Research Poster

Understanding the Preferences of Growers for Climate Adaptation Extension in California

Samuel Ikendi
Academic Coordinator, Climate Smart Agriculture
University of California Agriculture and Natural Resources/Cooperative Extension, UC Merced
sikendi@ucanr.edu

Vikram Koundinya
Associate Professor of Extension and Evaluation Specialist
University of California – Davis, University of California ANR/Cooperative Extension
vkoundinya@ucdavis.edu

Natalia Pinzón
Postdoctoral Scholar, Climate Resilience in Agriculture
University of California – Davis
npinzon@ucdavis.edu

Lauren Parker
Managing Director, Secure Water Future
University of California – Merced
leparker@ucmerced.edu

Leslie Roche
Professor of Cooperative Extension in Rangeland Management
University of California – Davis, University of California ANR/Cooperative Extension
lmroche@ucdavis.edu

Steven Ostoja
Director, USDA California Climate Hub
University of California – Davis
smostoja@ucdavis.edu

Daniele Zaccaria
Professor of Agricultural Water Management for Cooperative Extension
University of California – Davis, University of California ANR/Cooperative Extension
dzaccaria@ucdavis.edu

Mark Cooper
Senior Lecturer, School of Earth and Environment
University of Canterbury, New Zealand
mark.cooper@canterbury.ac.nz

Tapan Pathak
Associate Professor of Cooperative Extension and Specialist for Climate Adaptation
University of California ANR/Cooperative Extension, UC Merced
tpathak@ucmerced.edu

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Introduction

California is the number one food basket of the United States. Its unique regional microclimatic zones support the production of over 400 commodities, including 40 specialty crops (CDFA, 2023). Also, California's diverse landscape supports a thriving livestock and rangeland industry across the Mediterranean grasslands, woodlands, chaparrals, and the cold desert steppe and warm desert rangelands (Huntsinger & Bartolome, 2014; Roche et al., 2015). Despite its potential to foster economic growth, California's agricultural industry is facing several climate and weather extremes (Pathak et al., 2018). Farmers and ranchers, both conventional and small-scale, are under constant pressure to adjust to uncertain weather and climate events to increase their resilience. In response, a multidisciplinary team of academics from the University of California system and partners developed a climate-smart agriculture project for growers to adapt to extreme climate events. The purpose of this needs assessment study was to identify and prioritize the best extension approaches preferred by the growers to receive information on adaptation strategies.

Framework

This project utilized an extension program framework, starting with a comprehensive needs assessment (Donaldson & Franck, 2016). This critical first step bridges scientific modeling and practical farming by evaluating producers' climate perceptions, current risk management, and systemic barriers, such as regulatory burdens (Lewis & Rudnick, 2019). A transdisciplinary team of researchers and extension educators designed a multifaceted, climate-smart project to help growers navigate complex environmental shifts, such as water scarcity. By gathering regional surveys, the assessment effectively translates field insights into actionable support. These findings shape local digital adaptation tools, refine state initiatives, such as the healthy soils program, and direct university extension programs to deliver realistic adaptation strategies.

Methods

This abstract presents a partial product of the cross-sectional surveys conducted across California's conventional farmers, small-scale farmers, and ranchers, assessing their adaptation strategies, extension needs, and approaches to receive information on adaptation. We present findings from two multiple-choice questions asking three groups of respondents: What is your preferred method to receive information on climate adaptation practices? If we organize climate change workshops, would you be interested in participating? Respondent emails were purchased through Farm MarketID, and others were accessed through the County Extension offices. An electronic mail communication strategy was adopted, and respondents were reached through Qualtrics. Five reminders were sent after the initial call for participation. The research team also used the network of Extension associations to distribute the survey through newsletters, listservs, and social media using a QR code. At the closure of data collection, all responses were cleaned for possible human fraudulent responses and sophisticated AI-generated responses (Pinzón et al., 2024). After thorough clean-up and categorization of responses, the usable data for purposes of this abstract include conventional farmers (*n*=223), small-scale farmers (*n*=124), and ranchers (*n*=102). Data are descriptively presented and comparatively interpreted across groups.

Results

Conventional farmers (*n*=223) responded to the question of preference for receiving information on climate adaptation practices. The majority preferred face-to-face (64%), emails (64%), print publications (57%), and extension events (47%). Other sources include social media

(14%) and group texting (5%). When asked if they would attend educational events, 40% said yes, 20% responded maybe, while 40% said no. Small-scale farmers (*n*=124) responded to the question of preference for receiving information on climate adaptation practices. The majority preferred emails (64%), extension education events (49%), print publications (41%), and face-to-face (40%). Other sources include group texting (23%) and social media (17%). When asked if they would attend educational events, 51% said yes, 24% responded maybe, while 26% said no. Ranchers (*n*=102) responded to the question of preference for receiving information on climate adaptation practices. The majority preferred print publications (76%), extension education events (55%), face-to-face (34%), and social media (31%). Other sources include group texting (10%), and least with emails (5%). When asked if they would attend education events, 46% said yes, 11% responded maybe, while 43% said no.

Conclusions

The preferred methods to receive information on climate adaptation practices were mainly six: print publication, emails, extension events, face-to-face, social media, and group texting. Conventional farmers statistically significantly preferred face-to-face methods to other respondent groups, whereas emails were preferred by both farmer groups more than by ranchers. Relatedly, ranchers significantly preferred print publications compared to farmer groups. Social media and group texting were preferences for ranchers and small-scale farmers, respectively. Small-scale farmers are more likely than the other two categories to attend educational events once organized.

Implications

Efficiency in supporting climate adaptation education by stakeholders requires understanding their preferred formats for receiving such information. Tailoring adaptation information to stakeholder preferences increases the uptake and use, thereby safeguarding their farm enterprises against increasing extreme climate events. This study revealed differentials in preferences; for instance, ranchers indicated a preference for on-site extension, which includes face-to-face and extension events for them to be practical in learning and also demonstrate their stewardship in real time (Banwarth et al., 2023). While large extension events are preferred by conventional farmers for their potential to hold mutual discussions between academics, farmers themselves, and the commodity board. Group communication strategies are preferred specifically by small-scale farmers for their unique specialty crops, unlike conventional farmers. The likelihood of small-scale farmers attending extension events can be explained by the disproportionate nature of climate change impacts that affect them more, yet they have limited access to technical assistance and often have fewer resources to adapt to climate change (Dahlquist-Willard et al., 2015; Dobler-Morales et al., 2021; Pong et al., 2025). While small-scale ranchers, too, have similar challenges (Ikendi et al.,2025; Woodmansee et al., 2025), their preferences in general are expressed through on-site events.

In sum, climate-smart agricultural practices on farmland and rangelands can build agricultural resilience to a changing climate and hold potential for mitigating climate change and creating a more resilient food system. Considering climate change awareness and climate-smart agriculture are relatively recent topics, widespread integration of climate-smart agricultural practices by farmers and ranchers is slow, and in some cases, non-existent. This study, therefore, emphasizes that organizing adaptation extension events for farmers and ranchers, including socially disadvantaged producers based on their needs, would not only enhance their ability to adapt and respond to climate stressors but also enhance their socio-economic stability.

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