

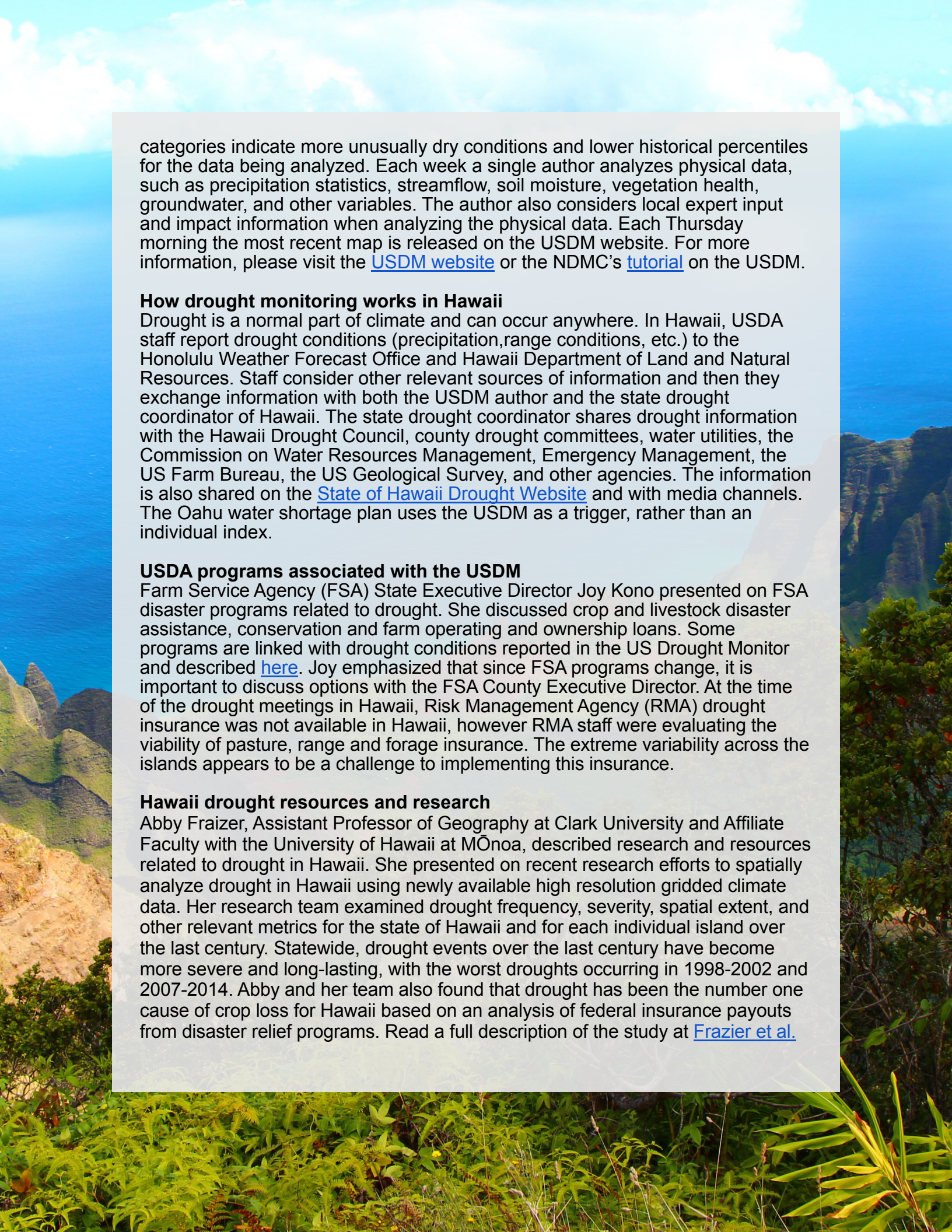
## Drought Monitoring and Response in Hawaii Oahu - October 4, 2022

