

The Delta Science Program's collaborative open science initiatives: science for adapting to extreme events

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Delta Stewardship Council

CWEMF Annual Meeting, May 14th, 2025

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Delta Science Program

DELTA STEWARDSHIP COUNCIL

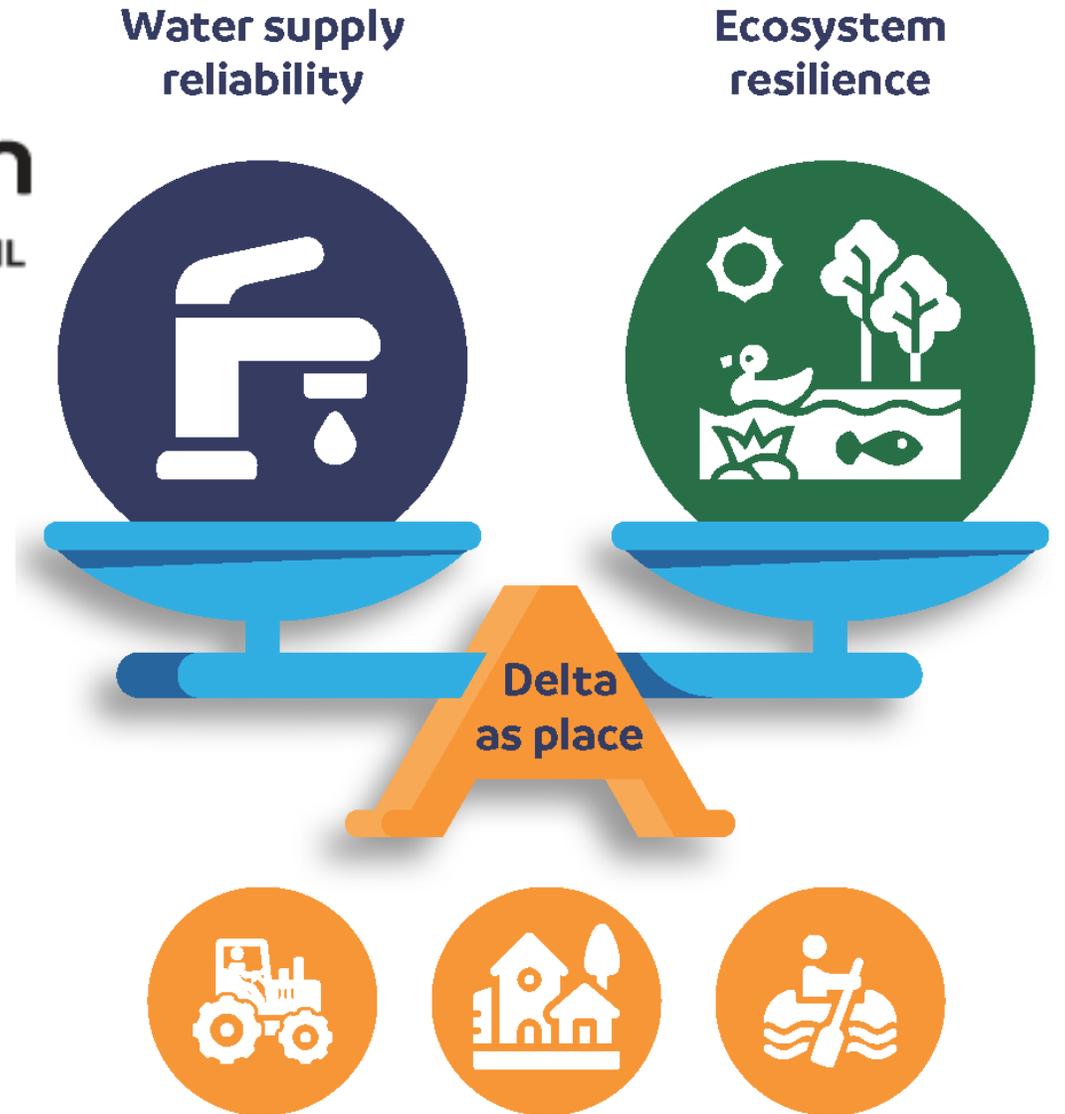


Delta Science Program

DELTA STEWARDSHIP COUNCIL

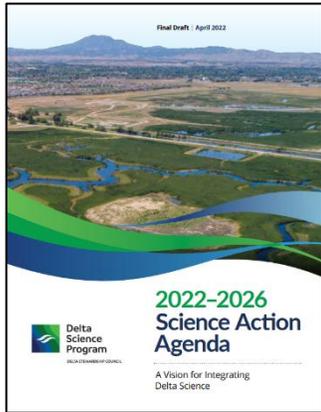
We align Delta decision-making with science.

