UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

II. Academic Program Review Dossier Cover Page | 2024 Cycle

Name, Lived Name:	Tapan B. Pathak
Preferred Pronoun(s):	He/Him/His
Academic Title:	Associate Specialist in Cooperative Extension
County/Program:	Statewide
Review Type:	Merit
Current Rank/Step:	Associate Specialist in Cooperative Extension III (Indefinite)
Requested Rank/Step:	Associate Specialist in Cooperative Extension IV(Indefinite)
Review Time Period:	October 1, [2022] to September 30, [2024]
Thematic Areas:	Enhancing agricultural resilience to climate and weather related risks

Position Description
Tapan Pathak

Assistant Cooperative Extension Specialist – Climate Adaptation in Agriculture
Effective Date: February 2, 2015

PURPOSE & CLIENTELE

Climate has direct influence on agricultural; with changes we have observed over the past and projected changes in future climate poses many challenges for agriculture in California. To assist agriculture in adapting to climate variability and change, the Cooperative Extension (CE) Specialist will create an applied research and extension program focused on translating current and future climate information into decision support framework suitable for use by agricultural community and Extension academics. The CE Specialist will also provide leadership role to enhance capacity within University of California Agriculture and Natural Resources (UC ANR) academics to address climate change issues. The CE Specialist will be located at University of California – Merced and will have a statewide appointment with area of responsibility in climate adaptation in agriculture.

Extension:
The CE Specialist will work with a diverse group of stakeholders including other UC ANR academics, academics at CSU Fresno and UC Merced, growers, commodity organizations, government agencies (CDFA, California Department of Water Resources, State and Regional Water Resources Control Boards, U.S. Bureau of Reclamation, USDA/NRCS, local water districts) to increase agriculture resilience to climate change. The CE Specialist will be expected to lead a program that will involve and benefit other programs within UC ANR. Methods of communication will include workshops, participation in conferences and UC ANR Strategic Initiative and Program Team meetings, Internet communications, social media messaging, scientific and trade journals and other forms of communication with the popular media.

Research:
The CE Specialist will develop a research program in one or more aspects of agricultural resilience to climate risks. The CE Specialist will build applied research program to analyze climate influence on important agricultural crops in California and to translate this information into decision tools and data products. The CE Specialist will be responsible for interacting with a wide range of CE stakeholders to better understand their perspectives on decision-making needs in regard to climate change and variability and develop research program to address those important needs. The CE Specialist will also provide leadership role in building capacity within the UC ANR to address and integrate climate change information into their existing programming.

All UC ANR CE Specialist appointees are responsible for performance in the areas of extending knowledge and information, applied research and creative activity, professional competence and activity and University and public service.

ACADEMIC PROGRAM MAJOR RESPONSIBILITIES:

- Conduct and report regular needs assessments to identify priority issues or problems relevant to the local clientele groups being served.
- Develop and implement effective UC ANR Cooperative Extension applied research and educational programs to address the identified priority needs of the clientele that are consistent with ANR's Strategic Vision and ANR initiatives http://ucanr.edu/files/906.pdf.
- Create a research and extension program on translating climate information into decision tools and data products.
- Provide leadership role to build capacity within UC ANR academics to address climate change information with respective clientele.
- Provide technical expertise in agricultural adaption strategies.
- Work directly with the Strategic Leader for the ANR Water Initiative.
- Work with AES faculty, CE specialists, and CE advisors throughout California, working on water and crops.
- Develop close working relationships with county-based CE advisors in key agricultural regions.

AFFIRMATIVE ACTION:

- Comply with all applicable federal and state laws and regulations, and all University policies regarding affirmative action, including prohibition of discrimination on the basis of race, color, national origin, religion, sex, sexual orientation, physical or mental disability, age, veteran status, medical condition, ancestry or marital status.

- Promote, in all ways consistent with other responsibilities of the position, accomplishment of the affirmative action goals established by UC ANR.

- Take all measures necessary to assure that any employee or volunteer workers supervised by this position fulfill their affirmative action responsibilities.

- Plan and conduct programs in such a manner as to provide equitable service to all ethnic and gender groups that comprise the potential clientele population for the program.

- Identify any barriers to clientele participation related to ethnicity, gender, or other characteristic of concern under the University's affirmative action policies, and take corrective action as needed to remove such barriers.

RELATIONSHIPS

Responsible administratively to the Associate Vice President for the conduct of UC ANR programs.

QUALIFICATIONS

A minimum of a Ph.D. is required, though other advanced degrees are encouraged, with a background in a discipline related to hydrology, agronomy, soil science, agricultural engineering and/or precision agriculture. Excellent written, oral and interpersonal communication skills are required. A demonstrated ability in applied agricultural research and extension of information is desirable.

Tapan Pathak
Climate Adaptation in Ag
CE Specialist

1-30-2016
Date

Chris Greer, Vice Provost
of Cooperative Extension

1-27-2016
Date

William E. Frost
Associate Vice President

1-27-2016
Date

Statement of Assignment

I am a Cooperative Extension Specialist in Climate Adaptation in Agriculture with ANR since 2015. I have statewide responsibilities with 1.0 FTE appointment with ANR and 0.0 FTE appointment in the Dept of Civil and Environmental Engineering, UC Merced. I hold indefinite status as Associate CE Specialist Step-III and seeking regular term merit to Associate CE Specialist Step-IV.

Climate is highly variable and significantly changing in California and across the world. Since California grows many high value crops, impacts of climate on agriculture are far more significant here compared to anywhere else in the nation. Farmers and technical service providers are under constant pressure to adjust and adapt to weather and climate extremes. Agricultural resilience to climate change is one of the significant priorities for the state and for the University of California. And since California leads the world in supplying major share of several commodities, it becomes national and global priority as well. To contribute to addressing this grand challenge, I have developed highly collaborative, well balanced, and well-funded research and Extension program. During this review period, my program was focused on one theme: Enhancing agricultural resilience to climate and weather-related risks. My work contributes directly to at least two of ANR's public value statements, safeguarding abundant and healthy food for all Californians and building climate-resilient communities and ecosystems with desired condition change to increase preparedness and resilience to extreme weather and climate change and to improve food security.