Representatives from the National Drought Mitigation Center (NDMC), the USDA Southwest Climate Hub, East-West Center, Clark University and the Institute of Pacific Islands Forestry hosted a series of drought workshops in October 2022 on four Hawaiian Islands. The second meeting was held at the East-West Center in Honolulu. Participants represented a variety of agricultural and natural resource management agencies including Oahu Resource Conservation and Development Council, USGS Pacific Islands Climate Adaptation Science Center, Oahu Soil and Water Conservation District, Hawaii Sea Grant, State of Hawaii Department of Land and Natural Resources, State of Hawaii Department of Agriculture, State of Hawaii Department of Hawaiian Home Lands, Hawaii Association of Conservation Districts, USDA Farm Service Agency, USDA Natural Resources Conservation Service, US Fish and Wildlife Service, Honolulu Fire Department, Kahikinui Hawaiian Homestead Association, NOAA National Weather Service. Prior to the meeting, participants noted what they hoped to gain from the meeting on Oahu, including:

- More insight into the United States Drought Monitor (USDM) process and other monitoring efforts.
- A better understanding of federal resources that can support farmers, ranchers and community-based stewardship initiatives as they adapt to drought on Oahu.
- Identify opportunities to further support and interface with the Pacific Drought Knowledge Exchange.
- A deeper understanding of drought mitigation strategies and drought mitigation funding, including USDA programs.
- Increased knowledge of long-term drought trends and severity.
- Recommendations about how to share information on drought impacts.
- Better understanding of other agency programs and collaborations
- Knowledge to mitigate drought risks by applying drought information agency plans
- Identification of citizen science opportunities
- Understanding of drought mapping capabilities available to the community
- Increased knowledge about sources of reliable drought impact information

### **United States Drought Monitor production and process**

Brian Fuchs, climatologist and USDM author, with the National Drought Mitigation Center (NDMC) discussed how the USDM describes drought conditions by historical percentiles that are expressed in a map with different severity categories. The USDM map shows how severely dry different areas are, compared to normals for the location and time of year. The map expresses drought in four categories, each with increasing severity: moderate, severe, extreme, and exceptional drought, as well as abnormal dryness, which is used to depict areas going into or coming out of drought. The more severe drought



categories indicate more unusually dry conditions and lower historical percentiles for the data being analyzed. Each week a single author analyzes physical data, such as precipitation statistics, streamflow, soil moisture, vegetation health, groundwater, and other variables. The author also considers local expert input and impact information when analyzing the physical data. Each Thursday morning the most recent map is released on the USDM website. For more information, please visit the [USDM website](#) or the NDMC's [tutorial](#) on the USDM.

### **How drought monitoring works in Hawaii**

Drought is a normal part of climate and can occur anywhere. In Hawaii, USDA staff report drought conditions (precipitation, range conditions, etc.) to the Honolulu Weather Forecast Office and Hawaii Department of Land and Natural Resources. Staff consider other relevant sources of information and then they exchange information with both the USDM author and the state drought coordinator of Hawaii. The state drought coordinator shares drought information with the Hawaii Drought Council, county drought committees, water utilities, the Commission on Water Resources Management, Emergency Management, the US Farm Bureau, the US Geological Survey, and other agencies. The information is also shared on the [State of Hawaii Drought Website](#) and with media channels. The Oahu water shortage plan uses the USDM as a trigger, rather than an individual index.

### **USDA programs associated with the USDM**

Farm Service Agency (FSA) State Executive Director Joy Kono presented on FSA disaster programs related to drought. She discussed crop and livestock disaster assistance, conservation and farm operating and ownership loans. Some programs are linked with drought conditions reported in the US Drought Monitor and described [here](#). Joy emphasized that since FSA programs change, it is important to discuss options with the FSA County Executive Director. At the time of the drought meetings in Hawaii, Risk Management Agency (RMA) drought insurance was not available in Hawaii, however RMA staff were evaluating the viability of pasture, range and forage insurance. The extreme variability across the islands appears to be a challenge to implementing this insurance.