The Council coordinates science-based policy and planning to achieve the coequal goals in a way that protects and enhances the Delta as a place where people live, work, and recreate.

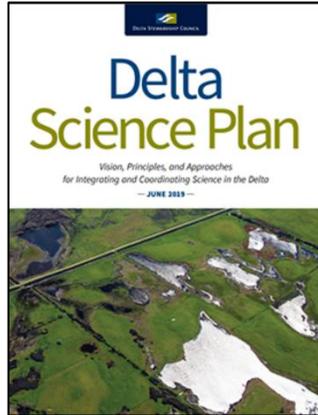


Delta Science Program Core Functions

Prioritize Research



Promote Collaboration



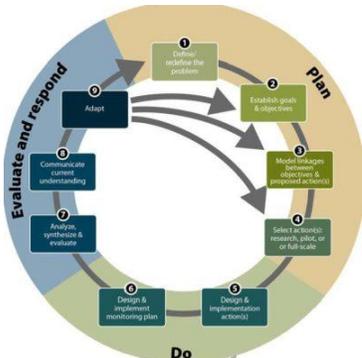
Fund Research



Synthesize and Communicate



Support Adaptive Management



Facilitate Independent Review



Support the Delta Independent Science Board



DSP's Wide-ranging Efforts to Promote Open Science

Accessible

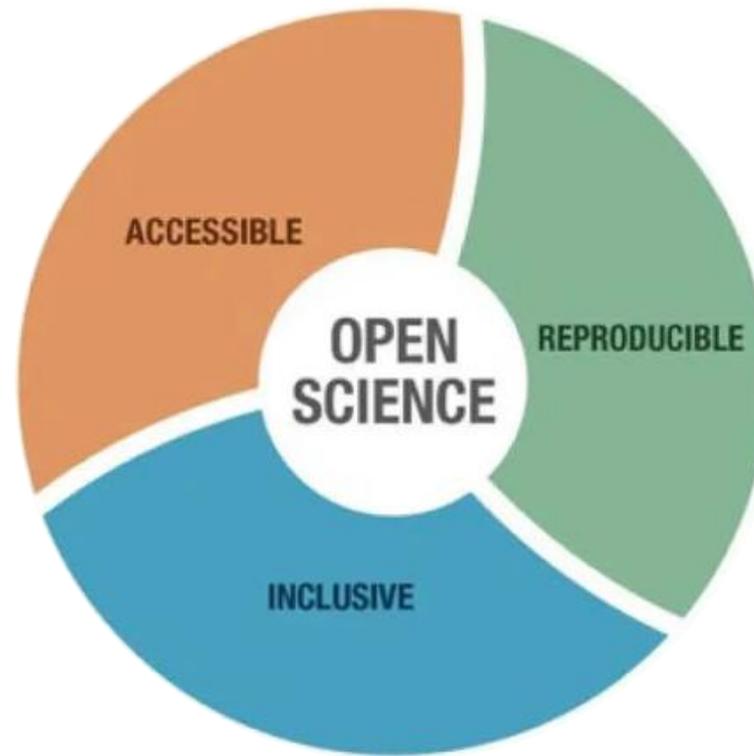
- Data from funded research
- Open-access journal
- Delta Science Tracker