Highlights of accomplishments during this review period

- I co-authored 22 publications that includes 12 peer-reviewed journal articles and other peer-reviewed publications, 1 popular press article, 3 technical reports, and 6 published abstracts. Peer-reviewed publications were all in top-tier journals
- I gave 33 Extension presentations, co-organized 12 workshops and directly reached approximately 3000 clientele statewide through my Extension activities
- I was interviewed by leading national media outlets such as The Wall Street Journal, LA Times, New York Daily News, Mother Jones, Yale Climate Connection, ABC News, in addition to several statewide and commodity focused outlets. I devoted significant time commitment to this, as media outlets provide an opportunity to reach a highly diverse audience in significant numbers and amplifies the conversation around climate change and agriculture
- In April of 2024, Governor Gavin Newsom publicly acknowledged the transformative study I co-authored on covering canals with solar panels and announced groundbreaking $15 million investment to install solar panels over canals in California, Oregon, and Utah. This is in addition to the $20 million investment made by the Turlock Irrigation District in 2022. Reflecting on our paper, Gov. Newsom remarked, "Why didn't we do this 25, 30 years ago?... very, very proud of this moment and the progress we're announcing and advancing here." This recognition highlights the profound, far-reaching impact of the work I contributed to, which promises to deliver lasting benefits in water conservation and energy production for decades to come
- I was invited along with experts nationwide to contribute to the National Climate Change Roadmap report. In addition to general contributions, my own proposed insight on adoption of agrivoltaics made it into the report under Energy-Smart Agriculture and Technology Integration theme. This report is highly impactful as it influences USDA-NIFA funding priorities.
- I was honored to be invited to deliver the keynote at two distinguished events, one of which was organized by highly prestigious National Academies of Sciences
- In recognition of my work, I was honored to be invited by several international entities in Chile, Japan, Jamaica, Uzbekistan, Canada, and Mexico to participate in and lead high-level discussions on climate-smart agriculture, underscoring the global impact and relevance of my work. In addition, I was invited to collaborate with professors from Thailand and India on relevant topics
- In this review period, I secured 4 new grants as Co-PI, totaling more than $3 million in funding

Theme #1: Enhancing agricultural resilience to climate and weather-related risks

Background, Rationale, Problem: I have established highly integrated, and collaborative program in applied climate science and agricultural interactions that is recognized at the state, national, and international levels. My program makes significant impacts by quantifying climate risks, developing innovative solutions, and translating these findings into actionable adaptation strategies and decision support tools. Solutions are tailored to meet the stakeholders' priorities, providing actionable, science-based insights to enhance agricultural resilience to weather and climate risks.

Clientele: Targeted groups include growers, commodity groups, industry, non-profit entities working with and supporting the work of agricultural producers, state, and federal government agencies, as well as academic colleagues that work closely with agricultural clientele.

Applied Research and Extending Knowledge and Information

1. CalAgroClimate – Decision Support Tools for Managing Risks

Activities and Outputs: I am leading the project on web-based decision support system called CalAgroClimate. It converts raw weather data and forecast into regionally relevant and crop specific decision support tools useful in managing risks. A big shoutout to an amazing IGIS team and other team members on this initiative. This project would not have been possible without this team. It has five decision tools, heat, frost, pest, crop phenology, and agroclimatic indicators. These tools use combination of high-resolution historical data and weather forecast.

We launched CalAgroCliamte in Nov. of 2022 for free public access. I have made significant efforts to disseminate the information through various methods including newsletters, radio, social media, news media interviews, Extension workshops, and tradeshow events. I helped write article on CalAgroClimate for ANR and UC Merced news release, which helped gaining visibility. Later local ABC News taped my interview and broadcasted in primetime news. After these initial media contributions, I've spent significant time to disseminate info on tools in various Extension events.

Outcomes and Impacts: Given the volatility in the climate and impacts it has on agriculture, having a system that provides early indication of risks and resources to minimize risks can be extremely impactful. In the survey we conducted during this review period, about 52% (n=152) farmers and about 75% (n=71) of the technical service providers (TSP) mentioned that they are interested in using online decision support tools. In separate workshop evaluation, 46.7% (n=15) said that CalAgroClimate tools were "very helpful", while 26.7% felt it was "extremely helpful". Here is a public quote from farmer, Scott Hunter, of Hunter Farms, on CalAgroClimate, "*The information could be very helpful. We've had these options in the past, but you have to go to different sites to get them… Now to be able to instantaneously get the historical data, it's a valuable tool for farmers. It's a great, great thing put together…will definitely make use of the data… To be able to do that in a targeted way is responsible and it's the future of farming here in California.*". TSP mentioned, "*The workbook was helpful, but I feel that…CalAgroClimate help me more. They seem to be more adaptable to the field and are more user-friendly…CalAgroClimate - Looking at numbers helps with making recommendations. Having them at our fingertips is very helpful!*" As a result of intensive dissemination efforts, CalAgroClimate has been widely and routinely used by stakeholders. Tools has been accessed more than 31,000 times. Through targeted outreach and workshops delivered, farmers and technical service providers across California have increased their understanding and adoption of CalAgroClimate tools, thereby increasing preparedness and resilience to extreme weather and climate change and to improved food security (condition change).

2. Seasonal climate forecasts and winter chill prediction

Activities and Outputs: During the review period ANR project scientist from my lab, Jha, and I published a paper that assessed the use of climate models for chill forecast. We used two dynamic climate models, Climate Forecasting System version 2 (CFSv2) and Canadian coupled general circulation model version 4 (CanCM4). Although there are many literatures on assessment of

improved seasonal forecast, but to our knowledge no study has investigated the linkage of seasonal forecasts to crop specific information that farmers and researchers can use operationally.
Outcomes and Impacts: Climate change is significantly affecting winter chill accumulation. In last 50 years, there has been 30-40% decline in winter chill accumulations. Knowing ahead of time whether there will be enough chill for the coming season, farmers and researchers can use that information to better manage orchards to manage risks. Our results demonstrated better skill in capturing the interannual variability of chill, especially during years with substantial decrease in chill. Additionally, the seasonal forecast showed potential in providing crop specific chill sufficiency prediction. Low chill can affect flowering and potentially yield, however, there are certain management practices can reduce the impacts. Such early warning information can help growers better manage risks and avert losses. This work contributes directly towards ANR public value statement of building climate-resilient communities and ecosystems.

