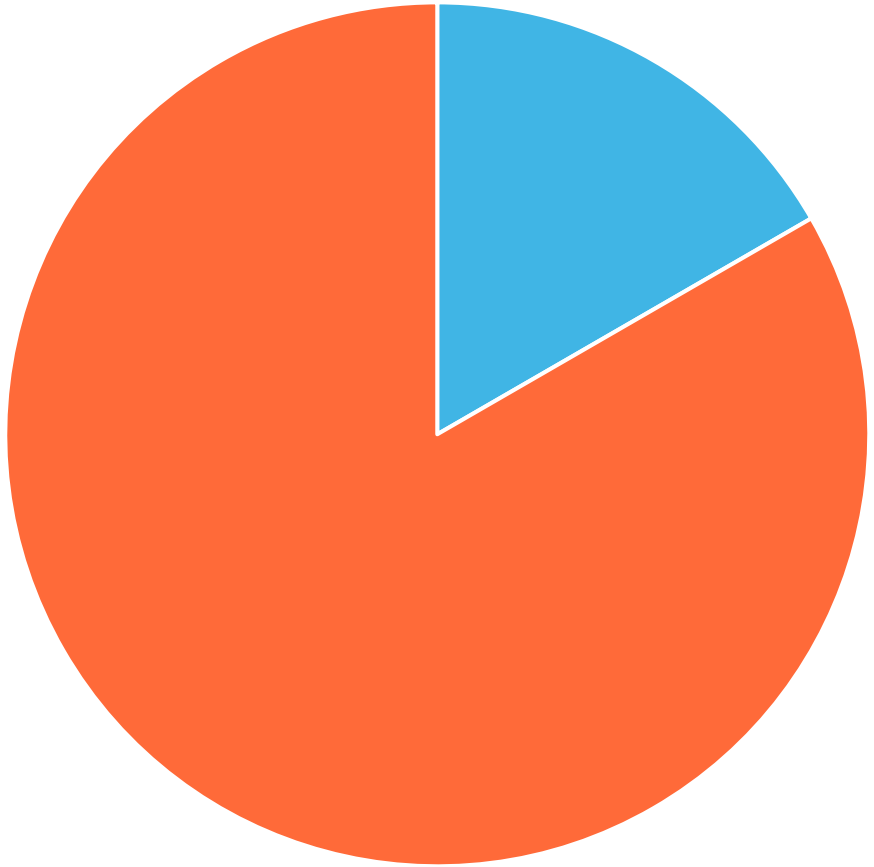
- Employer/Stakeholder data to inform future (not just current or past) needs.
- Land-grant mission and niches
- Emerging trends and urgency of the public need.
- ROI
- Productivity of people receiving the funds-measured outcomes
- How does it advance our purpose to sustain life

How often should we run a process to determine funding decisions?



Capacity funds should:

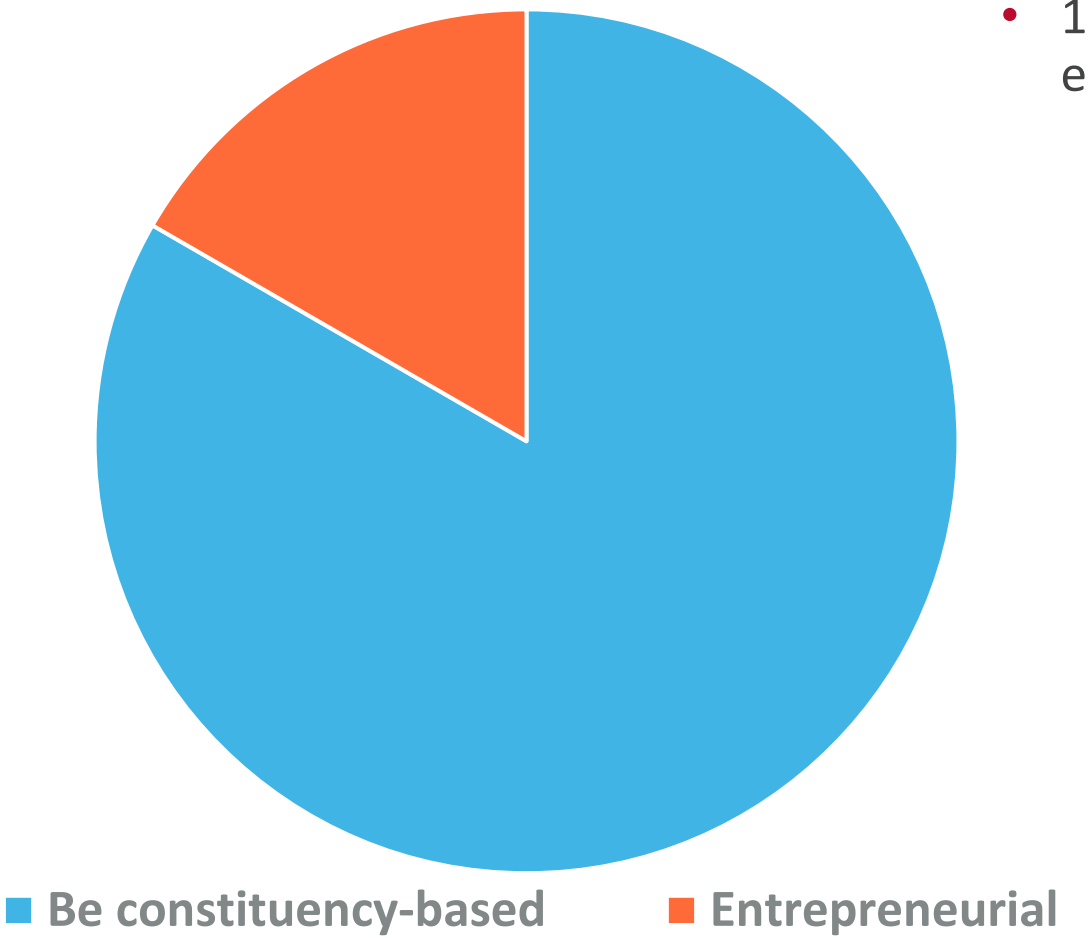
- 1 session skewed toward long-standing, ongoing programs



- 5 sessions skewed toward ideas and innovations

Capacity funds should:

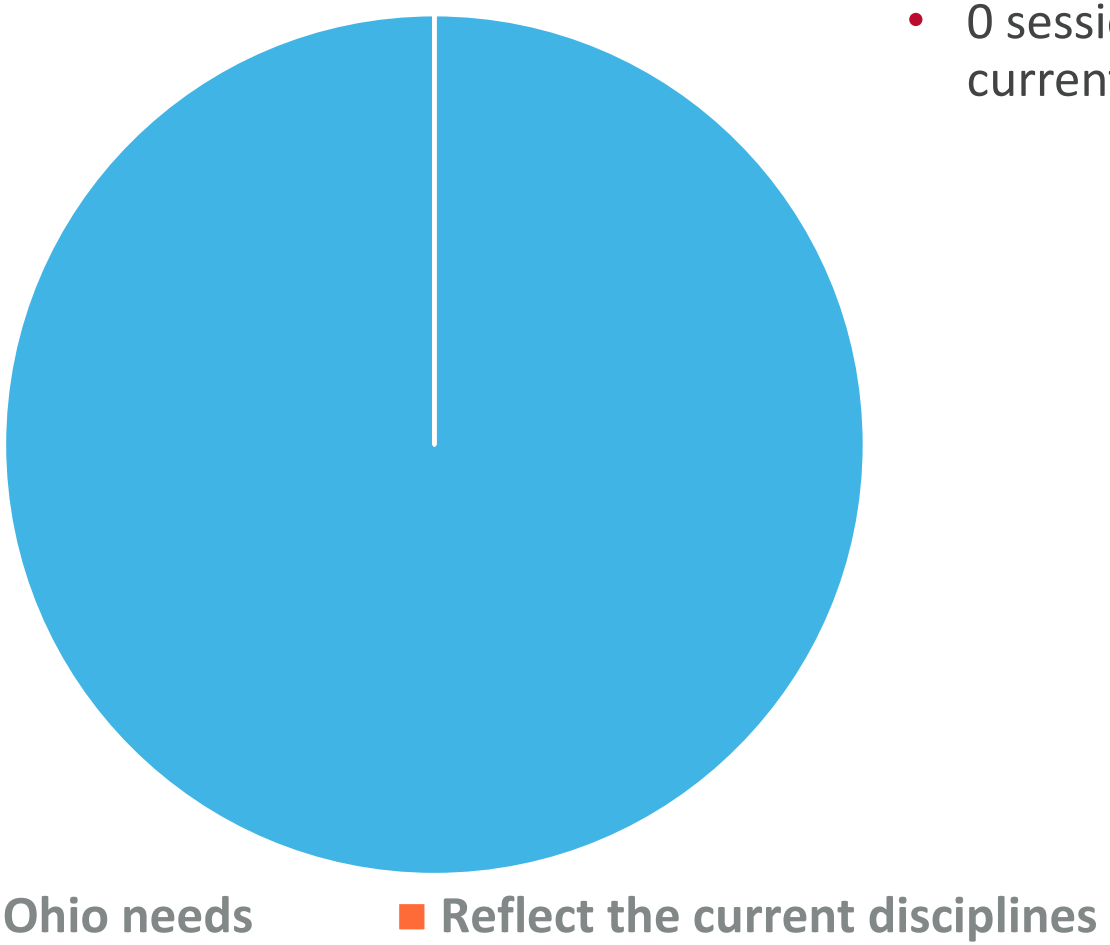
- 5 sessions skewed toward constituency-based



- 1 session skewed toward entrepreneurial

Capacity funds should:

- 6 sessions skewed toward Ohio needs
- 0 sessions skewed toward current disciplines



Challenges

- People/topics feeling left out
- Alienating stakeholder groups
- Connection with academic programs
- Separating what you are from what you should be
- Identifying weaknesses that are difficult to address
- Significant changes are difficult: Steering an aircraft carrier with a canoe paddle (Fred Cholick)

Next Steps

- Engage groups to receive feedback – Town Hall meetings
  - Identify processes/strategies to determine funding priorities should our capacity funding situation change.
- Continue infrastructure mapping
- Brief report, external audience: 3-5 year interval, align with revision of "Economic Contributions" report (due for update)
- Align with CFAES Strategic Alignment and Plan, and master planning efforts; Themes initiative
- Utilize for advocacy and resource allocation

NRCRD Update

April 2025

Maria I. Marshall
Professor, James and Lois Ackerman Endowed Chair in Agricultural Economics
Director, NCRCRD

NORTH CENTRAL REGIONAL CENTER
FOR RURAL DEVELOPMENT

Board of Directors

- Angie Abbot, Purdue University
- Francis (Frank) Arpan, Haskell Indian Nations University
- Elizabeth Dobis, USDA Economic Research Service
- Mary Emory, University of Nebraska-Lincoln (chair)
- Lynette Flage, North Dakota State University
- Sarah Rocker, USDA NIFA
- Ron Turco, Purdue University

Advisory Committee Members

- Zach Kennedy, University of Illinois
- Thomas Krumel, North Dakota State University
- Xinyi Qian, University of Minnesota
- Corinne Valdivia, University of Missouri
- Rial Carver, Kansas State University
- Himar Hernandez, Iowa Sate University

Program Leaders

- *4-H:* Tim Tanner, South Dakota State University
- *Community Development:* Dave Ivan, Michigan State University
- *Family & Consumer Science*: Pat Pebo, The Ohio State University,

NIFA Funding

Year	RRDC Funding	Amount to NCRCRD
2020	$2 million	$474,880
2021	$2 million	$494,880
2022	$2.5 million	$599,900
2023	$3 million	$704,232
2024	$2.6 million	$617,000
2025	?	

Indirect costs are not allowed.

Current Priorities and Activities

We approach all our endeavors from three thematic areas:

Creating Resilient Communities & Economies

Developing Leadership and Civic Engagement

Promoting Community Health and Wellness

NCRCRD activities seek to promote regional collaboration through

- **Elevating the research and extension** programs in our region;
- Offering **grant opportunities** to support new and ongoing regional research, extension, and integrated activities;
- Establishing a **North Central Region dataset** to encourage regional exploration; and
- **Creating networking opportunities** through webinars, sponsorships, and making introductions between our partners.

Activities

- Small Grants
- Faculty Fellows
- Working Groups
- NCR-Stat Database

Approximately 50% of core funds go toward these initiatives.

Recruiting and Retaining in Rural America
Emphasis Areas for 2024-2025

NCR-Stat:

- Baseline 2024 (expanded to Southern and Northeast region)

Rural Small Businesses and Workforce Development

- NCR-Stat: Small Business
- SB curriculum focused on substance misuse-Recovery friendly workplaces
- Rural Recreation Economy

Caregiving

- 2 Fellows finished work
- 1 new fellow (University of Missouri)

Housing

- Working group led by Iowa State
- 2 Fellows – one continuing into 2026

Placemaking

- New working group led by University of Wisconsin

Graduate & Undergraduate Students

- Remote work
- Food sufficiency and health
- Copreneurs
- Recovery friendly workplaces

Some Stats

- Total funds awarded to grantees in 2024: $241,827
- Completed grants and fellows
  - 16 presentations; 2 datasets; 5 journal articles; 1 curriculum
- Webinar series average registrants per webinar: 113
  - YouTube channel subscribers grew 43%
- CD Extension Library:
  - Visits 103,604; Downloads 7,131
- NCR-Stat database
  - Baseline (2022); Caregiving (2024); Small Business (2024);
  - Visits: 5,404; Downloads 719
- We've visited 20 LGIs -- only 14 more to go!

New Funding in 2024

- **New Beginnings for Tribal Students**
  - 2024-2029
  - $500,000 cooperative agreement with NIFA
  - Work area: National

- **Delta Regional Authority**
  - 2024-2026
  - $600,000 cooperative agreement
  - Work area: Missouri and Illinois

NORTH CENTRAL REGIONAL CENTER
FOR RURAL DEVELOPMENT

NCRCRD.ORG

USDA National Institute of Food and Agriculture
U.S. DEPARTMENT OF AGRICULTURE

NRSP_Temp13
Artificial Intelligence for Agricultural Autonomy

Alex Thomasson

Mississippi State University

Need for Autonomous Systems

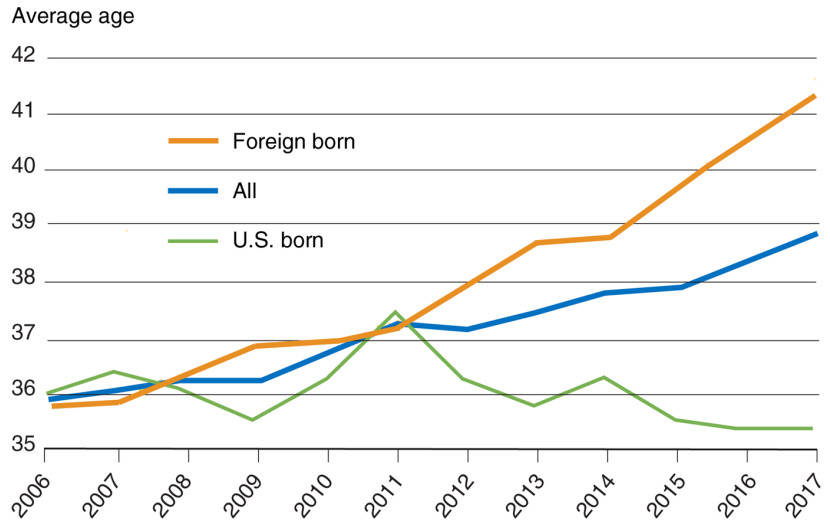
- Labor issues
- Safety and efficiency
- Higher precision and optimization

Requirements for Autonomous Systems

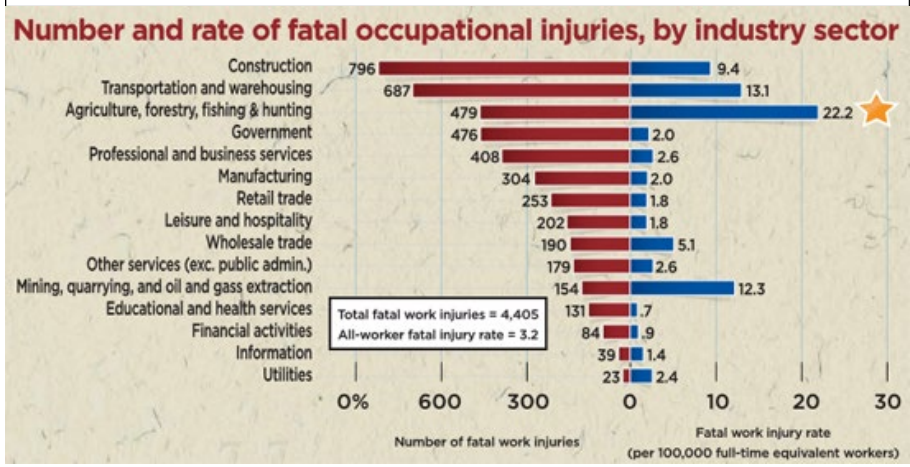
- Sensing (new smart sensors are available)
- Analytics (AI: needs vast amounts of data!)
- Actuation (wheels with motors, robotic arms, etc.)

In case you missed it . . .