Reproducible

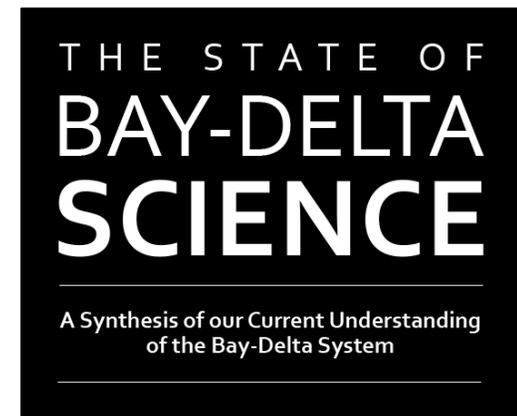
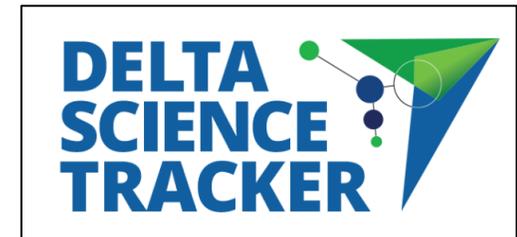
- Use of and support for Github
- Synthesis trainings, products
- Modeling Collaboratory

Inclusive

- SAA, Science Plan
- Collaborative groups
- Science workshops and events
- Social science integration
- Traditional knowledges



Adapted from NOAA

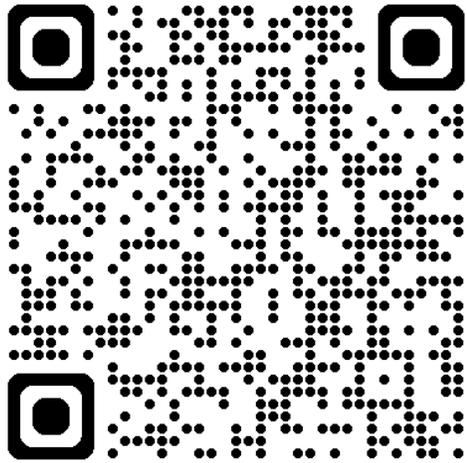


Hydroclimate whiplash

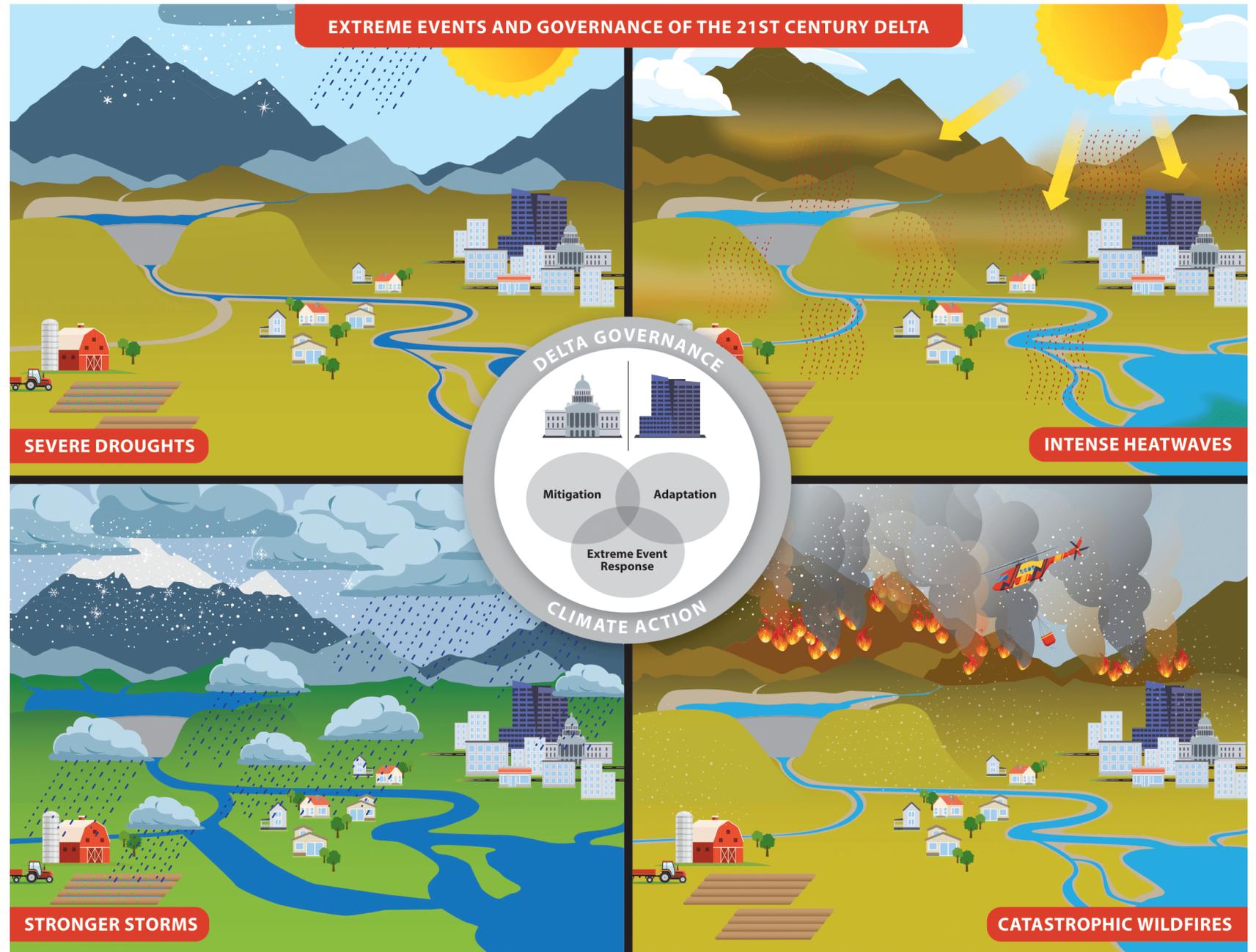
Exacerbating the "wicked problem" of the Delta