3. National Climate Change Roadmap

Activities and Outputs: I was invited to serve on the working group for the National Climate Change Road Map along with select group of experts nationwide with USDA leadership from Washington D.C. The Road Map was designed to engage the science community to inform key research and funding priorities for the USDA-NIFA. I contributed through several stages: generation of key research issues and associated research questions by Working Group members; thematic review and refinement of those key research areas; and an in-person convening of select members in Denver to ground truth and expand upon the earlier iterations of priority research questions. My original research insight on potential benefits of agrivoltaics was selected to be listed in the report.
Outcomes and Impacts: Addressing climate change impacts facing agriculture and natural resources is a global priority. However, translating science to solutions requires national and international policies that support more sustainable forms of land use, efficient agricultural production, and community engaged research. This report is designed to develop a science agenda that is holistically designed to serve researchers, policymakers, farmers, and practitioners. Through this contribution, I made a meaningful impact by enhancing awareness and influencing key decision-makers and policymakers. This report directly informs funding priorities for NIFA and other federal agencies, leading to lasting outcomes and impacts driven by my contributions.

4. Climate change impacts on agricultural insect pests:

Activities and Outputs: During the review period, we published this research work on assessing impacts of climate change using the latest CMIP6 climate change scenarios on Oriental Fruit Moth, Peach Twig Borer, and Codling Moth for all Central Valley Counties. Project scientist in my lab, Jha, led, UCCE Advisor Rijal was co-author, and I served as a corresponding/senior author. Information was extended through workshop presentations, social media, and media interviews.
Outcomes and Impacts: One of the biggest and probably under-researched impacts of climate change is quantifying impacts on pests and expected damage to agriculture. Through this research, we projected that climate change would contribute 1 or more additional generations of major nut and fruit pests, by the mid-century. Being able to quantify risks associated with insects under climate change will enable agricultural industry to prioritize development of varieties that are resistant to insect borne diseases and be able to minimize future risks associated with potentially damaging insect pest for various crops. No detailed research has been done on these pests. We published work on impacts of climate change on Oriental Fruit Moth, Peach Twig Borer, Codling Moth. These crops have combined revenue of more than $4 billion, understanding threats and being able to plan for strategies ahead of time can save growers thousands of dollars. In statewide survey that we conducted, over 80% of the growers mention that they are concerned with pest and disease pressure. Pre workshops, only 2% of growers and TSP had “superior knowledge” on climate change and pest topic and after workshops, 44% reported superior knowledge. California office of environmental health and hazard assessment recognized the importance of this work and invited me to summarize it

to be listed on their report. Similarly, UCOP and USDA NIFA highlighted this work and listed on their news and communication channel. Through this highly relevant applied research and targeted outreach and educational workshops, we enhanced growers' capacity across California on this issue and their capacity to address it with science-based information resulting in potential saving of thousands of dollars. This work directly contributed to the condition change of increasing California growers' preparedness and resilience to extreme weather and climate change.

5. Multifaceted pathways to climate-smart agriculture

I am a project director of this USDA funded work. The overarching goal of this highly collaborative project is to develop multifaceted pathways to climate-smart agriculture through stakeholders needs assessments; climate-smart agriculture trainings for technical service providers; regional workshops for farmers and ranchers; and student education.

Activities and Outputs:

Climate Change and Agriculture Comprehensive Needs Assessment

The critical initial step for developing climate-smart agriculture strategies for farmers and ranchers is to understand and document their perceptions, experience, and knowledge of climate change exposures, potential impacts, and social vulnerabilities. Additionally, it is also important to know what effective risk management practices they currently use, what tools and resources would assist them in making strategic decisions, and what types of Extension education activities would help them in choosing and implementing climate smart agriculture practices and where to find necessary resources. We conducted comprehensive statewide survey, 5 focus groups, and informal interviews. Survey data from more than 600 legitimate responses were analyzed and documented. This work was first authored by my team member, Ikendi, with long list of ANR academics and other collaborators as co-authors. I contributed to every aspect of this work and chose to be listed as last/senior author.

Climate-Smart Ag workshops and Trainings

Assessing their level of knowledge and perception helped tailoring knowledge transfer and sharing program and extension education activities. During this review cycle, we organized six workshops across the state for farmers, and two trainings for technical service providers. These workshops were organized in collaboration with UCCE advisors to ensure relevant topics/speakers are included.

Outcomes and Impacts: State is highly diverse in what we grow and since each crop responds to climate differently, understanding stakeholders' perspectives, experience, and knowledge on climate change and needs for tools, resources, and extension programs for implementing climate-smart agriculture practices can provide valuable insights for the state. There are no comprehensive published documents of this efforts.

As a result of these efforts and we ensured the information on climate-smart agriculture strategies are equitable and inclusive, farmers and ranchers, including socially disadvantaged groups, are better equipped with information and mobilized resources to reduce climate and weather-related risks, technical service providers are better connected and equipped with tools and resources. In this project, so far, we have directly reached appx. 500 farmers and technical service providers statewide. In Jamaica, I shared project framework with the College of Agriculture, Science & Education. It motivated them, and as a result, they initiated a nationwide conversation and planning to implement a similar program in Jamaica. This demonstrates the direct international impact of my work.

In combined pre-workshop assessments so far, (n=231), the overall mean knowledge of climate-smart ag programs and practices was 2.7, which falls within "minimal knowledge" and after the workshop, the overall mean knowledge changed significantly to 4.0 which is "adequate knowledge". By theme, workshop participants 33.3% (n=40) had basic knowledge of climate change trends before the workshop and the majority 57.5% (n=69) had gained additional knowledge and 23.3% (n=28) had gained superior knowledge. Additionally, 44.2% (n=53) had a basic knowledge of climate change impacts on their cropping systems before attending the workshop and after attending the workshop, the majority 55.0% (n=66) had gained adequate knowledge, and 36.7% (n=44) had gained

superior knowledge. Similar results were found for adaptation practices and tools and resources. These outcomes show significant increase in capacity of farmers and ranchers to adopt climate-smart practices which is directly linked (as described in many literature) to the condition change of enhanced agricultural resilience to climate risks.