Average age of U.S. hired farm laborers by place of birth, 2006–17

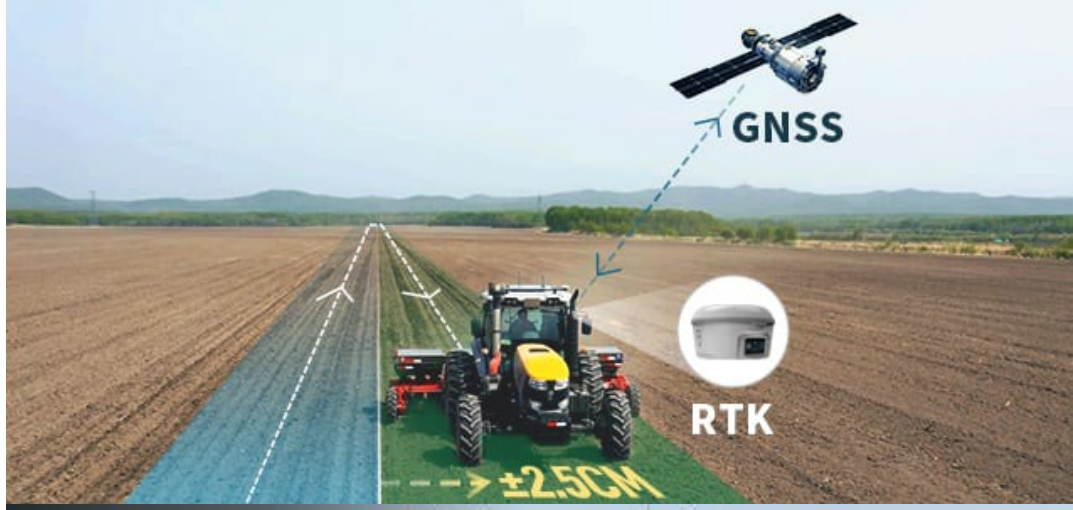


Source: USDA, Economic Research Service using data from the U.S. Census Bureau, American Community Survey, 2006–17.



Simple Solutions Being Developed

- Simple operations like tillage
- Autonomy in large flat fields; limited interaction with crops
- GPS and inertial autonomous guidance



But Complex Solutions Need ABoost

- Complex operations like fruit harvesting and pruning
- Autonomy in semi-structured fields; complex interaction with crops
- Advanced perception, decision-making, and actuation

Robotics Has Flourished in Industry

- Autonomous mobile robots in warehouse
- Robotic arms for manufacturing
- Robotic arms and grippers for medical surgery

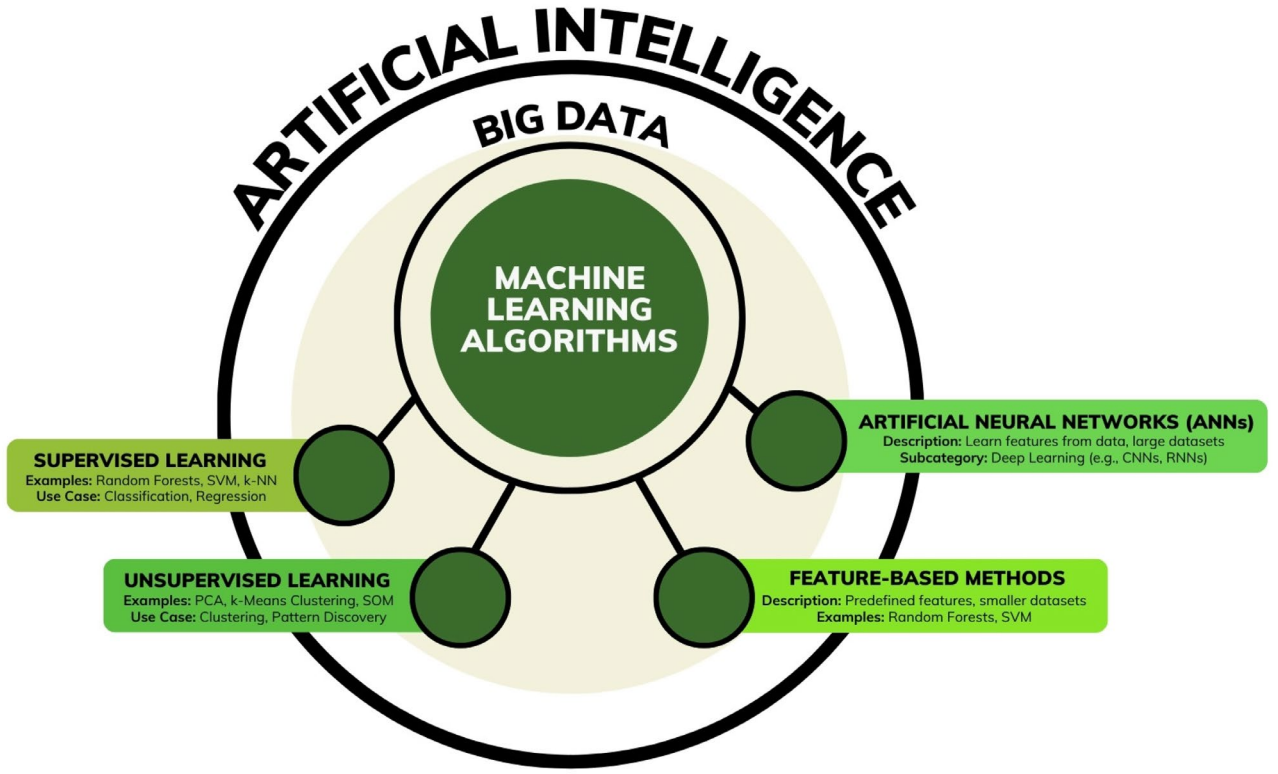
Agriculture is Much More Complex Than Industry

- Uncontrolled environment (temperature, precipitation, topography, geography, dynamic obstacles, dirt, farming systems, etc.)
- Many more variables and tasks

Our Specific Problems

- R&D on Agricultural Autonomy suffers from:
  - Gaps in data
  - Gaps in AI model development
  - Minimal collaboration

PlantVillage Dataset: images of healthy and diseased plant leaves
Agriculture-Vision Dataset: aerial images of agricultural fields with anomalies (weeds, dry areas and insect damage)
Open Images Dataset for Agriculture: images of agricultural objects including machinery, farm animals, and crops
DeepWeeds Dataset: images of weeds in Australia
CropDeep Dataset: images for crop recognition and disease detection



Objectives

1. To ***develop large, comprehensive, open-source datasets*** that make benchmark data available to researchers nationwide and span a wide range of agricultural-autonomy applications. Specific tasks are as follows:
   a. Crop Selection and Field Data Collection
   b. Enhancing Data Variability, Quality and Access
   c. Data collection and sharing standards
2. To ***build a formal collaboration with computer scientists to develop AI algorithms and architectures*** that account for the fusion of data on different geospatial and temporal time scales, that use feature engineering to maximize algorithm efficiency, and that use data that are practically available to growers and agronomic consultants. Specific tasks are as follows:
   a. Models for autonomous navigation in agricultural fields
   b. Models for automating labor-intensive agricultural operations
   c. Partnership with computer scientists to develop robust AI models

Related multistate projects

- W4009 Integrated Systems Research and Development in Automation and Sensors for Sustainability of Specialty Crops
  - Technical Lead: Vougioukas
- S1090 AI in Agroecosystems: Big Data and Smart Technology-Driven Sustainable Production
  - Technical Lead: Won Suk (Daniel) Lee
- S1098 Autonomy for Agricultural Production, Processing, and Research to Advance Food Security through Sustainable and Climate-Smart Methods
  - Technical Lead: Thomasson

Advantages of national effort

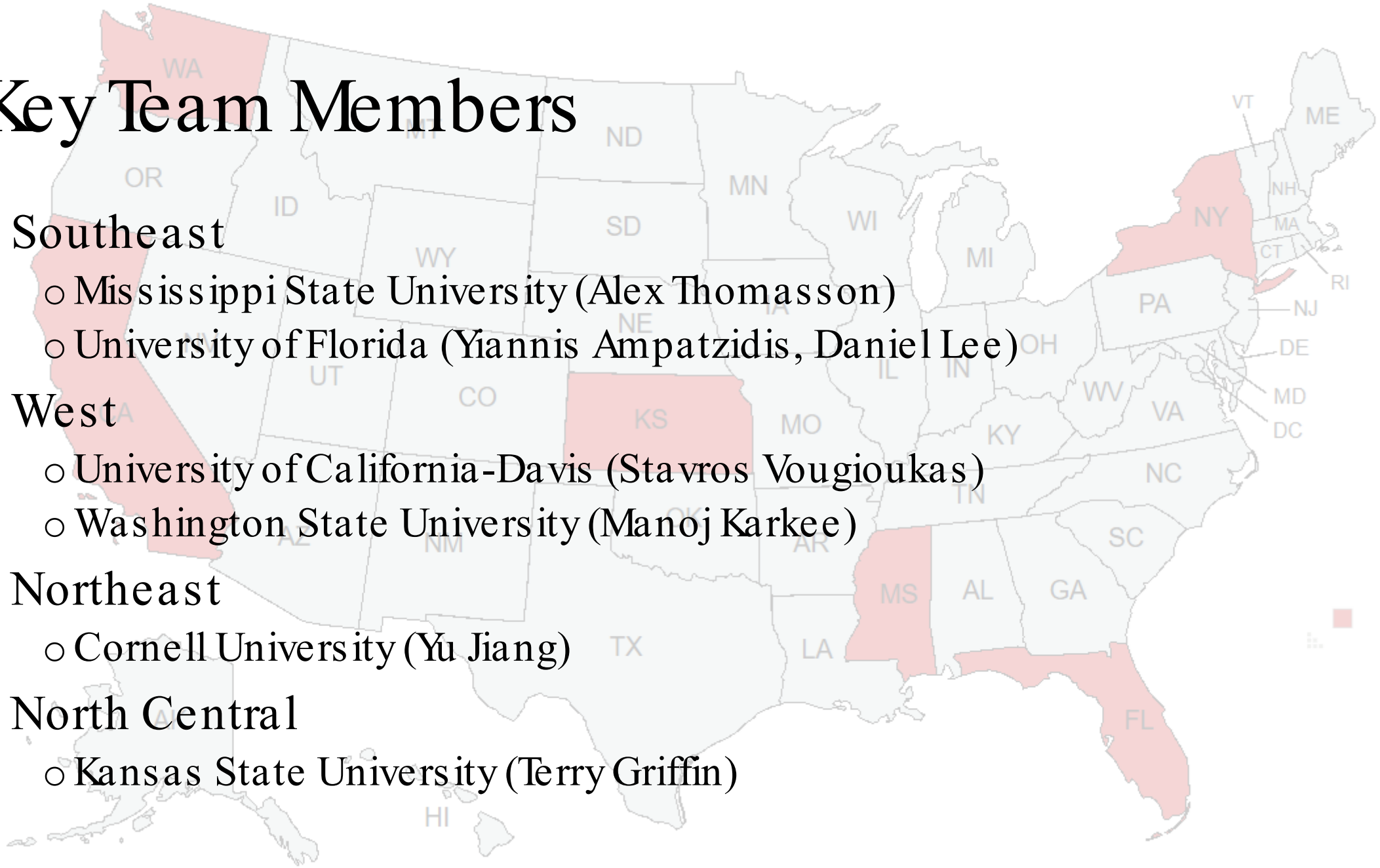
- Agricultural autonomy faces similar challenges across geographies and crops (e.g., variations in lighting and weather, occlusion due to foliage, unstructured terrain, etc.)
- The creation of data-collection standards, along with the development of large open-source databases and customized AI solutions, will benefit researchers in this field across the country
- There is a need for much greater collaboration across the country, as well as a dedicated effort to facilitate related multistate projects
- A consistent, concerted effort with national leadership, and funding to maintain that effort, is required to achieve coordinated progress in AI for autonomous systems to overcome the most challenging aspects of the problem.
  - obstacle avoidance and safety including consideration of negative obstacles
  - object detection considering occlusion
  - standardization of data collection
  - robust algorithms tailored to autonomous agricultural systems
  - etc.

Impacts

- Accelerate the progress of research in agricultural autonomy
- Move from solving very simple tasks to solving complex tasks that are the most dependent on the waning labor supply
- Provide solutions to many agricultural labor issues
- Add safety, efficiency, and quality-of-life improvements to many jobs currently requiring humans to do dull, dirty, and dangerous tasks
- Open new avenues for a greater level of precision in the optimization of crop management

Key Team Members

- Southeast
  - Mississippi State University (Alex Thomasson)
  - University of Florida (Yiannis Ampatzidis, Daniel Lee)
- West
  - University of California-Davis (Stavros Vougioukas)
  - Washington State University (Manoj Karkee)
- Northeast
  - Cornell University (Yu Jiang)
- North Central
  - Kansas State University (Terry Griffin)



Budget

- MSU will receive all funds and subcontract other institutions.
- Individual institutional yearly budgets include salaries and fringe benefits, student and postdoctoral researcher support, travel, and supplies:
  - MSU $98k
  - WSU $75k
  - UF $158k
  - UCD $88k
  - CU $37k
  - KSU $44k
- The requested funds support activities that are challenging to support with other funding, such as the development and sharing of data collection standards, open-source datasets and code libraries, researcher collaboration, and stakeholder engagement.

Business Model

- This NRSP will provide an opportunity to leverage funds from other sources to support critical agricultural autonomy research at the national level

  - Individually, the members of the leadership team are very successful in securing federal, state, commodity board, and industry grants, as well as getting support from regional experiment stations and private donors

  - The leadership team has started – and will continue - to build joint proposals to develop agricultural autonomy technologies and support related activities

IR-4 Project

NRSP-4

An agInnovation's investment in securing pest management solutions for specialty crops and specialty uses to support public well-being.

What is being done and why it matters

NRSP-4 activities, as part of the IR-4 Project, ensure that specialty crops and specialty uses have legal access to safe, effective crop protection products

- Work with growers to identify pest management voids, needs and potential solutions.
- Conduct necessary crop safety, efficacy, and residue research (MOR studies)
- Submit data to the U.S. Environmental Protection Agency (EPA) and other entities for approval of new uses

IR-4 Project

Value of NRSP-4

Modest investment (currently $481,182) supports tangible deliverables & significant impact.

- Data supports >1000 new EPA food crop registrations annually on specialty crops.
- Facilitate reasonably priced healthy food and ornamentals that enhance the environment.
- Contribute approx. **$8.97 billion** to the annual gross domestic product and 123,000 jobs

IR-4 Project

Funding

- Initial funding for IR-4 in 1963 was from SAES Directors. Renewed >10 times
  - Funding has not changed in 30 years; $490,000 in 1994 = $1.1 million in 2025 dollars
- NRSP-4 funding is highly leveraged (38:1)
- During the last mid-term review, NRSP RC acknowledged the importance & productivity of NRSP-4 but recommended a **15% cut** ($72,177).
- Pending proposal; two budgets/justifications submitted
  1. Budget according to NRSP RC recommendation ($409,005)
  2. Budget for stable funding ($481,182)

IR-4 Project

Justification for stable funding

- Continue expansion of efforts to support biopesticides, biotechnology, next-gen chemical pesticides and emerging technologies.
- Provides regulatory assistance to public sector scientists + small businesses navigating EPA registration with bio-based products
- Support Integrated Solutions Platform
  - Residue mitigation
  - Resistance management
  - Finding that “Needle in Haystack”

IR-4 Project

Thank you!

NATIONAL
ANIMAL
NUTRITION
PROGRAM

NRSP-9 Renewal: National Animal Nutrition Program

March 31, 2025

Phillip S. Miller
University of Nebras

ANIMALNUTRITION.ORG

NANP is very appreciative of the support from agInnovation and the funding of NRSP-9

- Excellent Administrative Advisors
- USDA/NIFA
- Professional societies
- NASEM
- Academic and industry scientists

NATIONAL ANIMAL NUTRITION PROGRAM

History of NRSP-9

- Discussions started in 2008
- Initial funding was awarded in 2010
- Subsequent to 2010, two additional 5-year funding cycles were successful: 2015-2020; 2020-25
- In late 2023, a working relationship with NRCS ($1.5 million) was developed to help NRCS provide resources and outreach for NRCS-producer nutrient management programs (funding and projects currently frozen). No NRSP-9 funds were used to develop this working committee

NATIONAL ANIMAL NUTRITION PROGRAM

The National Animal Nutrition Program (NANP) serves as a forum to identify high-priority animal nutrition issues and provides an integrated and systemic approach to sharing, collecting, assembling, synthesizing, and disseminating science-based information, educational tools, and enabling technologies on animal nutrition that facilitate high-priority research among agricultural species.