Hot off the press: State of Bay-Delta Science in SFEWS "Extreme events"

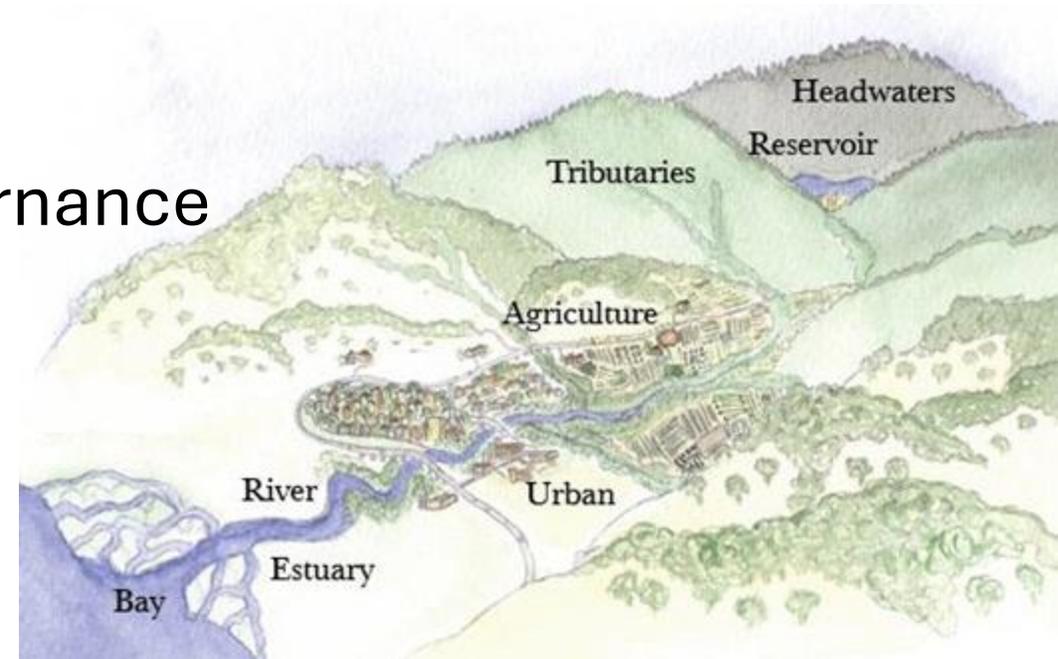


1. Introduction
2. Governance
3. Drought
4. Heatwaves
5. Wildfire and water quality
6. Atmospheric rivers
7. Synthesis/perspectives



Five perspectives from the SBDS editorial board

1. Continued long-term monitoring
2. Modeling frameworks and techniques
3. Collaborative open science and synthesis
4. Science communication
5. Anticipatory, adaptive, and flexible governance