Professional competence and activity

My strong professional competence is evident through various high-level engagements at state, national, and international levels. At state level, I was invited by CA Office of Environmental Health Hazard Assessment to advise their Indicators of Climate Change in California report, specifically on how to expand section on indicators of the observed impacts of climate change on California agriculture. Nationally, I served on two separate USDA grant review panels (program info not disclosed to maintain privacy). I was invited to participate in two additional national efforts, National Climate Change Roadmap and Environmental Defense Funds national reports. I was honored to give a keynote speech at the event that was organized by highly prestigious US National Academies of Sciences. I am a review editor for Journal of Crop Improvement. I had extensive invited international engagements in Chile, Jamaica, Japan, Canada, and Mexico. These documented evidence reflect the breadth and impact of my work and its recognition across state, national, and global platforms.

University & Public Service

I made exceptional contributions in university and public service activities. In 2021, I was appointed to serve on the ANR Peer Review Committee for three years (two years during this review period). This is the most important university service that I've served on. I served on/chaired 3 ANR search committees. I co-organized Workshop on Climate and Agriculture for UC Merced undergraduate students along with CE Specialist, Karina Díaz Rios. In this workshop, students attended guest lectures, hands-on activities, field tours, and group project related to climate and agriculture. Karina, Samuel (academic coordinator in my team) and I devoted significant time in the planning and execution of various activities. As an outcome, these undergraduate students, many of whom had no background in agriculture, found workshop a highly rewarding experience. This student quote sums it up, "*I want to pursue a career in agriculture and education…I want to create my own outdoor school that teaches horticulture and culinary. After participating in this workshop, I want to engage youth and community members in becoming advocates for the Earth. I also want to get inner city youth more aware of agriculture and the career possibilities they have. Growing up in the Bay Area, you're told people who work in tech are the ones who make money, but you're not taught much about agriculture.*" Overly positive feedback from students really motivated us up to continue hosting it next year. I am representing ANR on the Extension Foundation Climate Action workgroup.

Affirmative action and contributions to equity, diversity, and inclusion (EDI):

My program resources are made available to all eligible participants in a non-discriminatory manner and striving to achieve parity through All Reasonable Efforts. We conducted statewide survey on climate-smart ag. To effectively reach a diverse audience, we translated the survey into Spanish and distributed it in both languages. Additionally, to ensure inclusivity and amplify voices from underserved communities, we organized two focus groups specifically for small-scale growers from Hmong, Asian, and African American backgrounds, targeting those who may not have the capacity to complete the survey. In one instance, a last-minute request for Spanish translation was made for my workshop. We swiftly secured translation services to meet the need. I serve on the CAFF and CalCAN advisory team, which predominantly works for farmers of color, immigrant, indigenous, and women farmers. In the UC Merced workshop, we prioritized gender and racial diversity, an appx. 50-50 male-to-female ratio. Additionally, 58% of participants identified as Hispanic, many of whom were first-generation college students. Internally, I work with ANR colleagues from diverse ethnic and cultural backgrounds. I served on search committees, and I always give significant importance to equity, diversity, and inclusion. Team that I directly supervise is highly diverse as well, reflecting my commitment to fostering inclusive and representative work environment.

A. Project Summary

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
Enhancing agricultural resilience to climate and weather-related risks (16)				
Multifaceted pathways to climate-smart agriculture through participatory program development and delivery	PI	30+ ANR colleagues and other UC and external collaborators	$1,500,000 2021 – 2026	USDA – NIFA
Labor and Automation in California Agriculture (LACA): Equity, Productivity & Resilience	Co-PI	PI, Tom Harmon	$3,100,000 ($120,000 direct funds) 2020-2025	UCOP – MRPI
Development of CalAgroClimate - Web-based Decision Support Systems to Improve Crop Management Decisions	PI	IGIS, USDA, UC Davis, UC Merced	$138,000 2018 – 2023	USDA
Translating the USDA Climate Indicators for Agriculture report into Region-specific, Actionable Information for California's Economically important Agroecosystems	PI	Co-PIs, Parker, Ostoja	$50,000 2021 – 2022	USDA
California Ecosystem Climate Solutions	Co-PI	PI, Mike Goulden	$4,000,000 (Direct funds for full-time project scientist for 2 yrs. that I co-supervised) 2019 – 2023	Strategic Growth Council
Climate change and Farming in Japan - Japan Society for the Promotion of Science	Co-PI	PI – Haruhiko Iba	Kyoto University covers the cost of international conference travels and collaborative meetings in Japan 2021 – 2024	Japan Society for Promotion of Science
Climate change and agricultural insect pests	PI	Co-PI, Jhalendra Rijal,	In-kind, supported by other projects 2020 – ongoing	Institutional collaborations

Project Title	Role	Collaborators	Support Amount/Duration (if applicable)	Support Source
Integrated Assessment of Climate Impacts on Ecosystem Functions and Productivity of Critical-Zone Eco-Hydrology	Co-PI	PI, Davide Cammarano	$1,100,000 (No direct support, work is collaborative) 2021 – 2025	NSF
INFEWS: Sustaining California's food production through integrated water and energy management	Co-PI	PI, Martha Conklin	$2,500,000 (No direct support, in kind contribution) 2019 – 2023	USDA – AFRI
Partnership on Solar Aquagrid: Feasibility Study	Co-PI	PI, Roger Bales	Postdoc/student mentoring – No direct funding 2019 – 2022	UC Merced
USDA Agricultural Adaptation Workbook	Co-PI	PI, Steve Ostoja	No direct support, in kind contribution	USDA
Building ranching and rangeland resilience among beginning and first-generation ranchers	Co-PI	PI, Leslie Roche	$6,700 (in-kind contributions) 2021 – 2023	SAREP
California Fifth Climate Change Assessment Sierra Nevada Regional Synthesis Report	Co-PI, ANR, PI		$300,000 ($141,000 direct funding) 2023 – 2026	CA – LCI/UC Merced
Climate Change Impact Assessment and Adaptation and Mitigation Measures for Major Crops in the Feed the Future Countries	ANR PI	PI, Dr. Prakash, Mississippi State University	Direct funding, $15,000 2023- 2024	Mississippi State University
A fusion outlook product for predicting climate water variation toward efficient decision making	Co-PI	PI, Isabella, UC Irvine	$2,000,000 ($200,000 direct funding) 2023 – 2025	UCOP/UC Irvine
Ventura County Climate Action Plan (CAP) Implementation Programs	Co-PI	PI, Annemiek Schilder	$420,136 ($302,000 direct funding) 2023 – 2027	County of Ventura