NATIONAL
ANIMAL
NUTRITION
PROGRAM

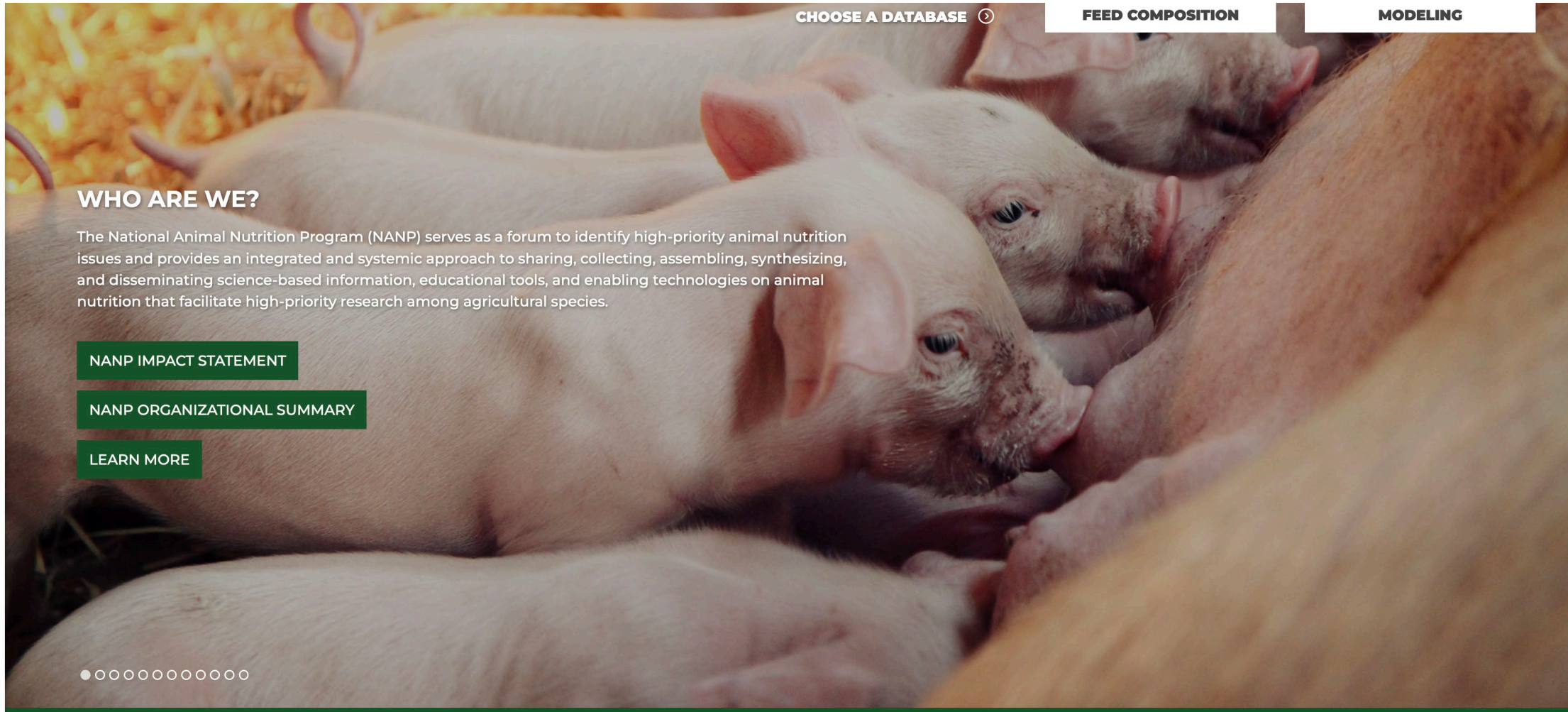
NATIONAL
ANIMAL NUTRITION
PROGRAM

- FEED COMPOSITION
- MODELING
- CLIMATE-SMART FEED MANAGEMENT
- PUBLICATIONS / EVENTS
- RESOURCES
- ABOUT
- FEEDBACK / QUESTIONS

LOGIN / REGISTER

SEARCH SITE

Connect with us



A National Research Support Project (NRSP-9)

Supported by agInnovation, the State Agricultural Experiment Stations, the Natural Resources Conservation Service, and Hatch Funds provided by the National Institute of Food and Agriculture, U.S. Department of Agriculture

Website by SURFACE 51

USDA United States Department of Agriculture - and partnered with the - Natural Resources Conservation Service

NANP Working Committees

- Coordinating Committee
  - Phil Miller
- Feed Composition Committee
  - Ryan Dilger
- Modeling Committee
  - Luis Tedeschi
- Climate-Smart Feed Management Committee
  - Luis Tedeschi

NATIONAL ANIMAL NUTRITION PROGRAM

Major Accomplishments

- Coordinating Committee
  - Overall program development
  - Review working committees activities
  - Plan and coordinate biennial Summits
  - Developed NANP 501c3 designation
    - In process: outlining marketing prospectus
  - Oversight of 2025-2030 project renewal
  - Initiated social media campaign

NATIONAL ANIMAL NUTRITION PROGRAM

Major Accomplishments

- Feed Composition Committee
  - Ingredient database: represents 95% of feed tonnage and 97% of feedstuffs for nonruminants. 90% of feed tonnage and 85% of feedstuffs for ruminants
  - The entirety of the Beef and Dairy NASEM ingredient databases are uploaded. This significantly increases the number of feedstuffs
  - Broadened the curation of feed composition data to include small ruminants, horses, aquatic species, companion animals and zoo animals
  - Integrated NANP feed composition database into Poultry NASEM report (i.e., the database will exist on the NANP website and not be published in its entirety in the hardcover report)

NATIONAL ANIMAL NUTRITION PROGRAM

Major Accomplishments

- Modeling Committee
  - Over 700 participants trained since 2017, including faculty, graduate students and industry professionals
  - As a result of these training symposia and modeling committee activities, 25 manuscripts have been published
  - Developed beta-testing protocols for NASEM software to reduce errors and enhance usability
  - Collaborated with the Feed Composition Committee to enhance model(s) accuracy using updated feed composition data
  - Continued to develop a cross-species performance modeling platform

NATIONAL ANIMAL NUTRITION PROGRAM

Goals: 2025-2030

- Develop an easily accessible and searchable feed composition database for the NASEM Swine Committee and integrate this database with others.
- Develop and foster relationships with commercial laboratories and organizations for ongoing submission of feed analyses and automated data screening methodologies. This would include expansion of ingredients to cover other species (e.g., horses, small ruminants, companion animals, aquatic, and wildlife/zoo animals).
- Target solicitation of composition data for both nutrients that are not well represented or ingredients where data are lacking.

NATIONAL ANIMAL NUTRITION PROGRAM

Goals: 2025-2030

- Expand multi-level training of modeling techniques to academic and industry nutritionists and graduate students across multiple species at professional meetings and develop online tools to provide modeling training and certification of users.
- Provide data and modeling resources in conjunction with scientific expertise to develop a Climate Smart Feed Management Committee program.
- Expand our social media platform to enhance client and stakeholder engagement.

NATIONAL ANIMAL NUTRITION PROGRAM

Goals: 2025-2030

- Development of an Application Program Interface (API) to allow users to directly engage with NANP Feed Composition records, which will also enable streamlined integration with modeling and CSFM committee efforts moving forward.
- Develop budget for 501c3 – by the end of the funding cycle (2025-2030) we expect to use funds (acquired through sponsorships, data/modeling analyses, and educational programs) of $150,000/year through the 501c3.

NATIONAL ANIMAL NUTRITION PROGRAM

Budget

- Currently requesting $1.591 million (2025-2030)
- Increase in post-doc salaries/benefits
- Website maintenance and data management
- Social media and workshops/symposia
- Anticipate to leverage over $37 million

NATIONAL
ANIMAL
NUTRITION
PROGRAM

Questions?

NATIONAL
ANIMAL
NUTRITION
PROGRAM

National Urban
Research & Extension Center

Building collaborative research and extension networks to advance the application of science with urban communities

National Urban Research and Extension Center (NUREC)

NUREC - Bridges the gap between community and research by applying the unparalleled power and reach of the land-grant university system

Director - Brad Gaolach, Washington State University Extension and Professor Dept. of Community and Economic Development

Current Projects

- Building-Integrated Agriculture
- Transforming Rural-Urban Systems
- Urban Extension Toolkit
- Career Progression for Urban Extension Professionals
- Urban Professional Competency Development Framework

National Urban Research and Extension Center (NUREC)

FOUNDING MEMBERS

CURRENT MEMBERS

University of Arizona
University of California
Colorado State University
Cornell University
University of Florida
University of Idaho
Michigan State University
University of Missouri
University of Nevada Reno
New Mexico State University
Ohio State University
Oregon State University
Washington State University

Administrative Advisors

- Brent Hales, Associate Vice President for Research & Extension, UC ANR (West)
- George Smith, Associate Dean for Research, Director of Michigan State University AgBioResearch (North Central)
- Graham (Cliff) Lamb, Director Texas A&M AgriLife Research (South)
- William Miller – Associate Director UMass Amherst Center for Agriculture, Food & the Environment

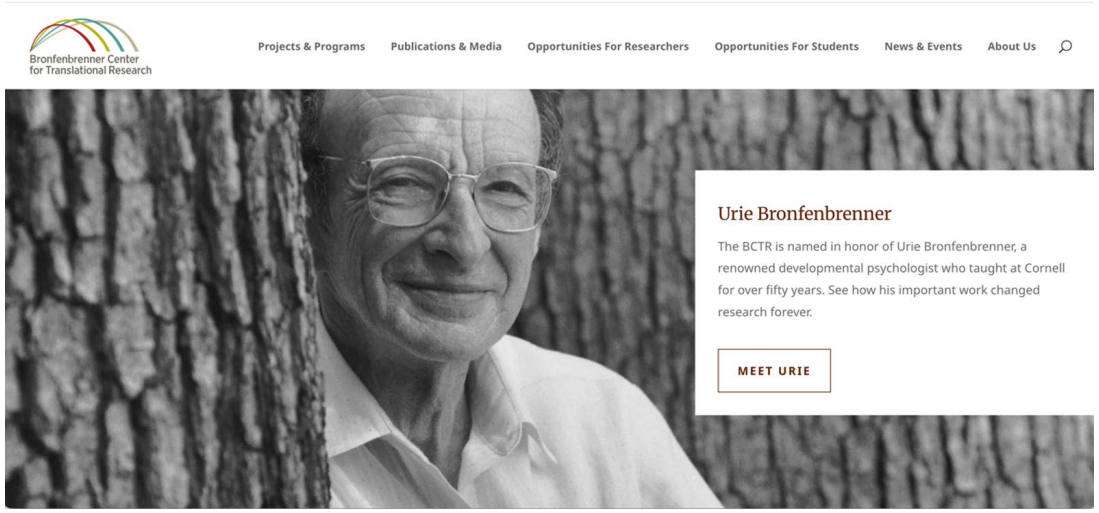
Why a National Research Support Project Focused on Urban?

Profound Demographic Changes since the Land-grant system was developed

Why an Urban National Research Support Project Focused on Integration?

25% of USDA Hatch Funds and 25% of Smith-Lever funds must be spent on Integrated (Research and Extension) activities

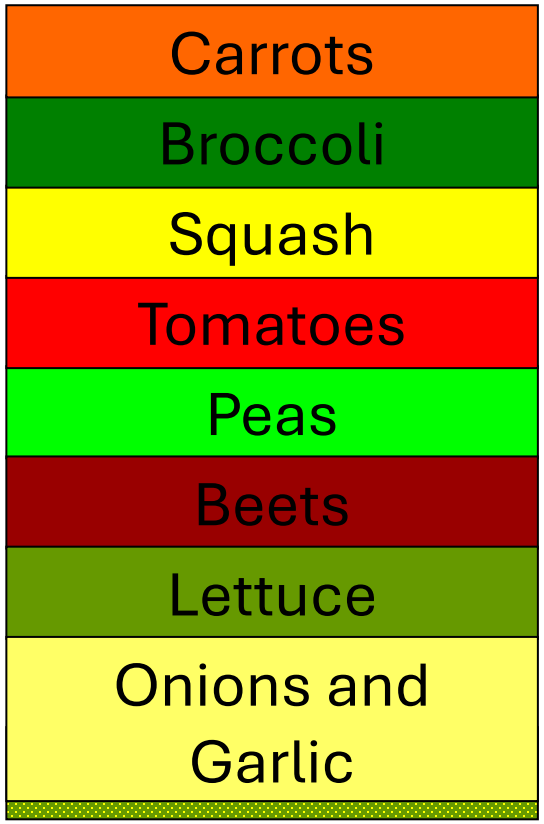
Theoretical Basis



phenomena related to the human experience is shaped by interconnected systems, ranging from immediate surroundings to broader structures (social, environmental, economic) and that these phenomena are often best (only) understood in the context within which these phenomena occur.

- Ecological Systems Theory
- Systems Thinking
- Resilience Thinking
- Socio-Ecological Systems (SES)
- Socio-Ecological Technological Systems (SETS)
- Guided Transformations

A.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Lettuce
Onions and Garlic
Corn

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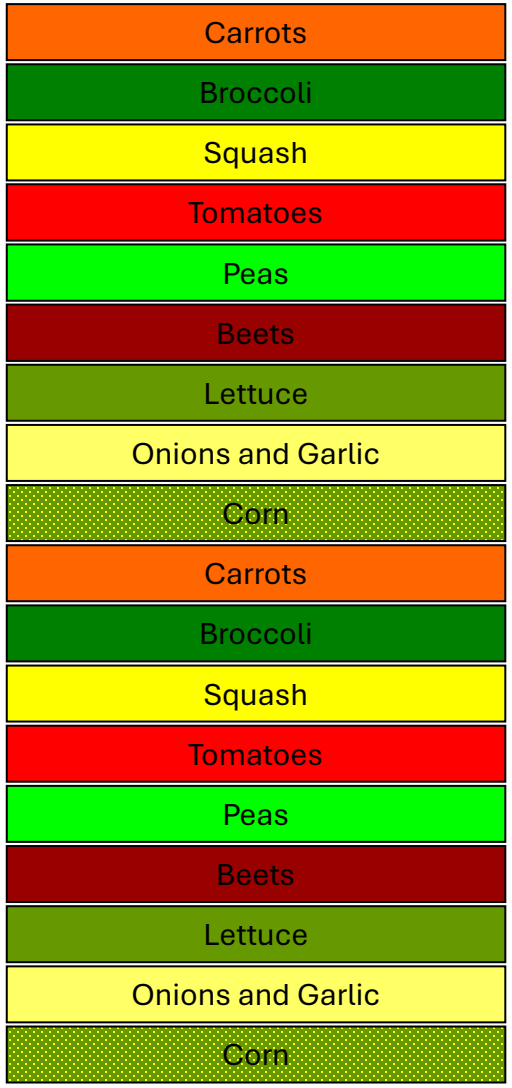
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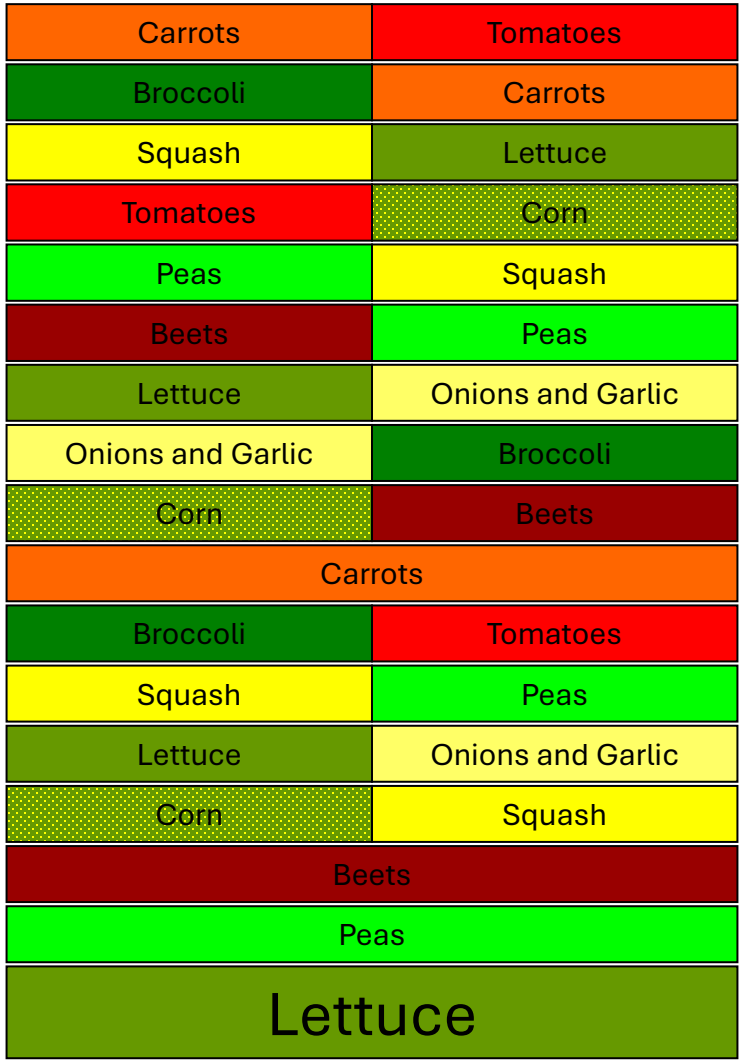
C.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Corn
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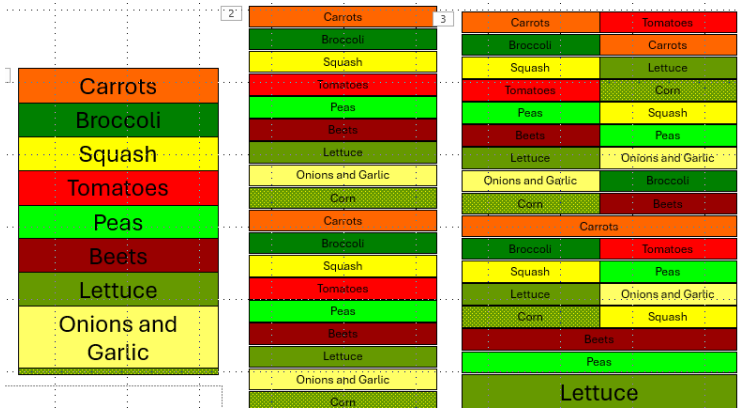
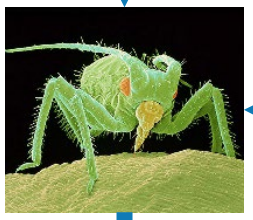
Peas
Lettuce