Colombano et al, In review at SFEWS

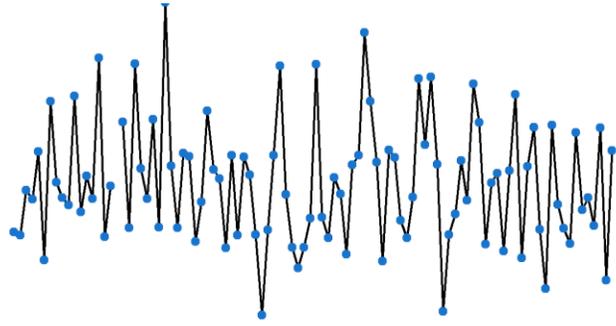
Non-stationarity:

Systematic changes in the

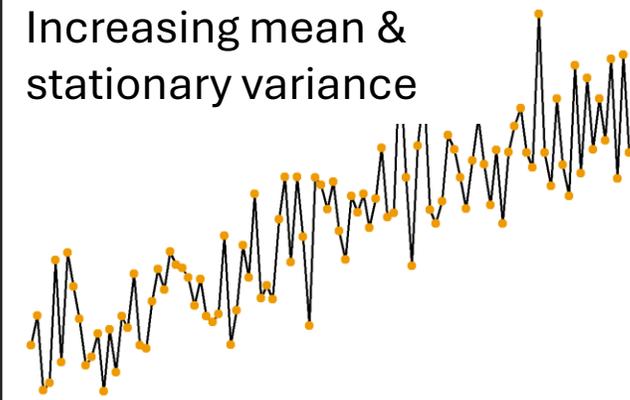
- Mean
- Variance
- Periodicity



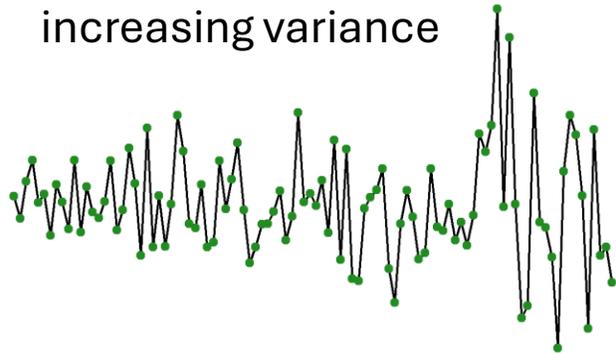
Stationary mean & variance



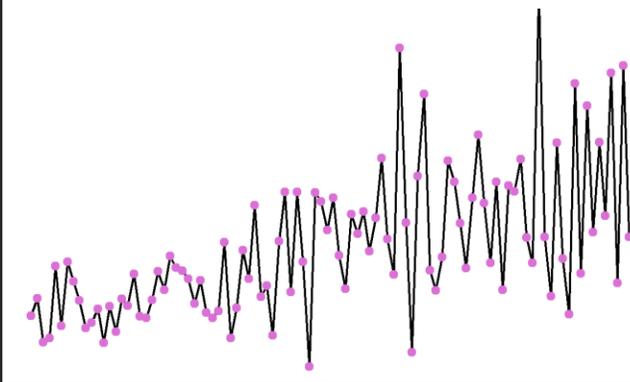
Increasing mean & stationary variance



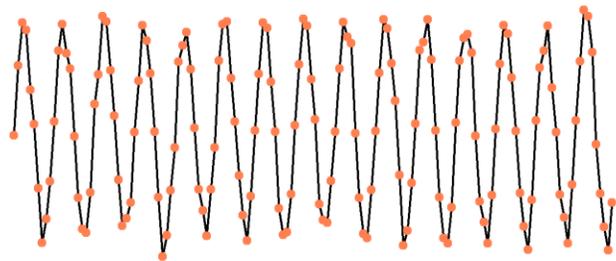
Stationary mean & increasing variance



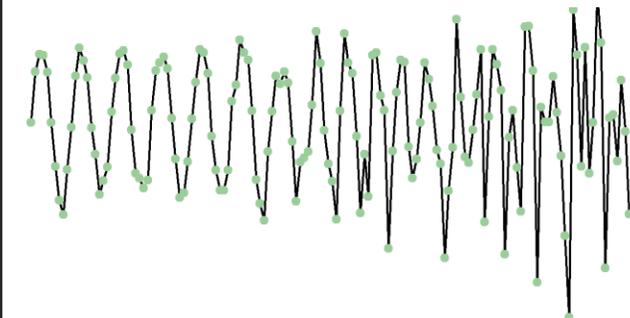
Increasing mean & variance



Stationary periodicity & variance



Increasing periodicity & variance

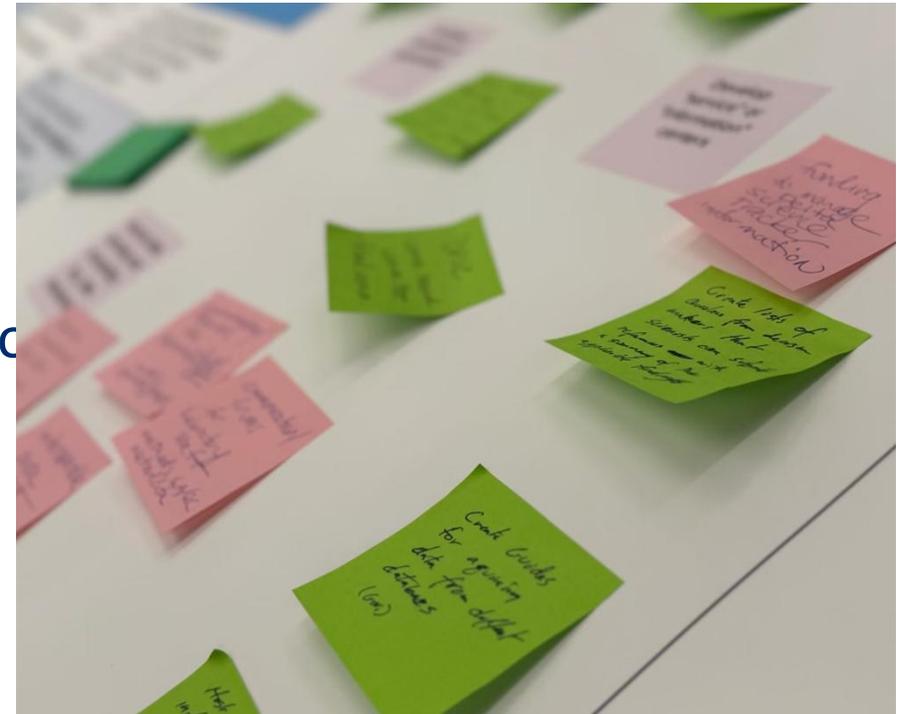


Time

Time