B. Professional Competence and Professional Activity

Professional Development and Training

Begin Date - End Date	Location	Name, Description and Occurrence of Activity
December 2023	San Francisco, CA	American Geophysical Union Annual Conference
July 2023	Omaha, NE	American Society of Agricultural and Biological Engineers Annual Conference

Disciplinary Society or Professional Association

Disciplinary Society/Prof. Assoc Name	Membership/Meetings Attended/Activities
University Council of Water Resources	Invited delegate
Extension Disaster Preparedness Network	University Delegate
Signa Xi Scientific Society	Invited member

Evidence of Professional Competency

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Oct 7, 2020 (Ongoing)	International	Invited to serve on funded international project related to climate adaption in agriculture. Invited scientists are from USA, Japan, Germany, Thailand, and Taiwan
May 7, 2021 - Nov 1, 2023	Remote	Invited to review and advise CA Office of Environmental Health Hazard Assessment (OEHHA) on their upcoming report, Indicators of Climate Change in California, specifically on how to expand section on indicators of the observed impacts of climate change on California agriculture
Oct 28, 2022	Fresno, CA	Guest lecture - Fresno State University titled "Climate change and California agriculture"
Jan 9, 2023 - Jan 13, 2023	Online	Invited to serve on the USDA - NIFA grant review panel
Apr 1, 2023 - Sep 30, 2023	Denver, CO	Invited working group member - National Climate Change Roadmap
Apr 24, 2023 - Apr 27, 2023	Fresno, CA	UC ANR Statewide Conference Learning & Poster Sessions Committee Member

Begin Date - End Date	Location	Name, Description and Occurrence of Award, Recognition, Professional Presentation, Office or Activity
Apr 26, 2023	Fresno, CA	UC ANR Statewide Conference Panel Discussion - Innovations in Weather and Climate Science, Tools, and Data
Apr 27, 2023	Fresno, CA	UC ANR Statewide Conference Panel Discussion - Food Systems: Healthy Planet, Healthy People
May 8, 2023	UC Merced	Invitation only focus group with UC Merced and Texas A&M leadership on ag research needs
May 18, 2023	Davis, CA	Invited to participate in Soil-Water Expert Convening organized by CDFA
May 26, 2023 - Jun 6, 2023	Jamaica	Series of conversations on climate smart ag project implementation with Jamaican faculty
May 31, 2023	Jamaica - College of Agriculture Science and Education	Invited talk - Climate change and global food insecurity.
Jun 1, 2023	Jamaica - College of Agriculture Science and Education	Invited talk - Climate change impacts on agriculture
Jun 2, 2023	Jamaica - College of Agriculture Science and Education	Invited talk - Decision support tools and resources for climate smart agriculture
Jul 8, 2023	Tokyo, Japan	Japan Society of Agriculture Management Research Invited talk - Climate change and California Agriculture
Sep 20, 2023	Sacramento, CA	Vineyards of the future Expert Convening
Oct 28, 2023 - Nov 4, 2023	Samarkand, Uzbekistan	Keynote speech - Innovative Solutions to Vulnerabilities. Accelnet PEER2PEER Workshop: Opportunities for Building Resilience in the Face of Transboundary Water Resource Vulnerabilities – A Focus on Central Asia, co-organized by National Academies of Science
Dec 1, 2023 (Ongoing)	Merced	Reviewing editor for Journal of Crop Improvement
Aug 7, 2024	Chile	Workshop on Rational use of water in winegrape vineyards - Challenges, strategies, and perspectives under a climatic crisis scenario. Gave an invited talk on Tools and strategies for managing climate risks for wine grape production in California

C. University Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Jan 1, 2019 (Ongoing)	Serving on UC ANR Water Strategic Initiative Advisory Committee	University-wide	Committee member
Dec 7, 2021 (Ongoing)	UC ANR Peer Review Committee	Division-wide	Member of the UC ANR Peer Review Committee
Aug 1, 2022 - Nov 22, 2022	Search committee chair - Academic Coordinator AP#22065s	Division-wide	Search committee chair
Oct 1, 2022 - Feb 28, 2023	Regenerative Ag CE Assistant Specialist AP# 22-62	Division-wide	Search Committee Member
Aug 1, 2023	UC Merced/ANR postdoc committee (failed search)	Division-wide	Chair
2022- 2023	Peer review committee	Division-wide	Committee member
Jan 1, 2024 - Jun 30, 2024	Search Committee Chair - UC Merced/UCCE Ventura Postdoc	University-wide	Chair
Mar 3, 2024 - Mar 17, 2024	Hosted visiting professors from Thailand and Japan to work with me and learn about climate adaptation in agriculture in California	International	Faculty Host
Mar 22, 2024 - Mar 29, 2024	Climate and Agriculture Spring Workshop for Undergraduate Students	University-wide	Co-organizer

D. Public Service

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Feb 3, 2015 (Ongoing)	Serving on USDA California Climate Hub Steering Committee: provide inputs on Climate Hub goals, priorities, and deliverables	National	Advisory committee member
Dec 1, 2020 (Ongoing)	Invited member of California Climate and Agriculture Network Science & Technical Advisory Council	State	Invited advisory council member
Jul 15, 2022 (Ongoing)	California Alliance of Family Farmers-Wildfire Resilience Advisory Council	State	council member

Begin Date - End Date	Name, Description, and Occurrence of Activity	Org Level	Your Contribution and Leadership Role
Nov 9, 2022	Climate change dialogue with 8th grade students at Southlands Christian School in Southern California	Community	Presenter
Aug 1, 2023 - Aug 31, 2023	USDA climate hub fellow search committee	State	Search committee member
Oct 18, 2023	Participated in invitation only CalCAN Advisors Meeting to discuss scientifically importance of topics for CalCAN sponsored bills	State	scientific advisor
Nov 24, 2023	Meeting with meteorology specialists	International	Discussion on using climate information for long-term adaptation planning: Information needs, modeling capabilities & tools
Jan 30, 2024 - Feb 1, 2024	The Extension Foundation, Climate Action Convening	National	UC ANR representative