### **Hawaii drought resources and research**

Abby Fraizer, Assistant Professor of Geography at Clark University and Affiliate Faculty with the University of Hawaii at Mōnoa, described research and resources related to drought in Hawaii. She presented on recent research efforts to spatially analyze drought in Hawaii using newly available high resolution gridded climate data. Her research team examined drought frequency, severity, spatial extent, and other relevant metrics for the state of Hawaii and for each individual island over the last century. Statewide, drought events over the last century have become more severe and long-lasting, with the worst droughts occurring in 1998-2002 and 2007-2014. Abby and her team also found that drought has been the number one cause of crop loss for Hawaii based on an analysis of federal insurance payouts from disaster relief programs. Read a full description of the study at [Frazier et al.](#)

(2022). Abby also described the upcoming expansion of the Hawaii Mesonet, including 95 new climate stations across the state. Mesonet data will be available on the [Hawaii Climate Data Portal](#) (HDCP).

### **Pacific Drought Knowledge Exchange**

Ryan Longman with the Center for Pacific Islands Studies, University of Hawaii at Manoa discussed the [Pacific Drought Knowledge Exchange](#) (PDKE). This program seeks to facilitate drought knowledge exchange and enable collaborative relationships among drought stakeholders in Hawaii and other Pacific Island nations. At the front lines of global climate change, the Pacific Islands experience a range of impacts, including not only drought, but sea level rise, flooding, climate-induced migration, and wildfire. In an effort to help the region combat these impacts, the PDKE was created. The four key aspects of a knowledge exchange include 1) sector- and geography- specific climate information, 2) better and more comprehensive information, 3) improved technical assistance, and 4) a more collaborative information-transfer environment through participation in knowledge co-production. The PDKE engages with regional stakeholders (e.g. watershed partnerships, forest reserves, national parks) to document drought stories, lessons learned, and relevant research; and to produce site-specific Climate Change, Climate Variability, and Drought (CCVD) portfolios in order to co-develop usable tools and educational items.

### **Summary and next steps**

Workshop organizers ran a group activity related to main needs in the regions. Through the discussion they were able to identify main themes and recommendations for each theme:

#### **Agriculture**

- Educating and implementing assistance for soil health and climate smart agriculture, including agro-forestry and silvopasture
- Including native Hawaiians in indigenous agricultural planning (e.g. Taro).
- Including Department of Hawaiian Homelands in outreach to indigenous serving agencies
- Supporting ridge to reef biocultural restoration (considers food and biodiversity and services) led by communities
- Working with farmers to encourage drought observation and monitoring

#### **Water planning**

- Restoring legacy plantation surface water systems and adding storage capacity
- Increasing fences to protect critical watershed areas
- Developing individual drought water shortage plans for water suppliers, irrigators and utilities

- Developing resilient water supplies, recycled water, groundwater back-up wells
- Establishing efforts for watershed restoration and protection

### **Citizen science, outreach and education**

- Developing a mobile APP to synthesize citizen science observations, simplify reporting procedures
- Increasing youth engagement
- Increasing outreach and media awareness about the information regarding drought, possibly through existing newsletters
- Working with non-profit programs to distribute tools and educational materials to the public
- Expanding knowledge and use of the Hawaii Climate Data Portal, Hawaii Mesonet, and the Pacific Drought Knowledge Exchange
- Training researchers and employees on how to efficiently engage in knowledge co-production
- Hosting more face to face meetings to discuss drought
- Hosting scenario planning and adaptation for more variable conditions based on stakeholder needs
- Sharing post-drought assessments

### **Other**

- Increasing State-level staff to support natural and working lands in Hawaii
- Increasing drought forecasting and prediction efforts

The group discussed next steps and decided that reasonable and useful next steps would include:

- Collectively contributing to some of the recommendations listed above, depending upon agency mission and activities.
- Workshop organizers send a follow-up message to identify who might like to join a team that would work to address these needs and follow-up on those with the most interest.
- Host a short webinar to discuss taking specific action on some of these needs.

Frazier, A. G., Giardina, C. P., Giambelluca, T. W., Brewington, L., Chen, Y.-L., Chu, P.-S., Berio Fortini, L., et al. (2022). *A Century of Drought in Hawai'i: Geospatial Analysis and Synthesis across Hydrological, Ecological, and Socioeconomic Scales*. *Sustainability*, 14(19), 12023. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/su141912023>

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