Delta Science Program "Grand Challenges"

1. Scientists and managers must **anticipate** a world in which environmental conditions and regulations may be fundamentally different from those faced today.
2. Environmental change is **outpacing** the of science.
3. Flows of scientific information remain **poorly connected** to
4. **Other ways of knowing**, especially Knowledge, remain siloed making

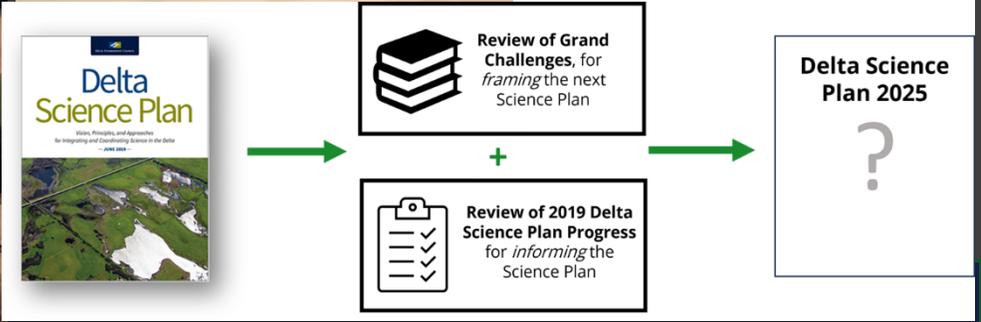


<https://deltascienceplan.deltacouncil.ca.gov/>



Delta Science Plan Update:
February 2025: Workshop
Fall 2025: Draft Science Plan Update
(for public review)

"Open Science Collaboratory"



What is a Collaboratory?