E. Extension Activities

Meetings Organized

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
Enhancing agricultural resilience to climate and weather related risks (11)					
Mar 8, 2023	Focus group for small farms	Climate smart agriculture focus group	Organizer	Fresno, CA	30
Mar 22, 2023	Climate Smart Agriculture for Nut Production Workshop	Climate Smart Agriculture for Nut Production	Organizer	Merced, CA	35
May 26, 2023 - Jun 6, 2023	Climate Smart Agriculture workshop for Jamaican ag experts	Climate Smart Agriculture workshop	Organizer	Jamaica	30
Jul 20, 2023	Climate Smart Agriculture Focus Group	Climate Smart Agriculture Focus Group	Organizer	San Diego, CA	15

Begin Date - End Date	Meeting Name and Type	Topic/no. of repetitions	Role	Location(s)	Total No. of Attendees
Jul 24, 2023	Climate Smart Agriculture Focus Group with Ranchers	Climate Smart Agriculture Focus Group with Ranchers	Co-organizer	Siskiyou, CA	10
Aug 31, 2023	California Adaptation Forum	Session - Advancing decision support for climate adaptation in agriculture and natural resources	Session Co-organizer	Pomona, CA	80
Nov 23, 2023	UC Davis Chile, Meeting with ministry of agriculture and meteorology team	Are long-term climate projections useful for on-farm adaptation decisions?	Discussion lead	Chile	20
Mar 5, 2024	Adapting fruit, vegetable, and berry production practices in Ventura county to changing and variable climate	Adapting fruit, vegetable, and berry production practices in Ventura county to changing and variable climate	Co-organizer	Ventura, CA	65
Mar 6, 2024	Adapting vegetable, berry, and grapevine production practices in the Central Coast to changing and variable climate	Adapting vegetable, berry, and grapevine production practices in the Central Coast to changing and variable climate	Co-Organizewr	Salinas, CA	65
Mar 7, 2024	Adapting fruit and nut production practices in the San Joaquin Valley to changing and variable climate". Tulare, California	Adapting fruit and nut production practices in the San Joaquin Valley to changing and variable climate. Tulare, California	Co-organizer	Tulare, CA	68
May 2, 2024	Managing Agriculture Under Climate and Weather Extremes Workshop For Technical Service Providers	Managing Agriculture Under Climate and Weather Extremes Workshop For Technical Service Providers	Co-organizer	Davis, CA	20

Educational Presentations

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Enhancing agricultural resilience to climate and weather-related risks (33)				
Nov 4, 2022	Calaveras Winegrape Alliance	Impact of Climate Change on Sierra Foothills Agriculture	Calaveras, CA	40
Nov 15, 2022	USDA-FAS Cochran Fellowship Program	Climate Change Trends and Impacts on Fruit and Nut Production in California	Kearney Ag Research and Extension Center	20
Jan 19, 2023	EcoFarm 2023	CalAgroClimate Decision Support Tools	Monterey, CA	150
Feb 15, 2023	World Ag Expo	CalAgroClimate Decision Support Tools for Managing Risks	Tulare, CA	100
Feb 28, 2023	US Global Change Research Program - Climate Change, Food Systems, and Nutrition Security Bi-monthly Meeting	CalAgroClimate Tools Demo	Online	40
Mar 8, 2023	California Regional Conservation District Conference	California Agriculture in a Changing Climate: Resources for Resilience	Online	100
Mar 22, 2023	Climate Smart Agriculture for Nut Production Workshop	CalAgroClimate Decision Support Tools for Managing Risks	Merced, CA	35
May 11, 2023	Santa Clara Master Gardeners	Climate change impacts on gardening	Santa Clara, CA	80
May 25, 2023	2023 Climate Action and Agriculture Symposium	Climate Impact on Agriculture and UC ANR Research and Resources	San Diego, CA	50
Jul 18, 2023	Avocado Irrigation Workshop	Challenges due to climate change and tools and resources to manage risks	Oxnard, CA	60
Jul 20, 2023	Climate Smart Agriculture Focus Group	CalAgroClimate Decision Support Tools	San Diego, CA	20
Aug 10, 2023	Avocado Irrigation Workshop	Challenges Due to Climate Change and Tools and Resources to Manage Risks	Escondido, CA	80

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
Aug 31, 2023	California Adaptation Forum	CalAgroClimate - Decision Support Tools for Managing Risks in Agriculture	Pomona, CA	80
Sep 7, 2023	Keynote address - 2023 Climate tech	Climate Volatility and Crops	Woodland, CA	70
Oct 13, 2023	Labor automation in agriculture	CalAgroClimate - tools for managing risks in agriculture	Riverside, CA	30
Oct 30, 2023	Advances in Grapevine Water Management Workshop - Baja California	Tools and strategies for managing climate risks for wine grape production in California	Ensenada, Mexico (Remote)	100
Nov 15, 2023	The Tulare Basin Watershed Network (TBWN), State of the Tulare Basin Conference.	Climate change and tools and resources for managing risks in agriculture	Tulare, CA	50
Nov 21, 2023	UC Davis Chile field day presentation to growers	Climate change: Fruit trees under stress	Chile	40
Nov 22, 2023	ExpoNut Industry Event	Coping with extreme weather events: The California Experience	Chile	700
Dec 7, 2023	San Mateo Resource Conservation District Workshop	Farming in the Face of Climate Change	Half Moon Bay, CA	30
Feb 6, 2024	California Plant and Soil Conference	Impacts of climate change on California's agriculture and tools for managing risks	Fresno, CA	200
Feb 15, 2024	Southern Interior Horticultural Show	Climate Change Trends and Impacts on California Agriculture and Tools and Resources for Managing Risks	Penticton, Canada	350
Feb 26, 2024	CA Irrigation Institute - Fluid Futures: Adapting to Extremes 62nd Annual Conference	Impacts of Climate Change on CA agriculture and Tools and Resources for Managing Risks	Sacramento, CA	40
Mar 5, 2024	Adapting fruit, vegetable, and berry production	Climate change trends and potential impacts on	Ventura, CA	65