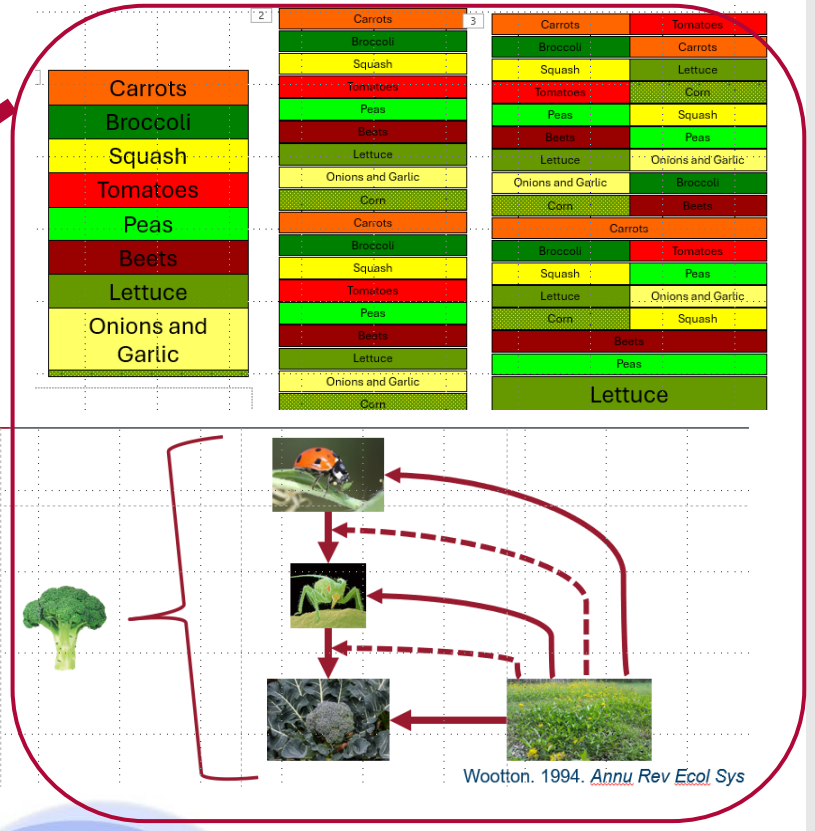


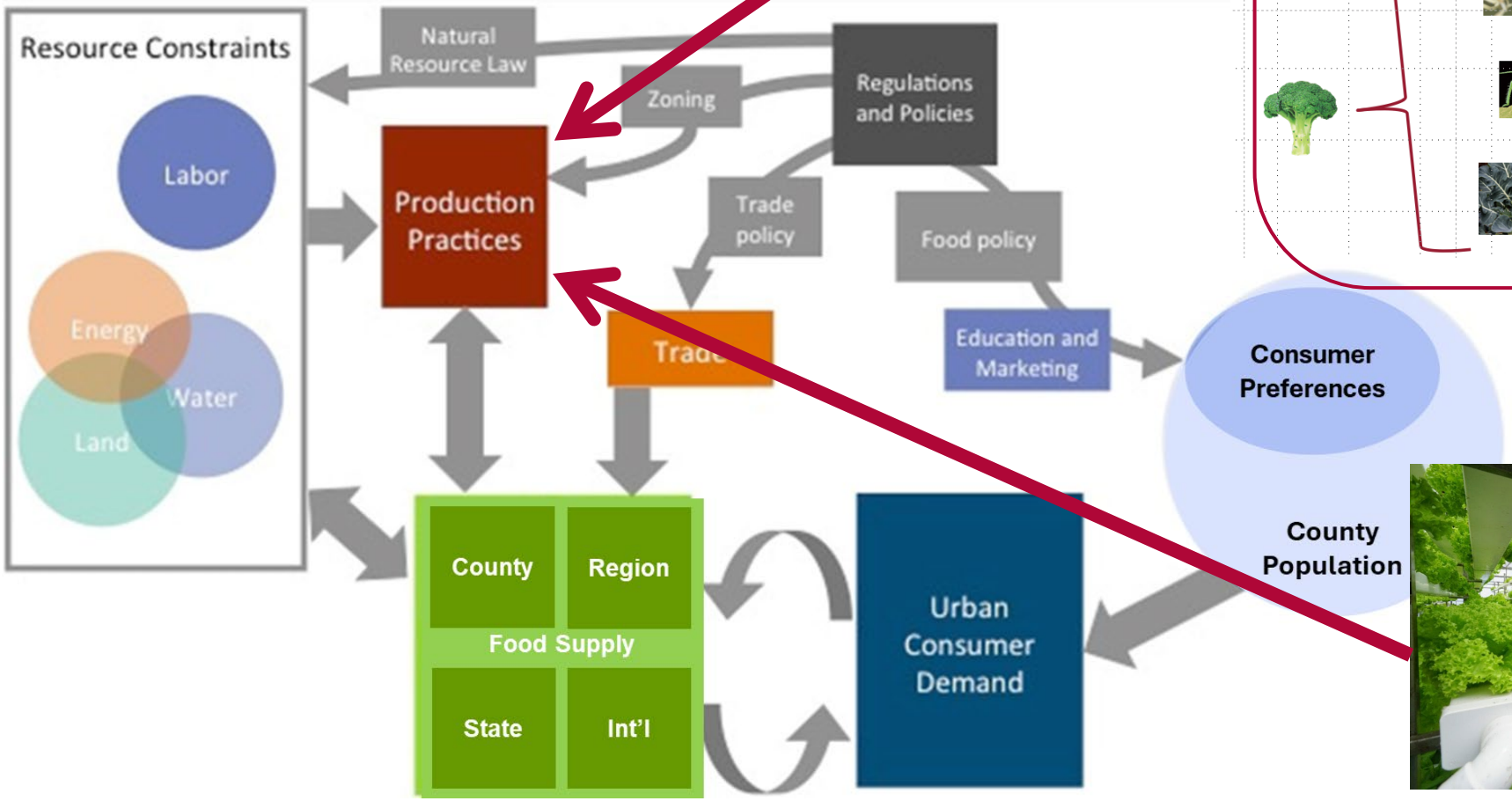


- 9 families = 36 combinations/family
- 2 plants X 6 herbivore species X 6 natural enemies = 91 2-way combinations

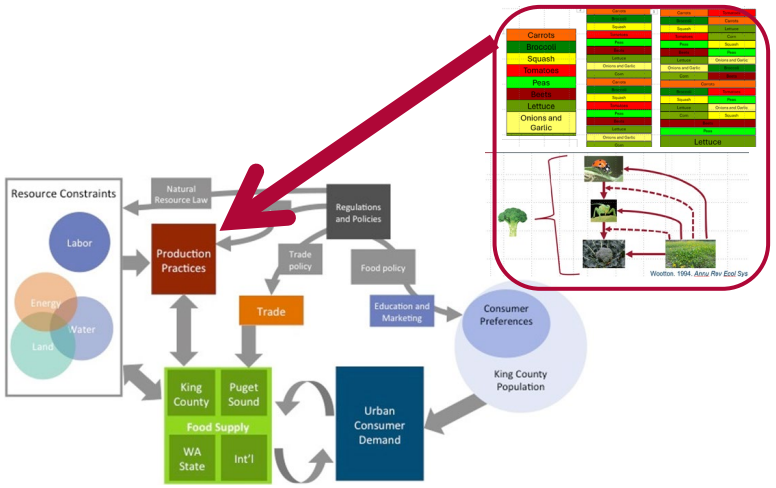
Wootton. 1994. *Annu Rev Ecol Sys*

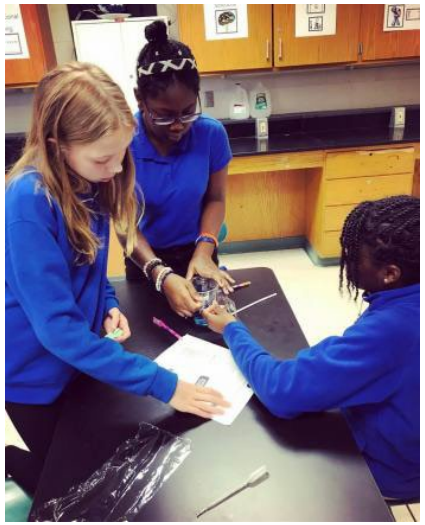
Urban Food-Energy-Water Systems (FEWS)



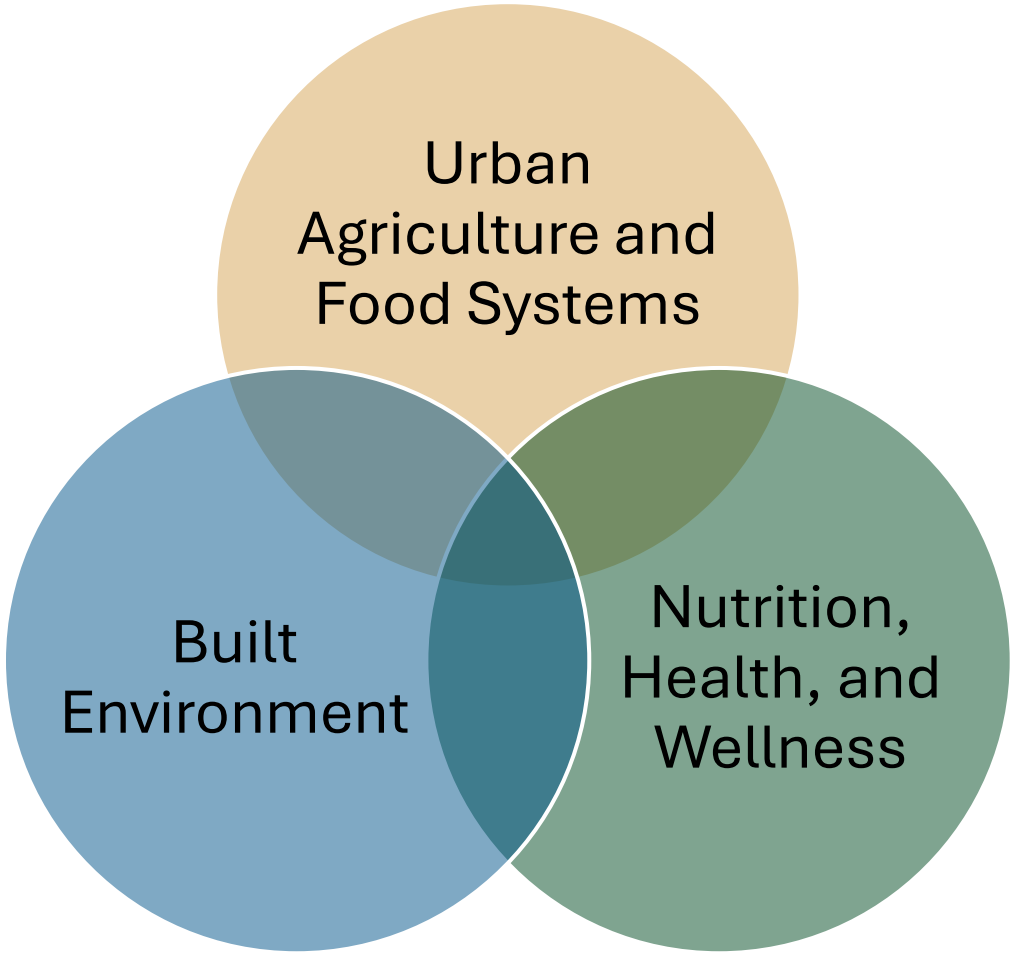


Urban Ecosystem





NRSP - Disciplinary Areas



Objective: Establish Communities of Practice

Collaborative Networks to support the development, implementation, integration and evaluation of Urban Research and Extension initiatives.

- Facilitate Collaboration among scientists, Extension professionals and Community Stakeholders
- Translate Knowledge
- Scale, Disseminate and Share Programs
- Support municipalities NGO's and citizen groups/community organizations

Objective: Professional Development

Training and resources to support the development, implementation, integration and evaluation of Urban Research and Extension initiatives.

- System approaches
- Community engagement (mutual benefit and reciprocity)
- Participatory research methods
- Collaborative Grant-writing
- Impact Evaluation

Objective: Urban Data Hub

Create, mange and provide access to data **to support the development, implementation, integration and evaluation of Urban Research and Extension initiatives**

Urban Mapping Database, Interface and Repository

- Repository of mappable data layers.
- Explore and visualize urban data to support research teams.
- The collection, storage, and distribution of information and empirical data related to research results, needs assessment and impact.

Support for Current Research

Hatch Funded Projects (Active FY 2019 through 2026)

Keyword "Urban" - 21 Projects

- Community-based urban agriculture: infrastructure, design and management (de la Pena – CA)
- Urbanization and Anthropogenic Impact on Natural Resources and Water Systems (Hargiss – ND)
- Decoding Urban Soil Landscapes – A Framework for Improving Ecosystem Services (McSweeney – IL)

Keyword "Cities" - 5 Projects

- Conserving and Creating Bird Habitat in Cities (Hostetler – FL)
- Urban Tree Ecosystem Services, Disservices, and Net Benefits (Koeser – FL)
- Water systems modeling for holistic water management in arid region (Saurav – TX)

Hatch Funded Projects (Active FY 2019 through 2026)

Keywords "Child Family Health" – 12 projects

- Neighborhood Risk, Paternal Parenting, and Early Childhood Outcomes (Yildirim – AL)
- The implications of stress for wellbeing in diverse families (Hibel – CA)
- Dynamic associations between children's outdoor experiences, physical health, and school readiness (Schmidt, IN)

Keywords "Youth Development" – 13 Projects

- Assessing youth development in 4-H: Exploring mediating and moderating, context-based processes in the elicitation of positive youth outcomes (Fogerty, FL)
- A Trauma-Informed Approach to Improving the Health and Well-Being of Children and Families (Stanton, MS)
- Examining Substance Use among Young Indiana Adolescents (Ruiz, IN)

Currently Active Hatch Multistate Projects

Keyword Search "Urban"

- NE2401 - Urban Agriculture: Equity, Sustainability, and Community Development (Dwane L Jones)
- NC2172 - Household financial and health decision-making under economic uncertainties (Carrie L Johnson)
- S1089 - Advanced Understanding and Prediction of Pollutants in Critical Landscapes in Watersheds (Mary Burrows)
  - Urban focus/expertise: Stormwater, watersheds, runoff, BMPs, Hydrology
- W2023 Understanding Recruitment and Retention in the 4H Club Program (Jacob DeDecker)

Impacts

University

- Attract funding from municipalities, federal and state agencies, businesses, and others.
- Provide opportunities for faculty & students to address real-world challenges.
- Conduit between the University and the community.
- Support community engagement.
- Access to expertise not available.

Research Faculty

- Identify collaborative research partners.
- New funding opportunities to support research and graduate students.
- Improved ability to conduct applied and translational research
- Tangible Impacts
- Scholarly products.

Business and Operating Plan

NRSP

- Project leadership
- 3 Community of Practice leaders (1 per content area)
- Professional Development team
- Urban Data Hub team
- External Evaluator
- Communications & Marketing
- Advisory Committee
  - agInnovations West
  - Dir of Research – National League of Cities

Additional Resources

- WSU: 20% Project Director (0.40FTE overall)
- TAMU: 0.05 FTE for Assistant Director
- MSU: 0.04 FTE Professional Development
- NUREC annual membership: $65,000 currently, target $100,000.
- National Urban Extension Leaders: >$90,000 annual for steering committee.

Questions?

Addressing National Issues

National Issues

- Food security & sustainable food systems
- Health & wellness disparities
- Infrastructure & land use
- Climate change adaption & mitigation
- Systems thinking
- Policy, systems, & environment (PSE) change

Identifying Research Priorities

2024 – convening in DC at National League of Cities

- 43 individuals from federal agencies, local government, research, and extension identified:
  - 59 Research needs
  - 149 short, medium, and long-term outcomes
  - Additional cross-cutting observations and opportunities

6 Research & Extension prospectuses (16 individuals)

Intended Audiences

- **Scientific community:**
  - land-grant universities;
  - urban serving universities;
  - local, state, federal, and tribal governmental agencies.
  - This would include graduate students and postdoctoral researchers and fellows.
- **Policy makers:**
  - local, state, federal, and tribal governmental agencies and
  - their associated organizations such as the National League of Cities as a conduit to their members nationally
- **Extension and other practitioners:**
  - local, state, and national levels;
  - local non-governmental organizations who may access or benefit from the research through their local Extension offices.