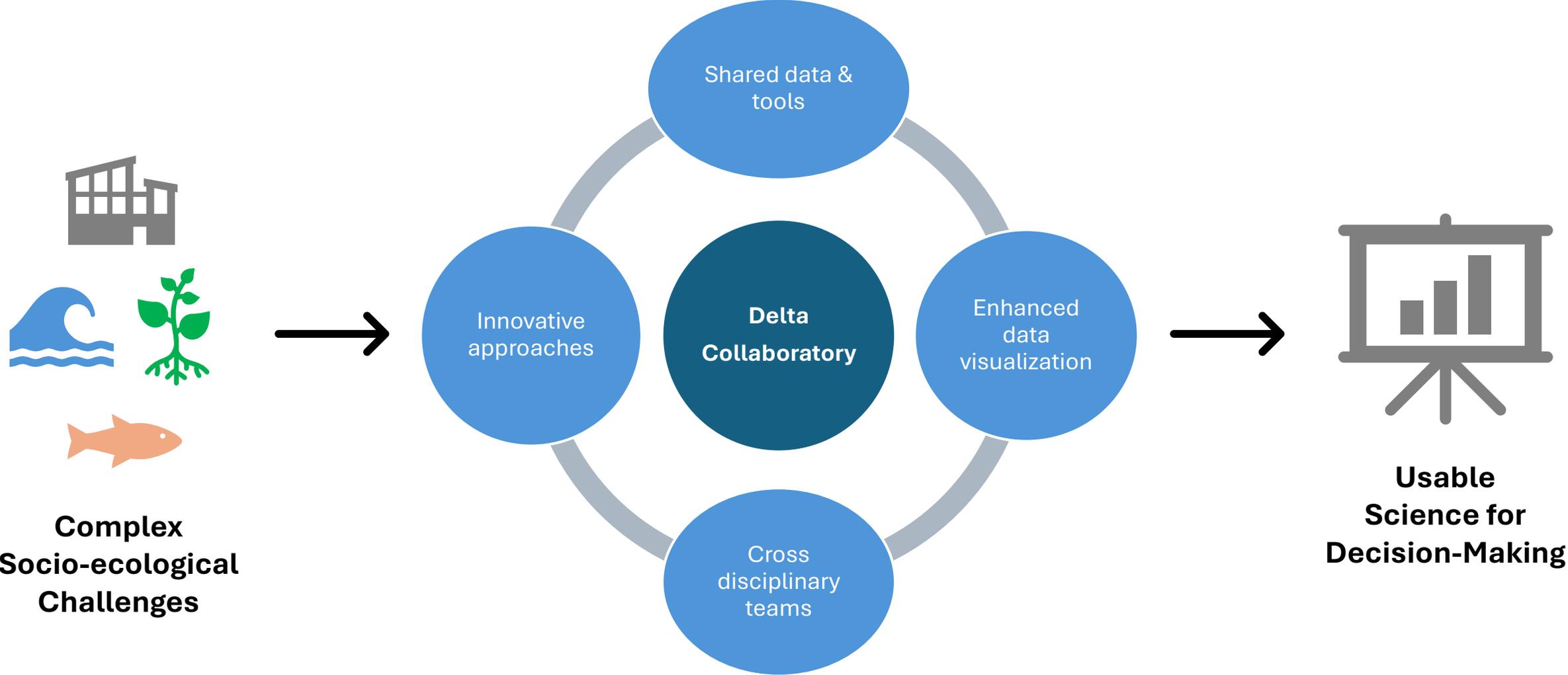
From Wikipedia:

Noun [\[edit \]](#)

collaboratory (*plural* [collaboratories](#))

1. (*sciences*) A networked organization in which scientists can collaborate

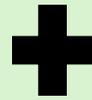
What is a Collaboratory?