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
	practices in Ventura county to changing and variable climate	specialty crops in the Southern Coast		
Mar 5, 2024	Adapting fruit, vegetable, and berry production practices in Ventura county to changing and variable climate	CalAgroClimate Decision Support Tools for managing risks in agriculture	Ventura, CA	65
Mar 6, 2024	Adapting vegetable, berry, and grapevine production practices in the Central Coast to changing and variable climate	Climate change trends and potential impacts on specialty crops in the Central Coast	Salinas, CA	65
Mar 6, 2024	Adapting vegetable, berry, and grapevine production practices in the Central Coast to changing and variable climate	CalAgroClimate Decision Support Tools for managing risks in agriculture	Salinas, CA	65
Mar 7, 2024	Adapting fruit and nut production practices in the San Joaquin Valley to changing and variable climate	Climate Change Trends and Potential Impacts on Agricultural Production	Tulare, CA	68
Mar 7, 2024	Adapting fruit and nut production practices in the San Joaquin Valley to changing and variable climate	CalAgroClimate Decision Support Tools for Managing Risks in Agriculture	Tulare, CA	68
Apr 10, 2024	Water Meeting for Hmong Growers	Climate Change: How does it affect farmers in the SJV?	Fresno, CA	30
Apr 15, 2024	Monitoring and Modeling of the Behavior, Welfare, and Phenology of Insect using ML and AI Techniques - Session, Entomology Society Pacific Branch Meeting	Climate change impacts on insect pests for high value specialty crops in California	Waikoloa, HI	20
May 2, 2024	Managing Agriculture Under Climate and Weather Extremes	CalAgroClimate - Tools for Managing Risks in Agriculture	Davis, CA	20

Begin Date - End Date	Meeting Name/Event	Presentation Topic/no. of repetitions	Location(s)	No. of Attendees
	Workshop For Technical Service Providers			
May 15, 2024	Agronomic Crops and Irrigation Water Management Workshop	Challenges Due to Climate Change and Tools and Resources to Manage Risks in Agriculture	Holtville, CA	50

Other (including TV and/or radio interviews/programs, newspaper/trade magazine interviews)

Begin Date - End Date	Topic	Name of Media or Publication
Oct 30, 2022	The party of food security vs. the party of climate change	New York Daily News
Nov 18, 2022	New interactive web tools help growers cope with climate change	UC ANR News
Dec 13, 2022	CalAgroClimate interview and demo	ABC30 interview
Dec 16, 2022	Discussion on CalAgroClimate Tools	Community Conversations Radio Interview - KYOS 1460
Feb 1, 2023	New Web Tool Offers Crop-Decision Support for Extreme Weather Events	West Coast Nuts
Feb 23, 2023	Aim for the Stomach Why the threat to food supplies—and industrial agriculture's role in global warming—is central to the discourse on climate change	Mother Jones
Mar 29, 2023	California Farmworkers Are Underwater in More Ways Than One	CivilEats
Apr 24, 2023	Digging deeper into climate change data - USDA California Climate Hub's free online compendium: Essentially CalAgroClimate	SeedQuest
May 19, 2023	El Niño is likely returning, bringing danger for California and the world. 'We need to be prepared'	Los Angeles Times (circulated by 22 other news media across the US)
May 22, 2023	California Tree Nut Growers Bat Lead Off in Climate Change Workshops	Growing Produce
Jun 6, 2023	Key Climate Data Added to Enhance Grower Decision-Support Tool	California Ag Today

Begin Date - End Date	Topic	Name of Media or Publication
Oct 5, 2023	Una megainundación podría inundar el Valle Central de California (The other 'big one': How a megaflood could swamp California's Central Valley)	Yale Climate Connection
Nov 30, 2023	Climate change to drive surge in insects that attack almonds, peaches, walnuts	UCOP News
Dec 5, 2023	California researchers say hotter temperatures are sending more and more pests to farms	KVPR
Dec 11, 2023	Climate Change to Drive Surge in Insects That Attack Almonds, Peaches, Walnuts	USDA NIFA News
Mar 18, 2024	Water Risks to Agriculture: Too Little and Too Much	UC Merced News
May 15, 2024	Climate Change Is Affecting My Garden—and It's Not All Bad	The Wall Street Journal
Jun 11, 2024	MyAgLife in Citrus episode, UC Merced's Tapan Parthak explains how the CalAgroClimate online tool can inform citrus growers' climate related management decisions in the short and long term.	My Ag Life
Jun 17, 2024	Paper highlights how climate change challenges, transforms agriculture	UC Merced News
Jul 19, 2024	UC Merced Researchers Paper Highlights How Climate Change Challenges, Transforms Agriculture	Sierra Sun Times
Aug 1, 2024	CalAgroClimate	Between the Furrows A Santa Cruz County Farm Bureau Monthly Publication
Aug 6, 2024	Stressed about climate change? You're not alone	Farm Progress

TAPAN PATHAK
BIBLIOGRAPHY
October 1, 2022 – September 30, 2024

Peer Reviewed	
B - Peer-reviewed scholarly journal publications	10
C - Other peer-reviewed publications	2

Non-Peer Reviewed	
A - Popular press articles	1
D - Technical reports and other non-reviewed articles	3
E - Published abstracts	6

TOTAL	22

PEER REVIEWED

B - Peer-reviewed scholarly journal publications

- *Jagannathan K, Pathak TB and Doll D (2023) Are long-term climate projections useful for on-farm adaptation decisions? Front. Clim. 4:1005104. doi: 10.3389/fclim.2022.1005104*
- Johnson, D.; Parker, L.E.; Pathak, T.B.; Crothers, L.; Ostoja, S.M. Technical Assistance Providers Identify Climate Change Adaptation Practices and Barriers to Adoption among California Agricultural Producers. *Sustainability* 2023, *15*, 5973. https://doi.org/10.3390/su15075973
- Eriksson, M., Safeeq, M., Padilla, L., Pathak, T., O'Geen, T., Egoh, B., Lugg, J. and Bales, R., 2023. Drivers of social acceptance of natural-resource management: A comparison of the public and professionals in California. Journal of Environmental Management, 345, p.118605.
- Mallappa, Vinaya Kumar Hebsale; Pathak, Tapan B. (2023). Climate smart agriculture technologies adoption among small-scale farmers: a case study from Gujarat, India. *Frontiers in Sustainable Food System*. 7.
- Pinzõn, N.; Koundinya, V.; Galt, R.; Dowling, W.; Boukloh, M.; Taku-Forchu, N. C.; Schohr, T.; Roche, L. M.; Ikendi, S.; Cooper, M. H.; Parker, L. E.; Pathak, T. B. (2024). AI-powered fraud and the erosion of online survey integrity: An analysis of 31 fraud detection strategies. Frontiers in Research Metrics and Analytics. *Frontiers in Research Metrics and Analytics*.
- Jha, P. K.; Zhang, N.; Rijal, J. P.; Parker, L. E.; Ostoja, S.; Pathak, Tapan (2024). Climate change impacts on insect pests for high value specialty crops in California. *Science of the Total Environment*. 906, 167605.
- Ikendi, S.; Pinzon, N.; Koundinya, V.; Taku-Forchu, N; Roche, L.; Ostoja, S.; Parker, L.; Zaccaria, D.; Cooper, M.; Diaz-Ramirez, J.; Brodt, S.; Battany, M.; Rijal, J.; Pathak, T.B. (2024). Climate smart agriculture: assessing needs and perceptions of California's farmers. *Frontiers in Sustainable Food Systems*. 8:1395547.