Urban Context

Population:

National	80% live in urban communities
WA	65.7% live in 5 counties (39 total)
MI	49.4% live in 5 counties (83 total)

Legislature:

Federal	58% Congressional districts are urban or suburban^
WA	75.5% legislative districts in those 5 counties
MI	57% legislative districts in those 5 counties

Fiscal: General Fund Expenditures 2023

State	State	5 Counties	Cities
WA	$31B	$2.1B (7%)	$5.2B (17%)
MI	$13.4B	$1.8B (14%)	$4.5B (34%)

^ Source: Congressional District Health Dashboard, 2022 CDHD District Density Index (based on CityLab Congressional Density Index)

Why a National Research Support Project

Urban Environments

- Complex systems
  - Human (including political)
  - Natural Environment
  - Built Environment
- Dense populations
- Result: interdependent social, ecological & technilogical relationships

Response Requires

- Tailored approaches that account for complexity
- Sensitive to those diverse systems
- Promote meaningful partnerships versus extractive research and practices

Artificial Intelligence in Agriculture

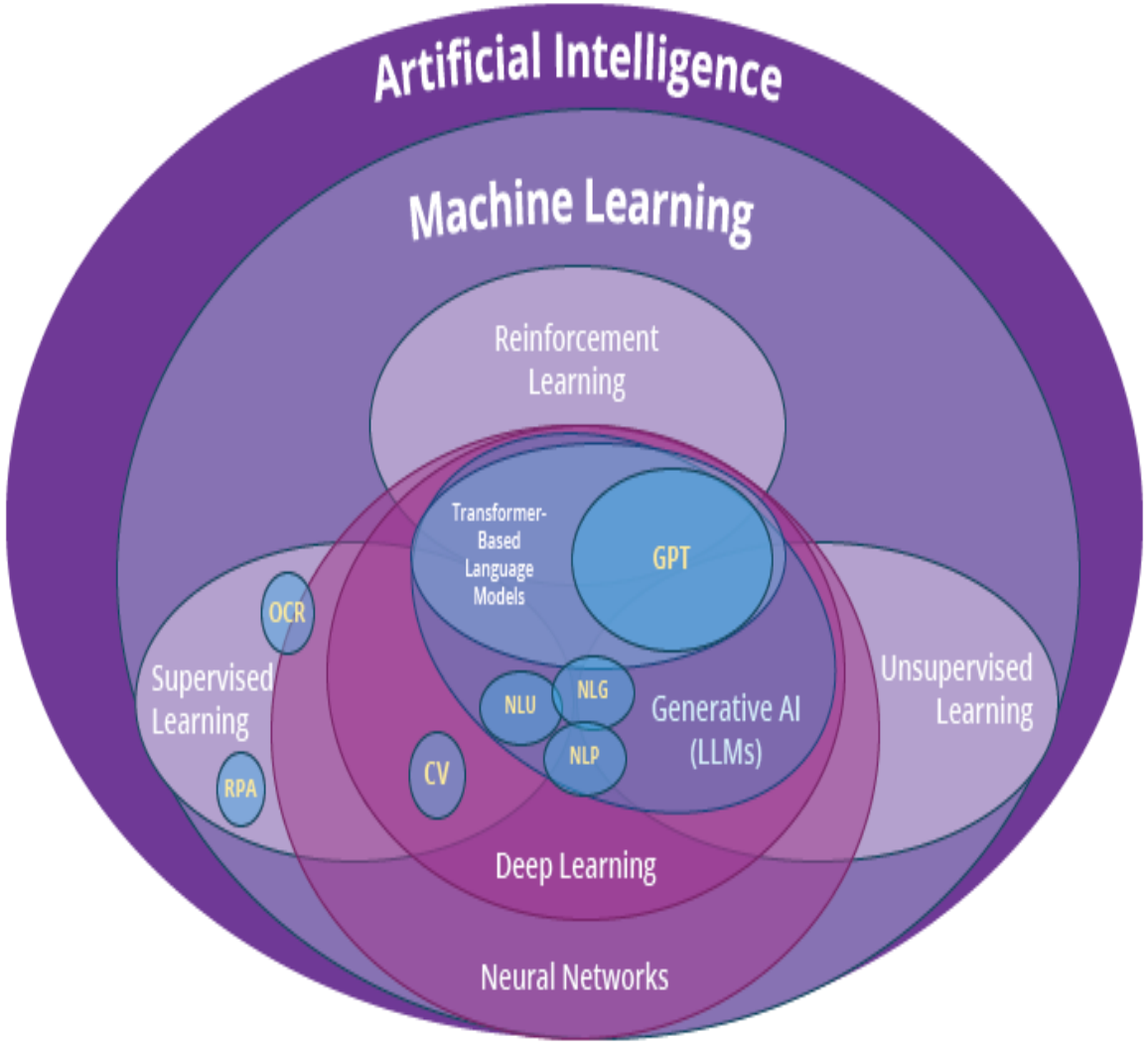
Tala Awada, UNL

April 2025

Source: https://certainly.io/blog/ai-in-agriculture-optimizing-crop-yield-and-resource-management/

What is Artificial Intelligence?

The theory and development of computer systems that are able to learn from, make decisions and perform tasks based on data, that normally require human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages



- https://blog.auditoria.ai/the-ingredients-of-artificial-intelligence

The Beginning of AI

1935: Alan Turing, the father of theoretical computer science introduced the concept of machine intelligence, the Turing Test, and published the book "Computing Machinery and Intelligence" in 1950! He also cracked the Enigma Code ☺ !!

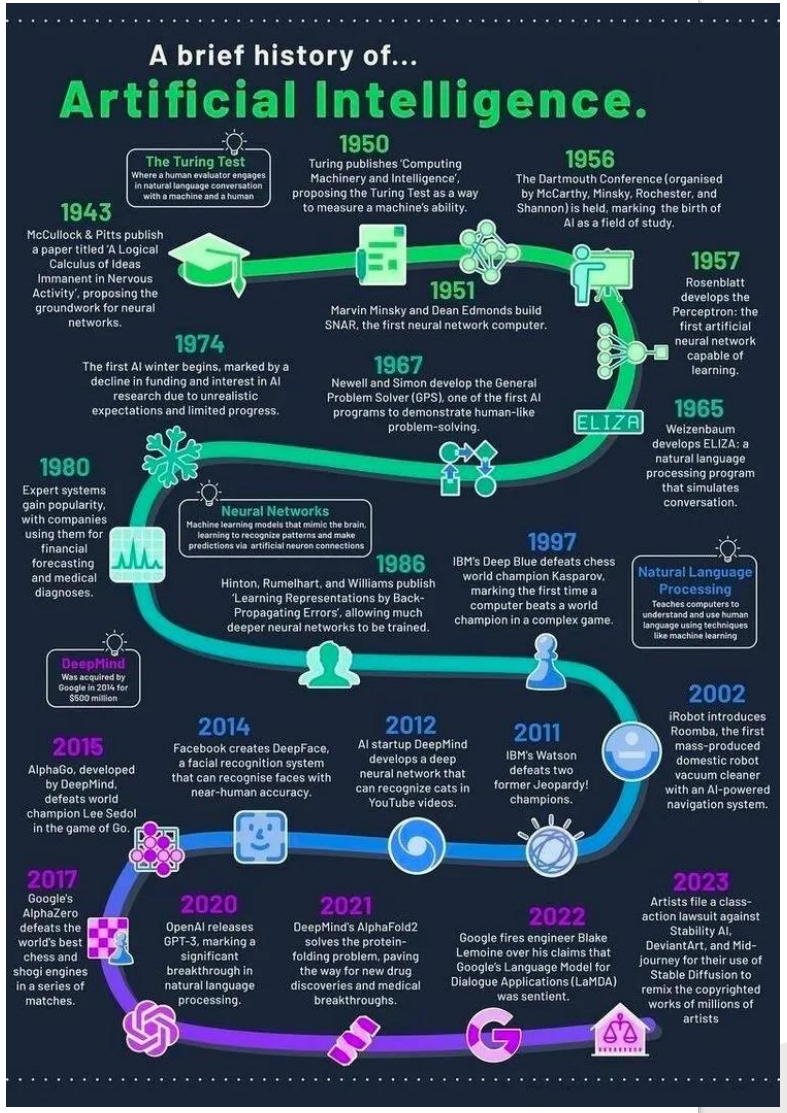
1956: Dartmouth Conference, the term "artificial intelligence" was established by John McCarthy (Stanford University), and colleagues.

2015: Sam Altman founded OpenAI

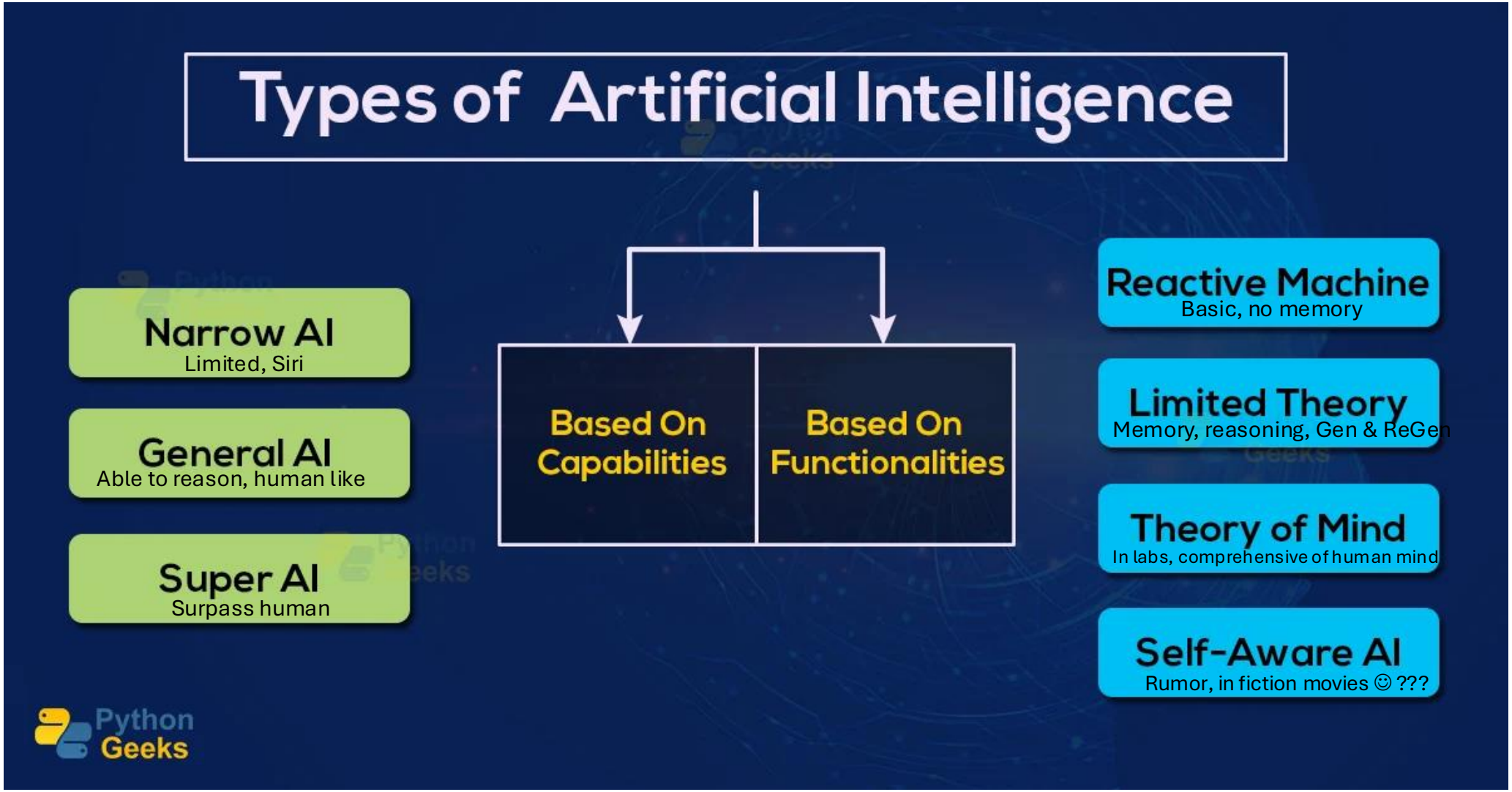
2018: Generative Pre-trained Transformer (GPT) released. A type of AI that can understand and create human language. It had 117M parameters* and demonstrated the power of unsupervised learning.

2020: OpenAI GPT-3 (175 B parameters). When the public and users started interacting with LLMs and and understand the impact of this technology

* adjustable sets or variables that control how the mode is generated



Source: https://medium.com/datafrens-sg/a-brief-history-of-artificial-intelligence-ai-7526de99efc4

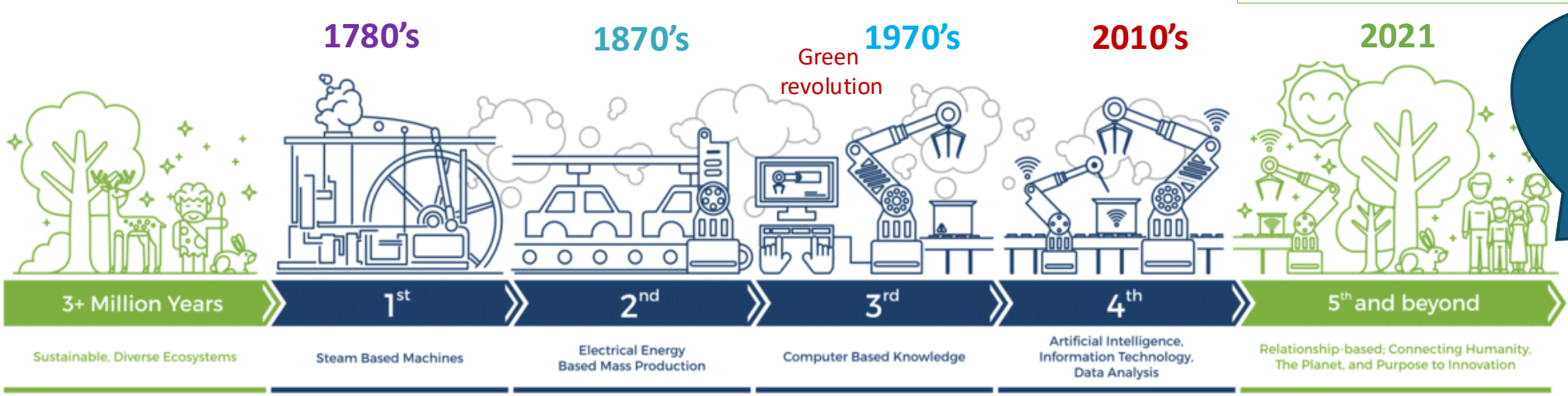


"The full development of AI could spell the end of mankind. It'd set off on its own, re-designing itself at a breakneck speed. Humans, whose biological evolution is slowed, would be unable to compete and would be surpassed." Stephen Hawking

https://pythongeeks.org/types-of-ai/

Industrial Revolutions:
A Natural Progression and Return to Our Core

EU's official launch



Population **Wealth share** **Waste share**	1,0 Billion 20:80 5%	1,5 Billion 15:85 10%	3,5 Billion 10:90 25%	7 Billion 2:98 45%	7,7 Billion 40:60 5%

6th IR is "a futuristic concept that envisions a future where human, digital, and physical systems are deeply integrated, driven by technologies like advanced AI, quantum computing, and nanotechnology, potentially transforming humanity and our interaction with the environment".

BRMInstitute
Business Relationship Management Institute

https://brm.institute/relationship-centered-shape/
https://michael-rada.medium.com/the-truth-about-industrial-revolutions-548081944791
https://medium.com/illumination/industry-6-0-the-rise-of-intelligent-manufacturing-and-the-future-of-industry-edb5f77f1706

AI for Addressing Societal Challenges in Food, Agriculture, and the Environment

Food, feed, fuel, fiber and bioenergy production

Environmental degradation (water, soil, atmosphere, and ecosystems)

Mitigating and adapting to climate change

Food waste (30-40 % of food ends up in landfills)

Energy supply, storage and distribution

Poverty and Injustice

Human-machine interaction

Cybersecurity

Biosecurity

Big data

~ 1.7 earths by 2050 to support current population trends and ecological footprints

Agriculture Emissions to increase by 6% by 2030

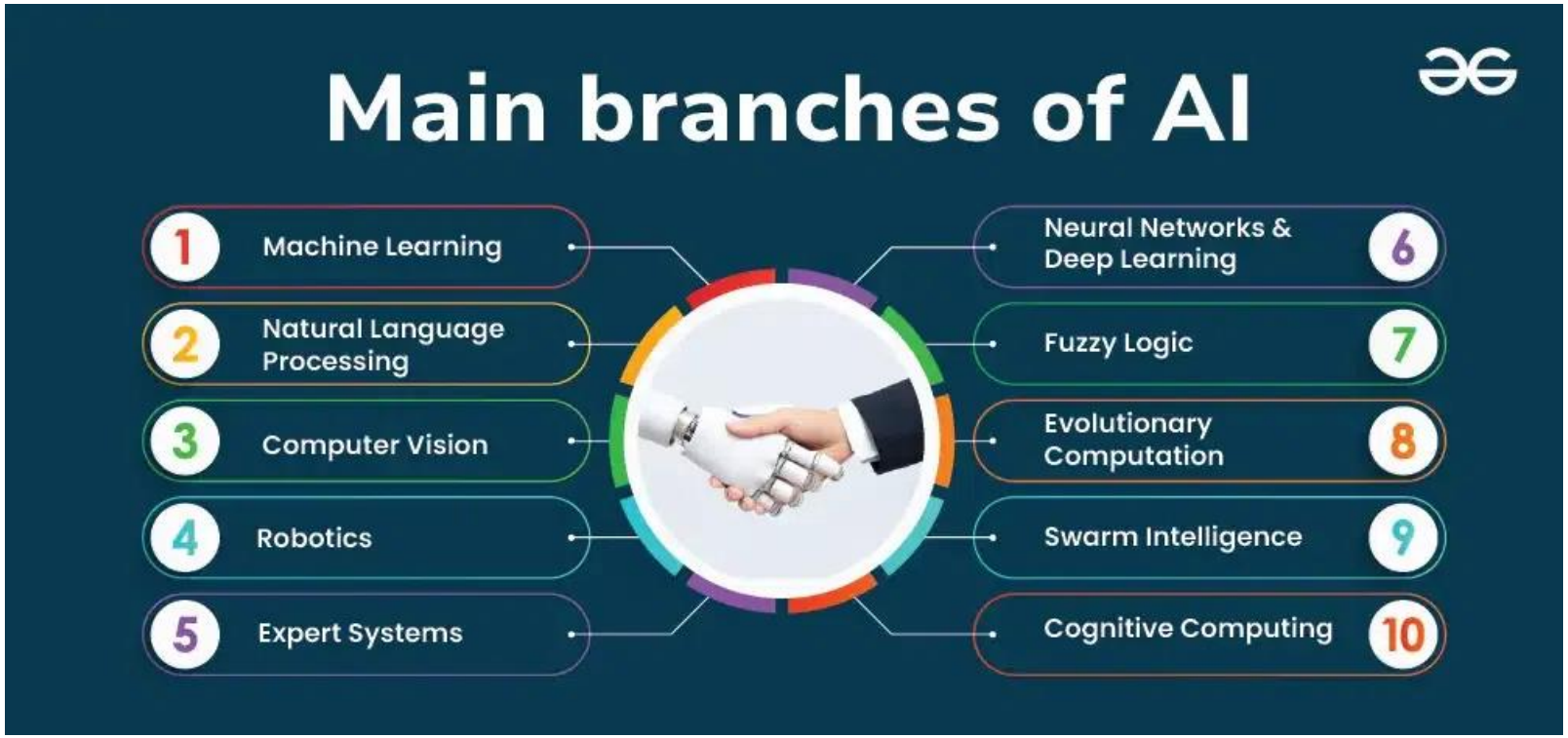
Cost of inefficiency of the global food system is $1-2 Trillion / yr (FAO)

AI and Sustainable Development Goals

"AI, particularly generative AI, provides new opportunities to analyse data and trends at pace and scale to further knowledge, allocation of resources and action. Applications to address the global challenges presented by the SDGs such as poverty and hunger, human health, climate change, biodiversity and ocean degradation are potentially limitless."

https://sdgresources.relx.com/events/relx-sdg-inspiration-day-2024

AI in Agriculture



Learning, reasoning, perception, decision making, problem solving

Agriculture and Natural Resource Sciences are leveraging the full potential of AI to shape innovation and address societal challenges

https://www.geeksforgeeks.org/top-10-branches-of-artificial-intelligence/

Current Trends of AI in Modern Farming

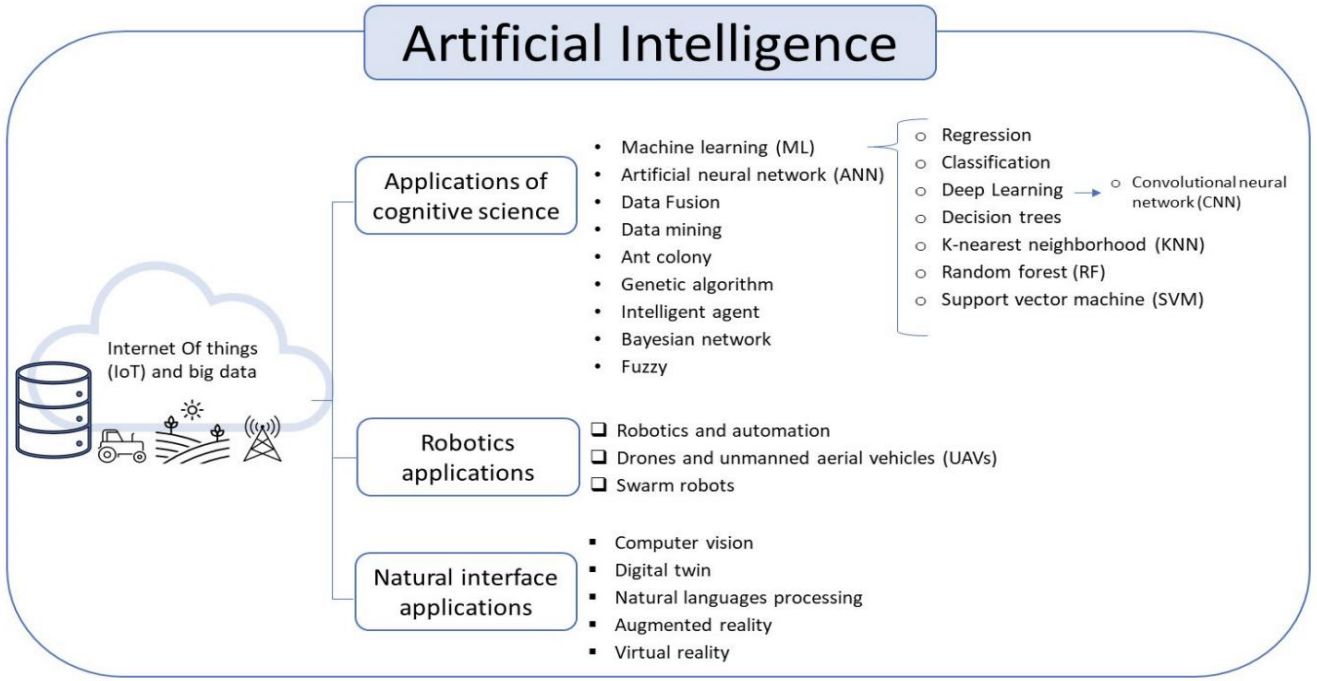


Figure 5. Identified AI technologies in descriptive analysis.

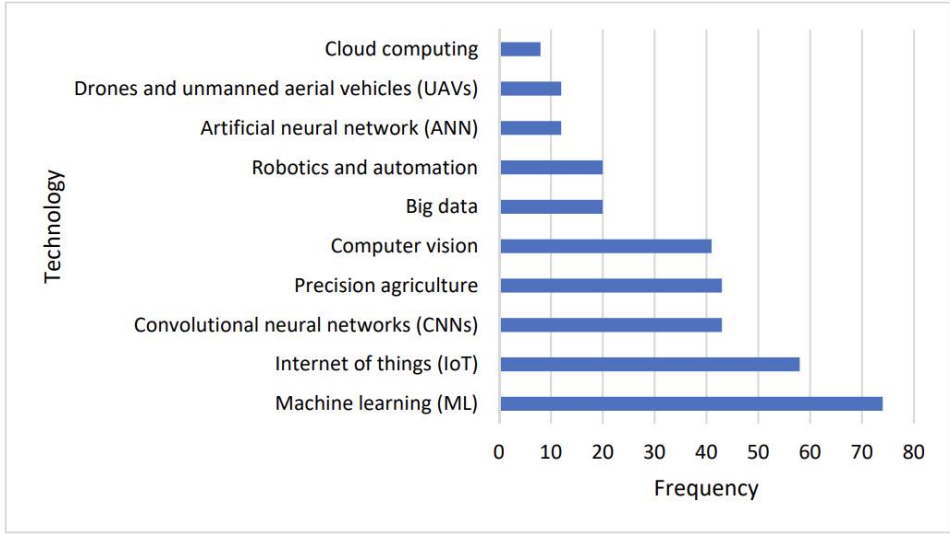


Figure 6. Top 10 most frequent technologies and terms resulting from the analysis of 176 papers.

Data in Ag is generally unstructured, poorly managed, and difficult to integrate, analyze and interpret!

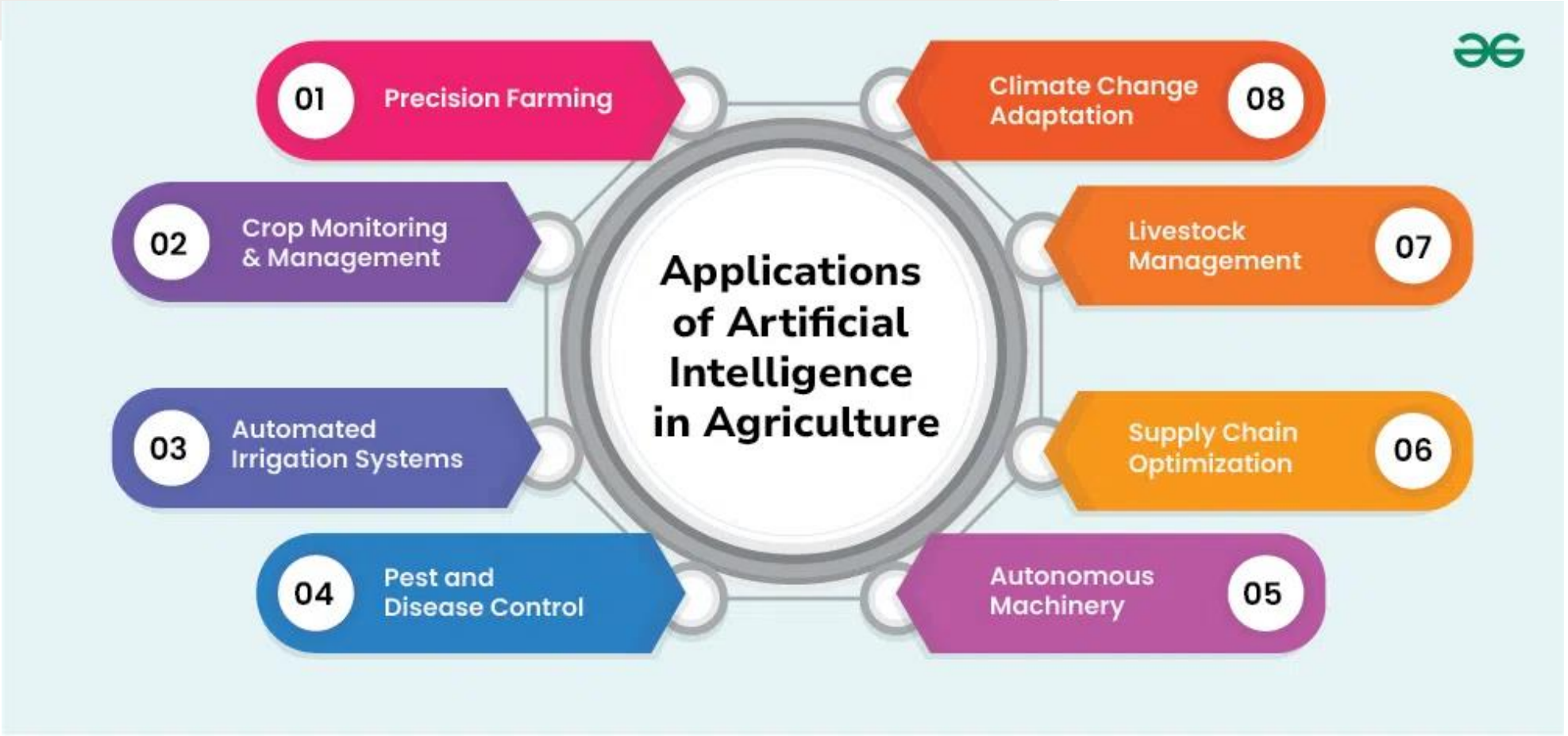
applied sciences

Review

Artificial Intelligence in Agriculture: Benefits, Challenges, and Trends

Rosana Cavalcante de Oliveira [1,*] and Rogério Diogne de Souza e Silva [2]