- Jha, P. K.; Pathak, T. B. (2024). Seasonal climate forecasts show skill in predicting winter chill for specialty crops in California. *Communications Earth & Environment*. 5:1.
- Lilavanichakul, A.; Pathak, T.B. (2024). Thai farmers' perceptions on climate change: Evidence on durian farms in Surat Thani province. *Climate Services*. 34:100475.
- Eriksson, M; Safeeq, M; Egoh, B.; Pathak, T.B.; Lugg, J.; O'Geen, A.; Keske, C.; Bales, R. (2024). The potential of collaborative solutions to improve management of California (United States) wildlands. *Restoration Ecology*. e14330.

C - Other peer-reviewed publications

- Parker, L. E., Johnson, D., Pathak, T. B., Wolff, M., Jameson, V., and Ostoja, S. M. (2023). Adaptation Resources Workbook for California Specialty Crops. USDA California Climate Hub Technical Report CACH-2023-1. Davis, CA: U.S. Department of Agriculture, Climate Hubs. 55 p.
- O'Connor, R.; Suttles, K.; McLellan, E.; Grimm, R.; Pilz, D.; Purkey, A.; Fernald, A.; McElvein, A.; Medellín-Azuara, A.; Pathak, T.B.; Preciado, J.; Yorgey, G.; Yourek, M. (2023). Scarcity and Excess: Tackling Water-Related Risks to Agriculture in the United States. *Environmental Defense Fund*. December 11, 2023. https://www.edf.org/sites/default/files/documents/EDF_ScarcityandExcess_Tackling%20Water-Related%20Risks%20to%20Agriculture%20in%20the%20United%20States_0_2.pdf

NON-PEER REVIEWED

A - Popular press articles

- Jha, P; Rijal, J.; Pathak, T.B. (2024). Impacts of climate change on insect pests of walnut and almond crops in California. *International Nut and Dried Fruit Council Magazine*. April 1, 2024.

D - Technical reports and other non-reviewed articles

- Zhang, N.; Parker, L.; Pathak, T.B. Office of Environmental Health Hazard Assessment (OEHHA, 2022). "Winter Chill" in Indicators of Climate Change in California, Fourth Edition, California Environmental Protection Agency, OEHHA. pp. III-24 - III-38. https://oehha.ca.gov/media/downloads/climate-change/document/2022caindicatorsreport.pdf
- Pathak, T.B. Office of Environmental Health Hazard Assessment (OEHHA, 2022). "FRUIT AND NUT MATURATION TIME" in Indicators of Climate Change in California, Fourth Edition, California Environmental Protection Agency, OEHHA. pp. V-81 - V-88. https://oehha.ca.gov/media/downloads/climate-change/document/2022caindicatorsreport.pdf
- Pathak, T.B. Office of Environmental Health Hazard Assessment (OEHHA, 2022). "NAVEL ORANGEWORM ABUNDANCE" in Indicators of Climate Change in California, Fourth Edition, California Environmental Protection Agency, OEHHA. pp. V-89 - V-94. https://oehha.ca.gov/media/downloads/climate-change/document/2022caindicatorsreport.pdf

E - Published abstracts

- Ikendi, S., Koundinya, V., Bergren, C., Taku-Forchu, N. C., Parker, L., Pinzon, N., Roche, L., Cooper, M., Zaccaria, D., Ostoja, S., & Pathak, T. (2023, September 18–20). *Communicating climate-smart agriculture to tree nut growers in the San Joaquin valley of California* (Poster

Presentation). Western Region of the American Association for Agricultural Education Research Conference: The crossroads of food, agriculture, and innovation. Logan, Utah: United States.

- Pathak, T. B., Jha, K. P., Ostoja, S., Parker, L., Zhang, N., Feirer, S., & Johnson, R. (2023, February). *CalAgroClimate–Decision support tools for managing risks* (Poster presentation). California Plant and Soil Conference. Fresno: California, United States.
- Jha, Prakash Kumar; Pathak, Tapan (2023). Application of Seasonal Climate Forecasts in Predicting Chill Accumulation for Specialty Crops of California. *AGU Fall Meeting Abstracts 2023 (2355), A53I-2355*. San Francisco, CA.
- Pathak, TB; Ostoja, S; Jha, P; Parker, L; Zhang, N; Johnson, R; Feirer, S (2023). CalAgroClimate Web-based Decision Support System for Managing Agriculture Under Weather and Climate Risks. *AGU Fall Meeting Abstracts 2023*.
- Ikendi, S., Koundinya, V., Mosase, E. N., Holmquist, H., Spaniel, E. N., Zabronsky, H., Jha, P. K., Parker, L., Pinzon, N., Roche, L., Cooper, M., Zaccaria, D., Ostoja, S., & Pathak, T. (2024, May 20–23). *Pathways to climate smart agriculture in the San Diego region of California* (Poster abstract pp. 481–484 and presentation). National Association for American Agricultural Education Conference: Manhattan, Kansas.
- Ikendi, S., Koundinya, V., Taku-Forchu, N. C., Pinzon, N., Parker, L., Roche, L., Cooper, M., Zaccaria, D., Ostoja, S., Diaz-Ramirez, J., Brodt, S., Battany, M., Rijal, J., & Pathak, T. (2024, April 22–25). *Current state, and future potential of using climate decision support tools for agricultural decision-making in California* (Poster abstract pp. 631–636 and presentation). Association for International Agricultural and Extension Education Conference: Orlando, Florida.