Application and Research of AI in Agriculture

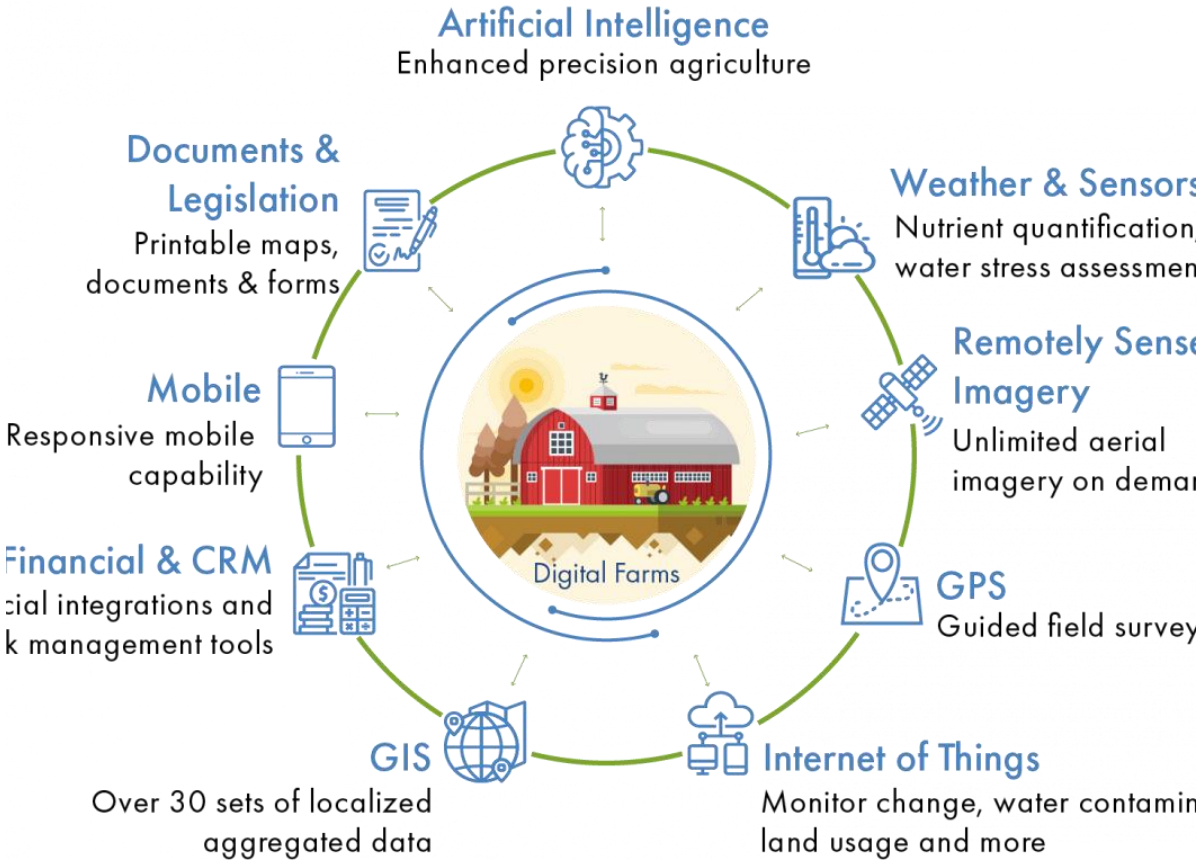


https://www.geeksforgeeks.org/ai-in-agriculture-future-of-farming/

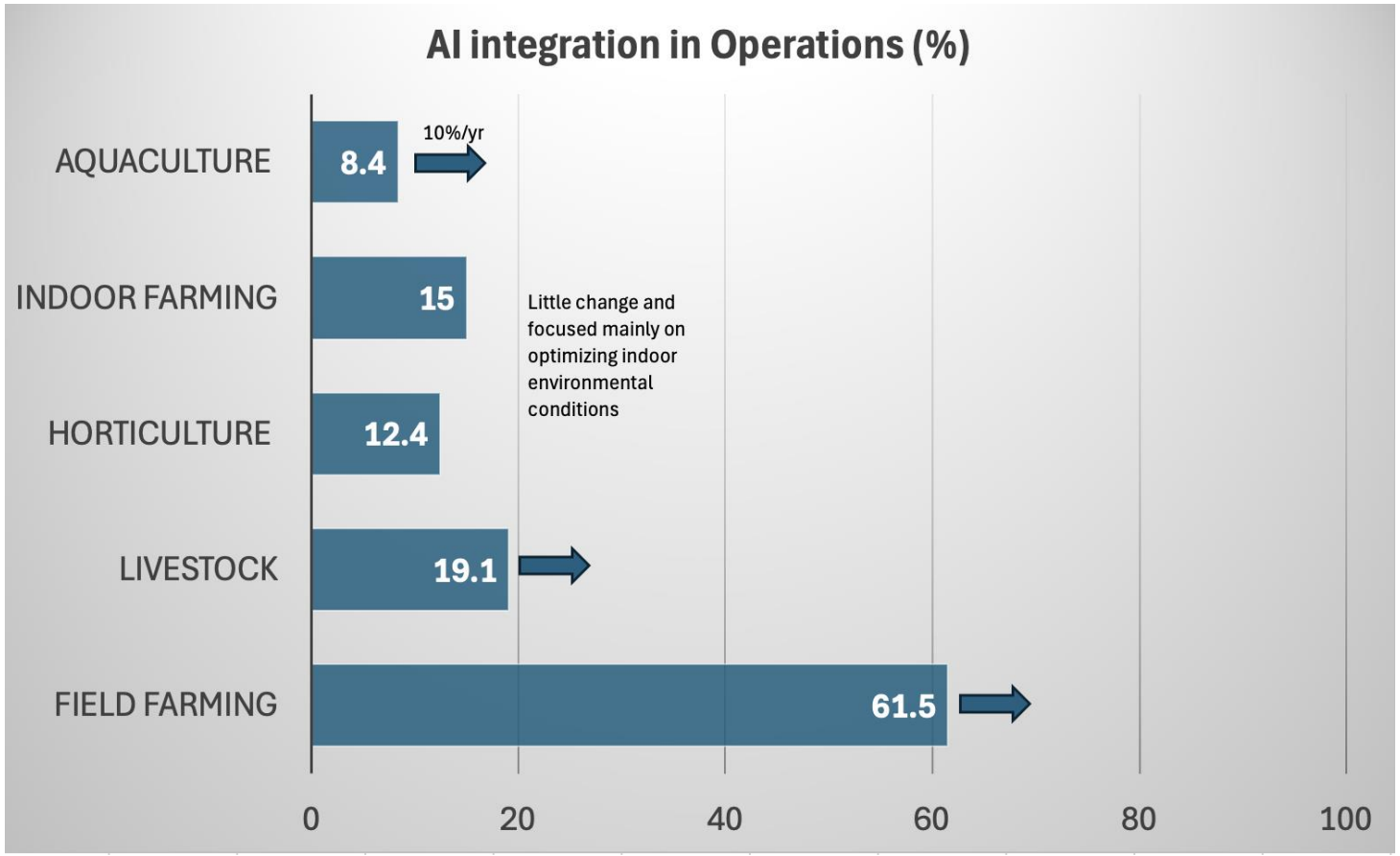
AI in Plant and Animal Agriculture

Most common uses

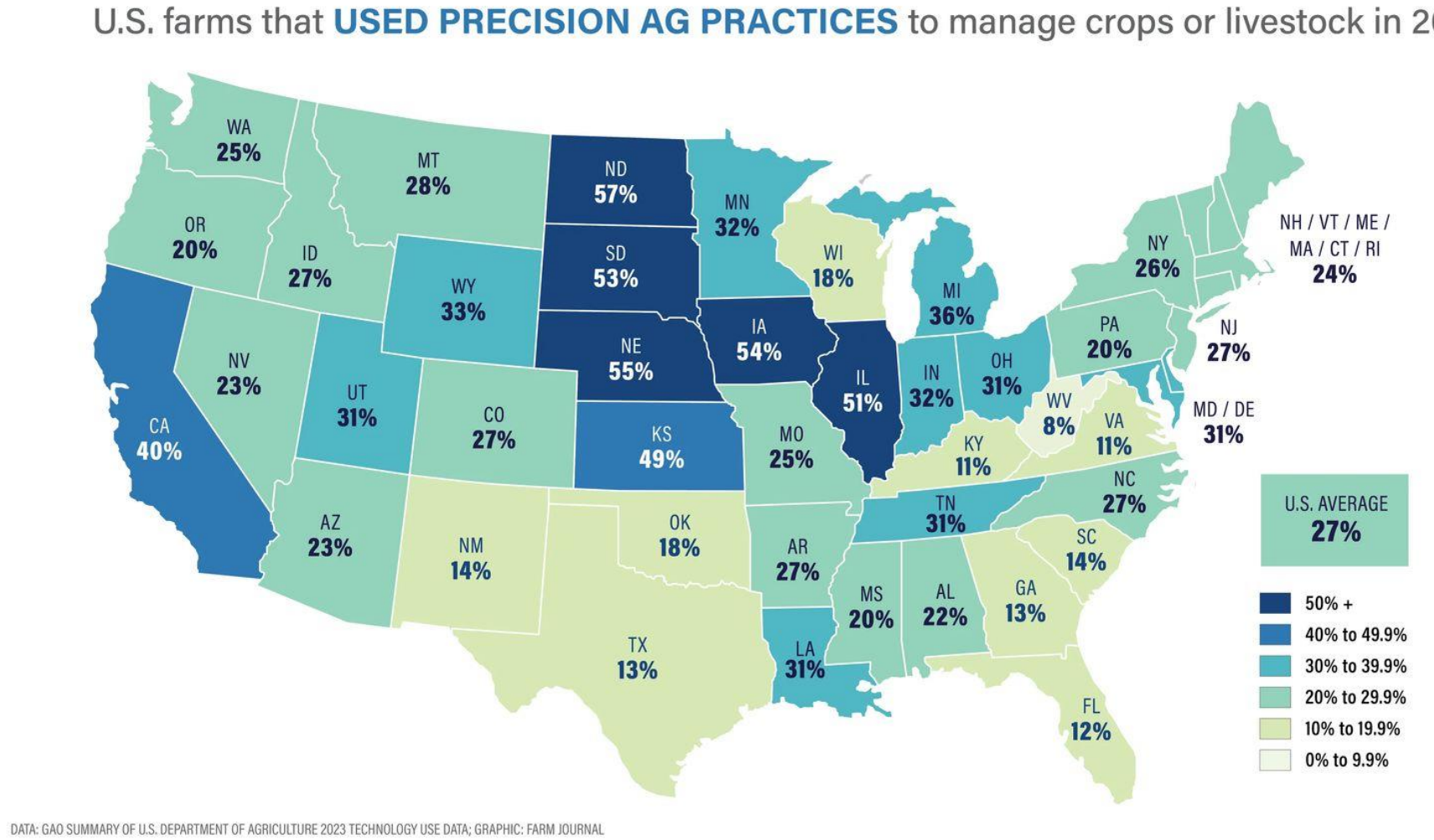
- In prediction (improve decision making for management)
- **Robotics** (GPS autosteering, operation eg milking, enhance efficiency, reduce fatigue, reduce labor)
- **Monitoring** (yield, water and nutrients)
- Sensing (reduce input)
- **Management** (variable rate application, reduce waste)
- Classification (diagnostics of plants & animal diseases)
- Forecasting (for sustainability, climate adaptation, and profit, climate decision tools)
- Biosecurity – emerging technology
- Breeding – emerging applications
- Transportation –
- AI in energy research (agrivoltaics)



By Category, Farming Types and AI Integration



https://artsmart.ai/blog/ai-in-agriculture-statistics-trends-2024/



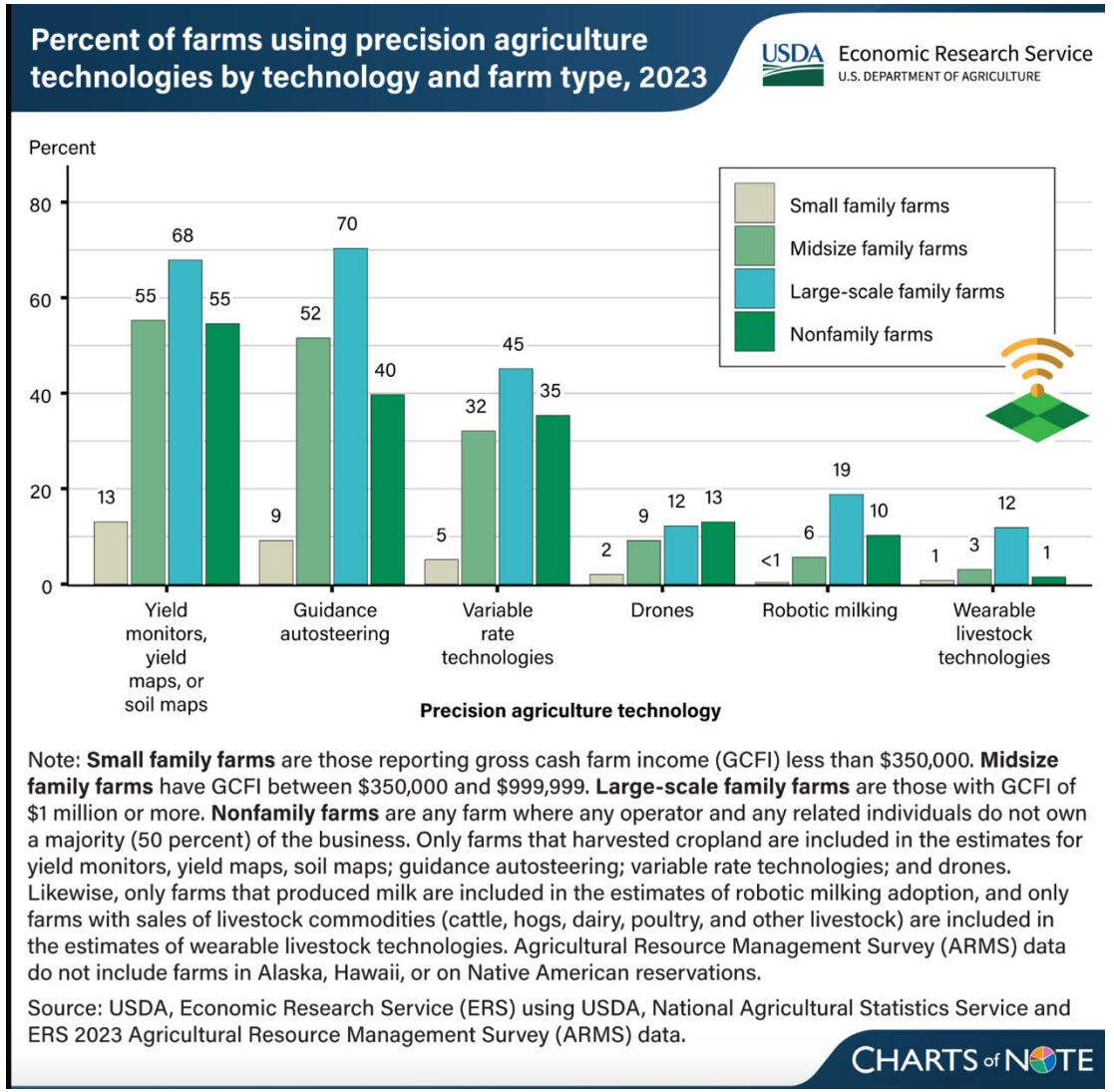
"While precision agriculture technologies have been available since the 1990s, only 27% of U.S. farms or ranches use precision agriculture practices to manage crops or livestock (2023 USDA). Top five states for tech use account for approximately 50% of the 2022 U.S. cash receipts for corn (52.6%) and soybeans (45.7%): ND, NE, IO, SD, IL

https://westernagnetwork.com/new-report-details-top-states-for-precision-ag-technology

Precision agriculture use increases with farm size and varies widely by technology

by Jonathan McFadden and Katherine Lim
12/10/2024

Farm Practices & Management | Crop & Livestock Practices



In 2023, small family farms accounted for 86% of all U.S. farms, while midsize family farms accounted for 6% and large-scale family farms represented 4% and

What is driving adoption?

- Improved Crop Yields
- Profit
- Precision Farming
- Predictive Analytics
- Automated Equipment (labor and time)
- Resource Efficiency
- Real-Time Monitoring
- Sustainability
- Climate Change
- Water Quantity and Quality
- Supply Chain Optimization
- Better Decision-Making
- Market and Price Predictions
- Waste Management
- Age (Helping older farmers with ease of use)
- Labor Reduction (Decreasing the need for manual labor)
- Wellbeing (Reducing physical strain and improving work-life balance)

Challenges to AI Adoption in Agriculture

Access to technology

- Connectivity Issues: limited access to broadband and high-speed cellular services in rural areas.
- High cost: high initial investment in tools and services (especially for small and medium farms).

Technical expertise of farmers, extension and consultants

- User-Friendly interfaces: must be intuitive for users with lower digital literacy levels.
- Access to expert in EXT and consultants.
- Services and maintenance
- Language barrier.

Data availability and quality

- Insufficient data: AI algorithms require extensive datasets, which may be lacking in areas. with inadequate data collection infrastructure.

Ethics and Trust

- Data privacy concerns: hesitation to share data due to concerns about ownership and usage.
- Cybersecurity: not if but when.
- Policy and regulation: incentives (e.g., subsidies) to use technologies aimed at farmers.
- Trust in AI: including understanding of what AI is, capabilities and limitations
- Socioeconomics inequality and ethics: large vs. small farms and ranches, power difference, responsibility (for errors), fairness, etc.
- Overdependence on AI for critical decisions (e.g., irrigation or pest control) and the "black box" nature of some AI models
- Culture

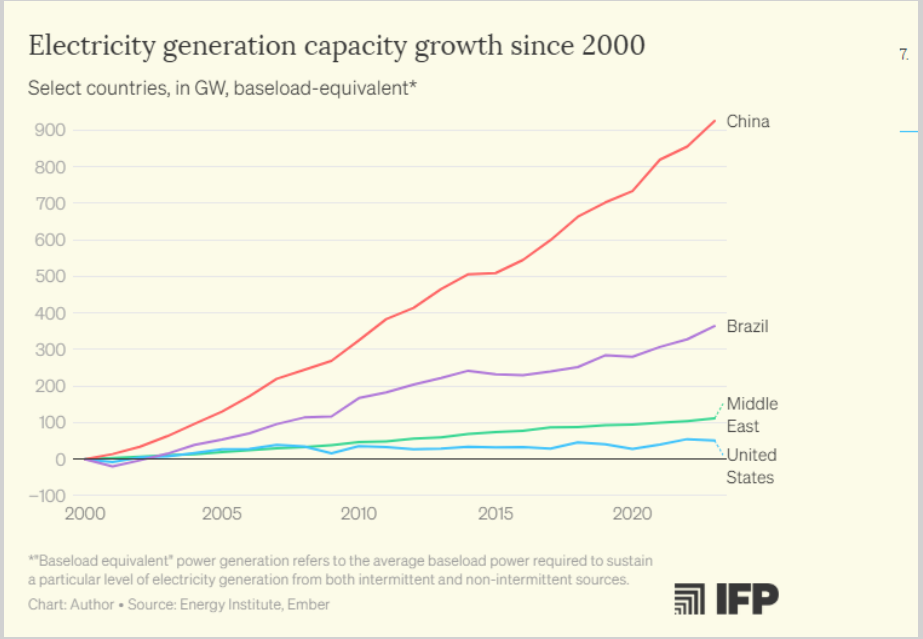
AI Challenge – Data Centers and Clean Energy

AI Leadership in the USA (Institute for Progress):

1. Making it easier to build AI data centers and associated energy infrastructure
2. Supporting American open-source AI leadership
3. Launching R&D moonshots to positively shape the development of advanced AI
4. Establishing a fast and effective national security-focused model evaluation capacity
5. Attracting and retaining superstar AI talent
6. Improving export control policies and enforcement capacity

https://ifp.org/an-action-plan-for-american-leadership-in-ai/

Overall, these estimates suggest that global power demand for AI will grow by anywhere from 60% to 330% of U.S. Generation Growth. Generation growth will also have to support other associate industries (wind and solar can't meet the demand)



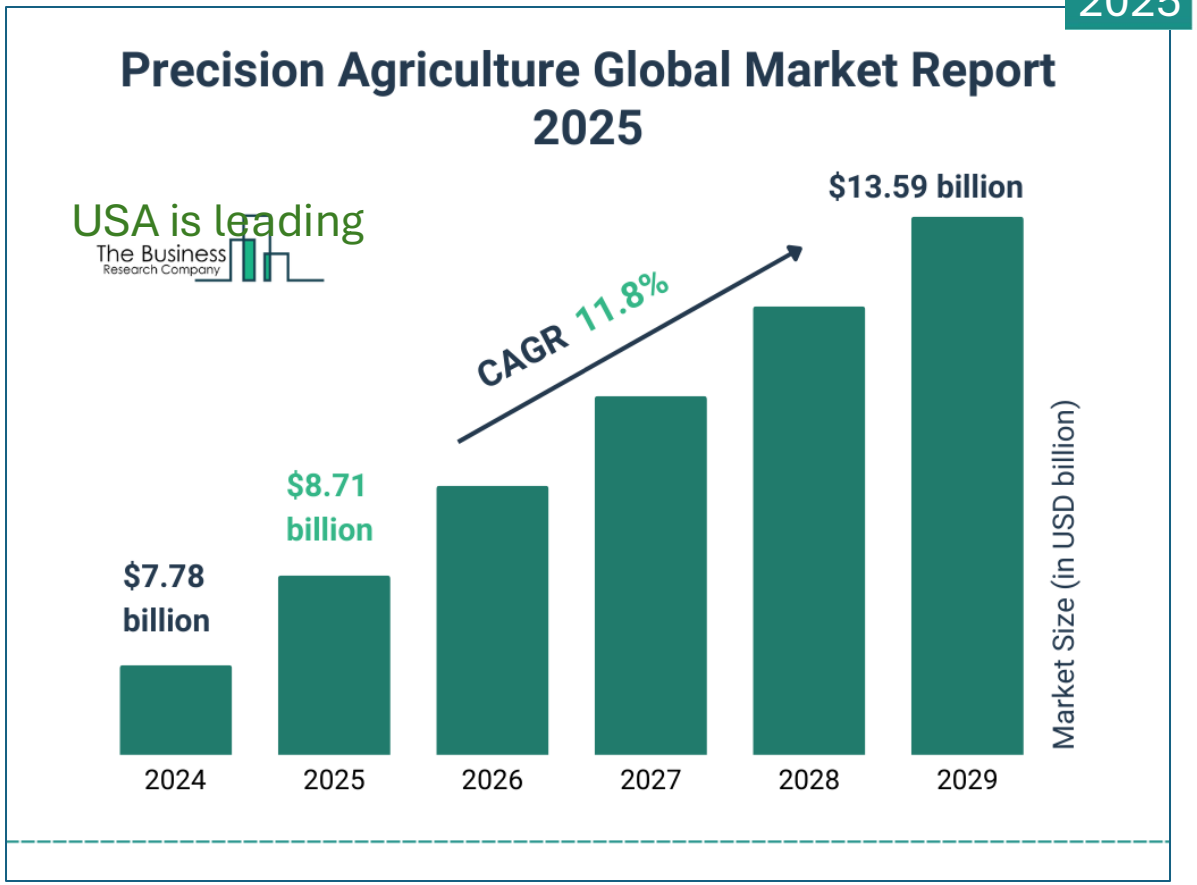
Looking abroad for establishing Data Centers

Global Market of Precision AI Driven Agriculture

Market evaluation based on:

- Component: Hardware, software and service
- Technology: automation, remote sensing, variable rate
- Application: yield monitoring, telematics, crop scouting, weather tracking and forecasting, inventory management, labor management, other
- Services: consulting, support and maintenance, system integration

Main Countries: USA, Australia, Brazil, China, France, Germany, India, Indonesia, Japan, Russia, S. Korea, UK, Canada, Italy, and Spain.
Other countries may be covered depending on the segment/component.



*CAGR: Compound Annual Growth Rate

https://www.thebusinessresearchcompany.com/report/precision-agriculture-global-market-report

Top Ag Companies Leading AI Driven Solutions

- **John Deer:** autonomous tractors, optimization of planting, irrigation, harvesting.
- **Raven:** autonomous tractors and solutions.
- **Bayer Digital Farming:** predictive analytics, pest management, soil health and yield. Major tool "FieldView"
- **Corteva Agriscience** – major tool Granular: crop protection, genetic engineering, disease detection, pest management, fertilization, and harvesting.
- **IBM Watson for Agriculture**: weather, pest control, soil health, IoT.
- **Syngenta:** crop protection, seed technologies, and farm management.
- **Ag Leader Technology:** planting, irrigation, harvesting, resource management and waste. Major tool "In Commend"
- **Timbler AgTech:** global leader in GPS solutions, eg monitoring and mapping.
- **Sentera:** drones and AI farming, crop health, pest, diseases. Major tool "Aeroview"
- **Fertility Solution** (Fertilizer AI): soil analysis, and nutrient management

TOP Startups to Watch For

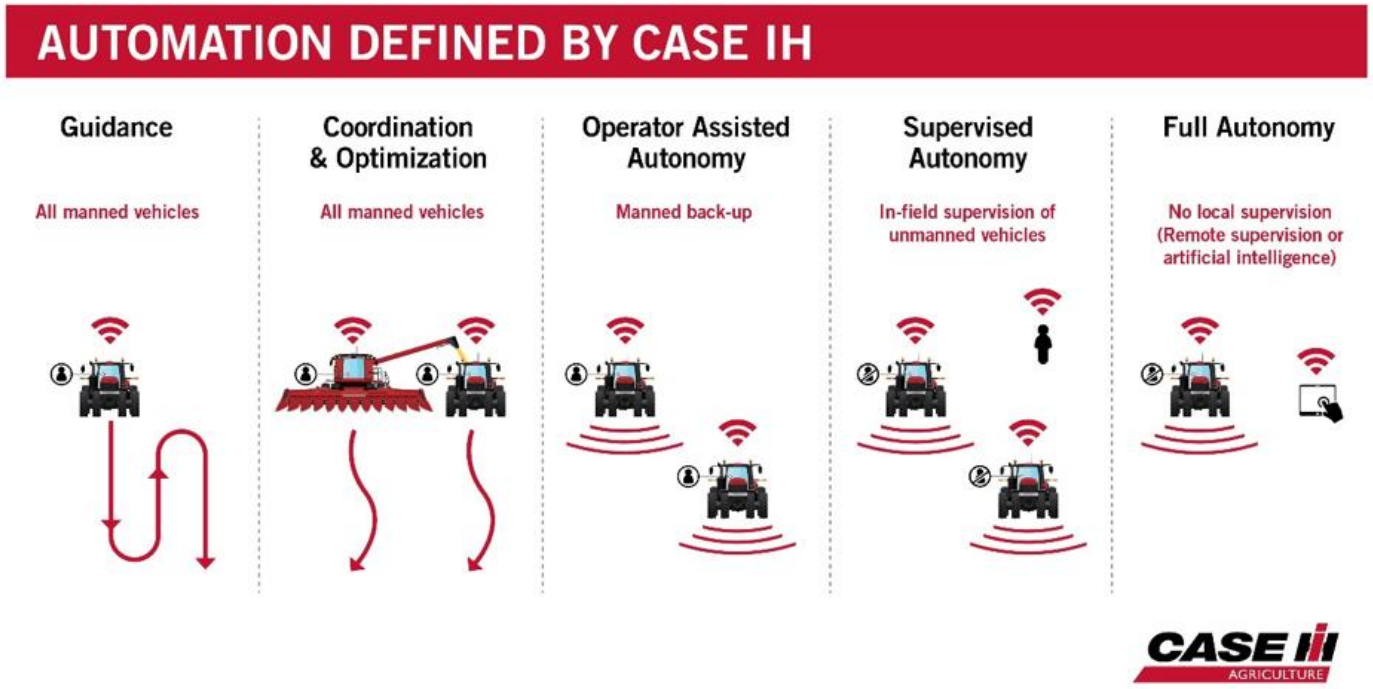
- **Taranis:** computer vision and AI for areal images from satellites and drones
- **Climate AI:** climate adaptation and risk
- **Ecorobotix (Swiss):** AI powered robots for weeding and pesticides
- **Small Robot Company:** small robots for precision management on farms
- **Indigo Agriculture: p**redictive analysis for actionable farming
- **Rip Robotics:** harvest of fruits and vegetables
- **Farmsense:** pest management and crop health
- **Trace Genomics**: soil microbes for soil management
- **Nanoloom:** AI in nanotech to create sensors that monitor plants

Example of AI in Ag Initiatives at Universities and Most Common Types of Publications

- Integration of AI in Agricultural education, research, and extension. Examples AIClimate (U Minnesota), AI Farms (U Illinois), Robotics and Phenomics (UNL), DAREC (U Missouri), Advanced Ag Technology Center (NDSU), etc..
- Publications: tools, techniques, automation, sensing, robotics, drones, sustainability, climate-resilient agriculture, precision farming, genomic research, global food security, environmental challenges, resources management, animal performance and health, grazing pattern, GHGs, wildlife conservation.
- Growing: digital twin, economics, adoption, education, stakeholders' engagement, biosecurity, cybersecurity

From

Automation to Autonomy (A2A)



- https://www.caseih.com/en-us/unitedstates/connect-with-us/farm-forum/five-categories-of-automation-a-technology-framework

Open Access | Editor's Choice | Review

The Path to Smart Farming: Innovations and Opportunities in Precision Agriculture

by E. M. B. M. Karunathilake [1], Anh Tuan Le [1], Seong Heo [2], Yong Suk Chung [1,*] and Sheikh Mansoor [1,*]

[1] Department of Plant Resources and Environment, Jeju National University, Jeju 63243, Republic of Korea

[2] Department of Horticulture, Kongju National University, Yesan 32439, Republic of Korea

* Authors to whom correspondence should be addressed.

Agriculture **2023**, *13*(8), 1593; https://doi.org/10.3390/agriculture13081593

Submission received: 19 June 2023 / Revised: 4 August 2023 / Accepted: 9 August 2023 /

	Conventional Agricultural Practices	Digital Agricultural Practices	Smart Agricultural Practices
Diagnosis/ Detection/ Observing stage	By farmers	By remote sensing, ground sensing	By smart sensing
Decision Making stage	By farmers & Expertise	By decision support systems	By smart analytics and planning
Performing stage	By farmers & labors	By automated machines	By Intelligent performing systems

Previe

CAST – Release of Paper at Mississippi State meeting

https://cast-science.org/publication/ai-in-agriculture-opportunities-challenges-and-recommendations/

To register: https://members.cast-science.org/ap/Events/Register/aZF7a84cvCqCZ

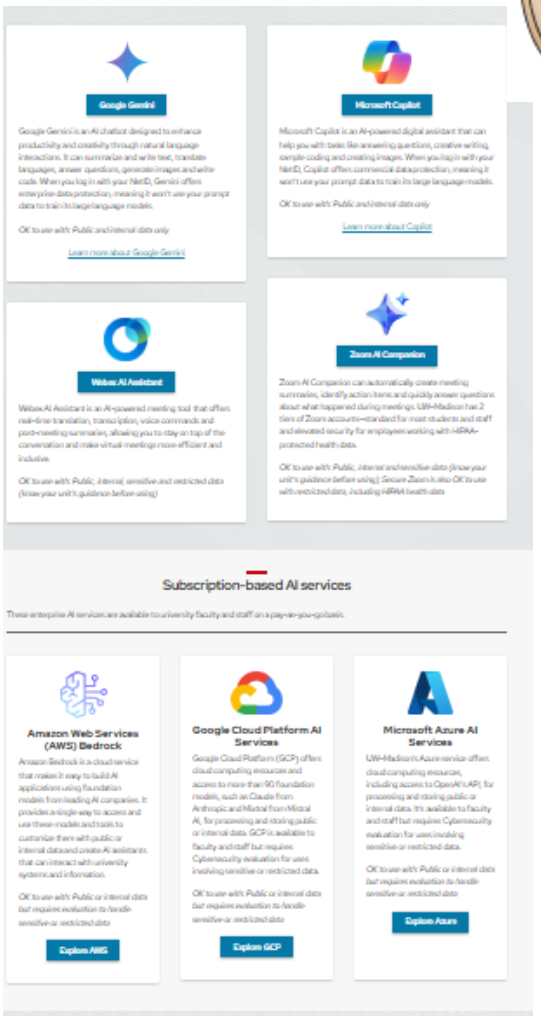
Some Universities are Offering Free AI Tools

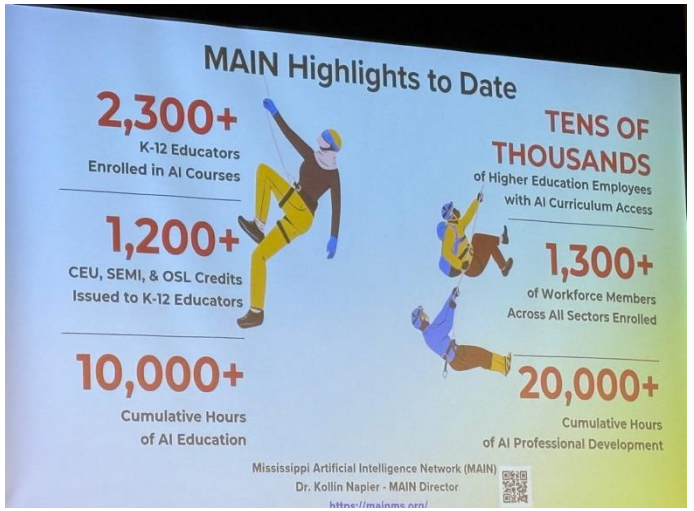
AI Tools Directory

Microsoft Copilot and Adobe Creative Cloud are available to Ohio State users and offer a variety of AI functions as described below. In addition, many of us are taking advantage of AI features in existing tools once they have been vetted. For more technical users, Azure, Amazon Web Platform, and Google Cloud Platform offer more options for using AI.

Ohio State does NOT have a contract with OpenAI for use of the ChatGPT chatbot; however, ChatGPT technology can be accessed through Azure as an Open Source Model.

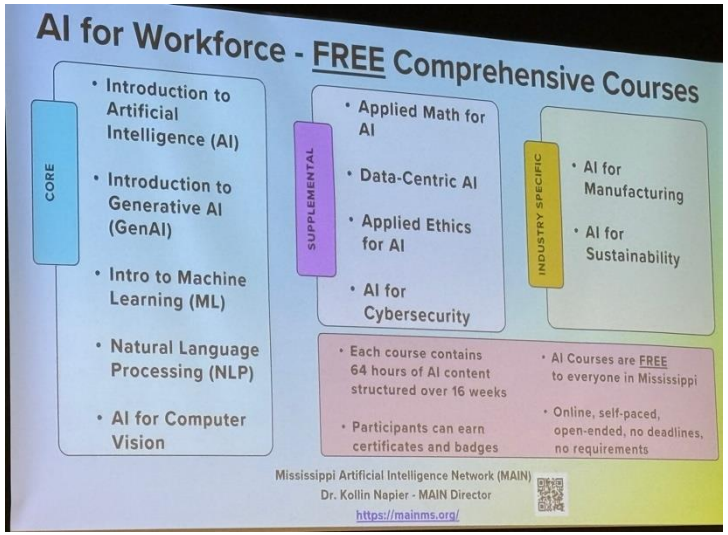
Approved AI Tools	Cloud Computing Platforms	Tools with AI Components
Microsoft Copilot	Ohio State AWS	CarmenCanvas AI Tools
Adobe Creative Suite	Ohio State Azure	CarmenZoom AI Tools
	Ohio State Google Cloud Platform	SalesForce Marketing Cloud (Einstein)





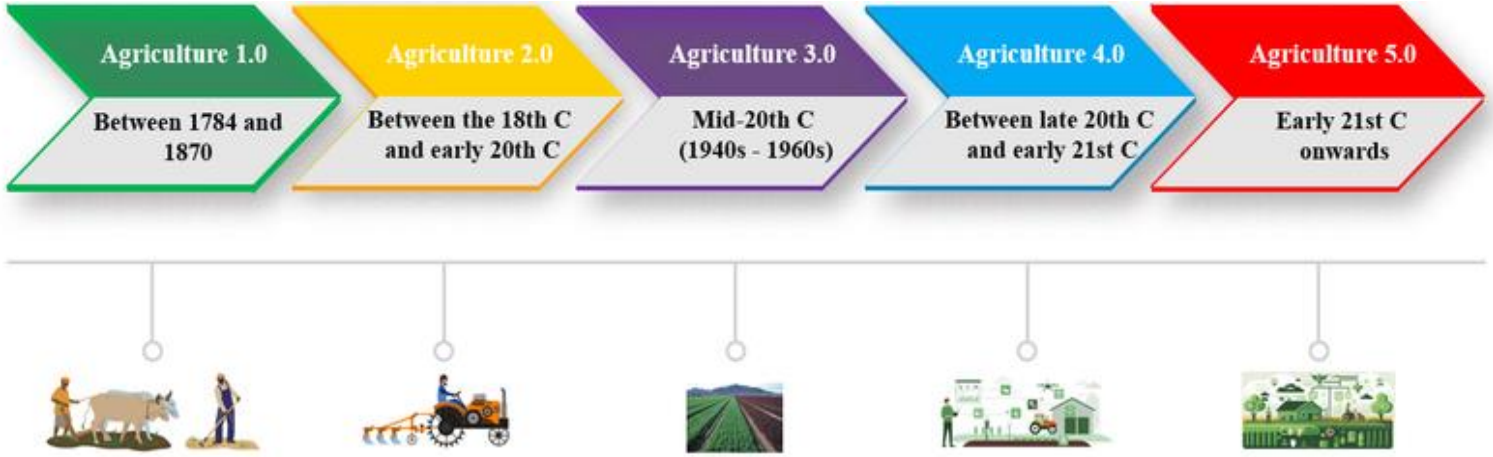
Established in 2023
Director: Kollin Napier

Goals:
- Accelerated Innovation
- Workforce Development
- Improved Public Services
- Enhanced Coordination



https://mainms.org/

From Animal Power to Neural Networks: Farming's Quantum Leap
(Generated with PopAI)



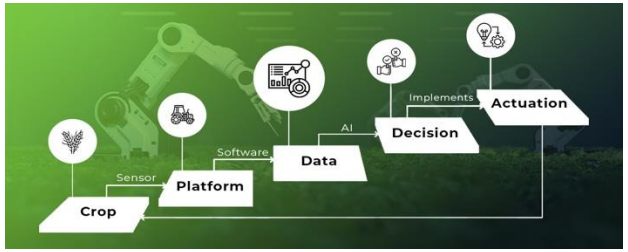
- Reliance on human and animal labor
- Use of essential hand tools
- Most farming was for local consumption
- Diverse cropping systems for food security
- Small-scale farms run by families
- Use of simple canals or buckets to water the farms

- Introduction of machinery
- Use of machines, fertilizers, and better seeds
- Utilization of scientific concepts

- Widespread use of chemical fertilizers, pesticides, and herbicides
- Increase and improvement of irrigation techniques
- Use of tractors, combines, and other machinery
- Development of high-yield, disease-resistant crop varieties
- Better farm management practices
- Use of earth observation satellites, GPS, and computer science technologies in agriculture

- Precision agriculture
- Virtual and augmented reality
- Big data analytics
- 3D printing
- IoT devices
- Quantum computing
- Drones
- Satellites
- Smart farming technologies
- Wireless Sensor Networks
- Cloud computing platforms
- Artificial intelligence
- Blockchain technology
- Robotics

- Artificial intelligence and machine learning
- IoT
- Big data and analytics
- Drones and satellite imaging
- Vertical and urban farming
- Advanced robotics and automation
- Biotechnology and genetic engineering
- Non-terrestrial networks
- Blockchain technology
- Smart irrigation
- Sustainable practices



GUMA, ALI & Mijwil, Maad & Buruga, Bosco & Abotaleb, Mostafa & Adamopoulos, Ioannis. (2024). A Survey on Artificial Intelligence in Cybersecurity for Smart Agriculture: State-of-the-Art, Cyber Threats, Artificial Intelligence Applications, and Ethical Concerns. Mesopotamian Journal of Computer Science. 2024. 71-121. 10.58496/MJCSC/2024/007.

Looking into a Cristal Ball

ChatGPT Prompt: Describe Ag in 2050

In 2050, agriculture will be revolutionized by advanced technology like AI, robotics, and vertical farming.

Precision farming will optimize water, and chemical usage, minimizing waste and environmental impact.

Drones and autonomous vehicles will handle planting, monitoring, and harvesting.

GMO will be more resilient to climate change, with higher yields and enhanced nutritional value.

Urban farming will become widespread, with indoor vertical farms producing fresh food closer to cities.

Sustainable practices and circular economies will be at the forefront, ensuring a balance between food production and environmental preservation to feed a growing global population.

https://redresscompliance.com/the-role-of-ai-consulting-services-in-agriculture/

Thank you

https://medium.com/@toni1988/technological-advancements-how-they-are-changing-our-world-f63c38da7313