Modified from Chesapeake Global Collaboratory

The Collaboratory, a networked community of scientists and shared resources

Scientists and research projects

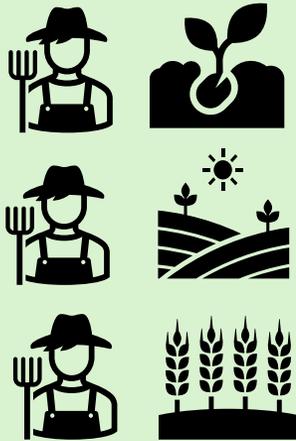


Shared network of resources



Collaboratory supporting projects to generate research outputs

Gardeners & their plots



Seed, fertilizer



Water



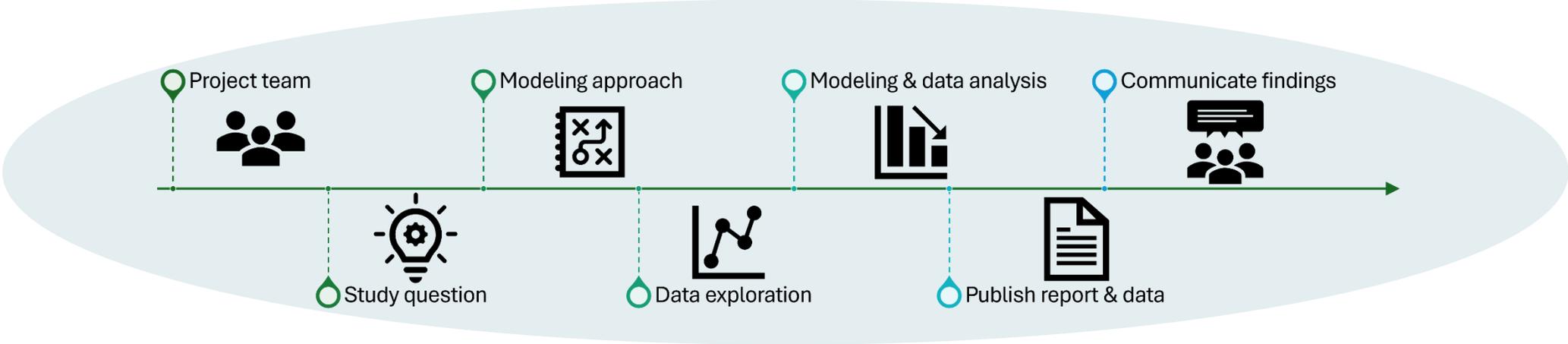
Tools



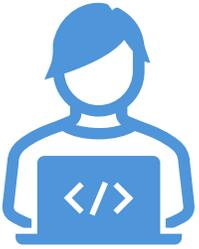
Helping hands

Community garden producing crops & lessons learned





Researcher profiles



Networking coordination



Team facilitation



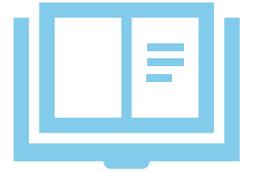
Publication library



Learning materials and training modules



Best practices and protocols



Project team



Modeling approach



Modeling & data analysis



Communicate findings



Study question



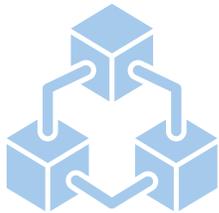
Data exploration



Publish report & data



Model inventory



Integrated model framework



Cloud computing



Data library and integrated datasets



Data science training and workshops



Data visualization assistance

CHABs prediction

Leads: David Senn (SFEI) + Keith Bouma-Gregson (USGS)

Project team



Modeling approach



Modeling & data analysis



Communicate findings



Study question



Data exploration



Publish report & data



Cross-pollinators

Salinity intrusion

Lead: Josué Medellín-Azuara, UC Merced

Project team



Modeling approach



Modeling & data analysis



Communicate findings



Study question



Data exploration



Publish report & data



Tidal wetlands food webs

Leads: Rosie Hartman, DWR + Denise Colombano, DSP

Project team



Modeling approach



Modeling & data analysis



Communicate findings



Study question



Data exploration



Publish report & data



Scoping stage

CHABs prediction

Leads: David Senn (SFEI) + Keith Bouma-Gregson (USGS)

Project team

Modeling approach

Modeling analysis

Study question

Data exploration

Salinity intrusion

Lead: Josué Medellín-Azuara, UC Merced

Project team

Modeling approach

Modeling analysis

Study question

Data exploration

Tidal wetlands food webs

Leads: Rosie Hartman, DWR + Denise Colombano, DSP

Project team

Modeling approach

Modeling analysis

Study question

Data exploration

Identify shared approaches & needs

- Hydrodynamic models
- Bathymetry data
- Training/knowledge
- Scenarios

Identify appropriate models

Prioritize common resource needs

Support for shared training/knowledge transfer

Identify scenarios relevant to multiple management needs

Cross-pollinators





Thank you

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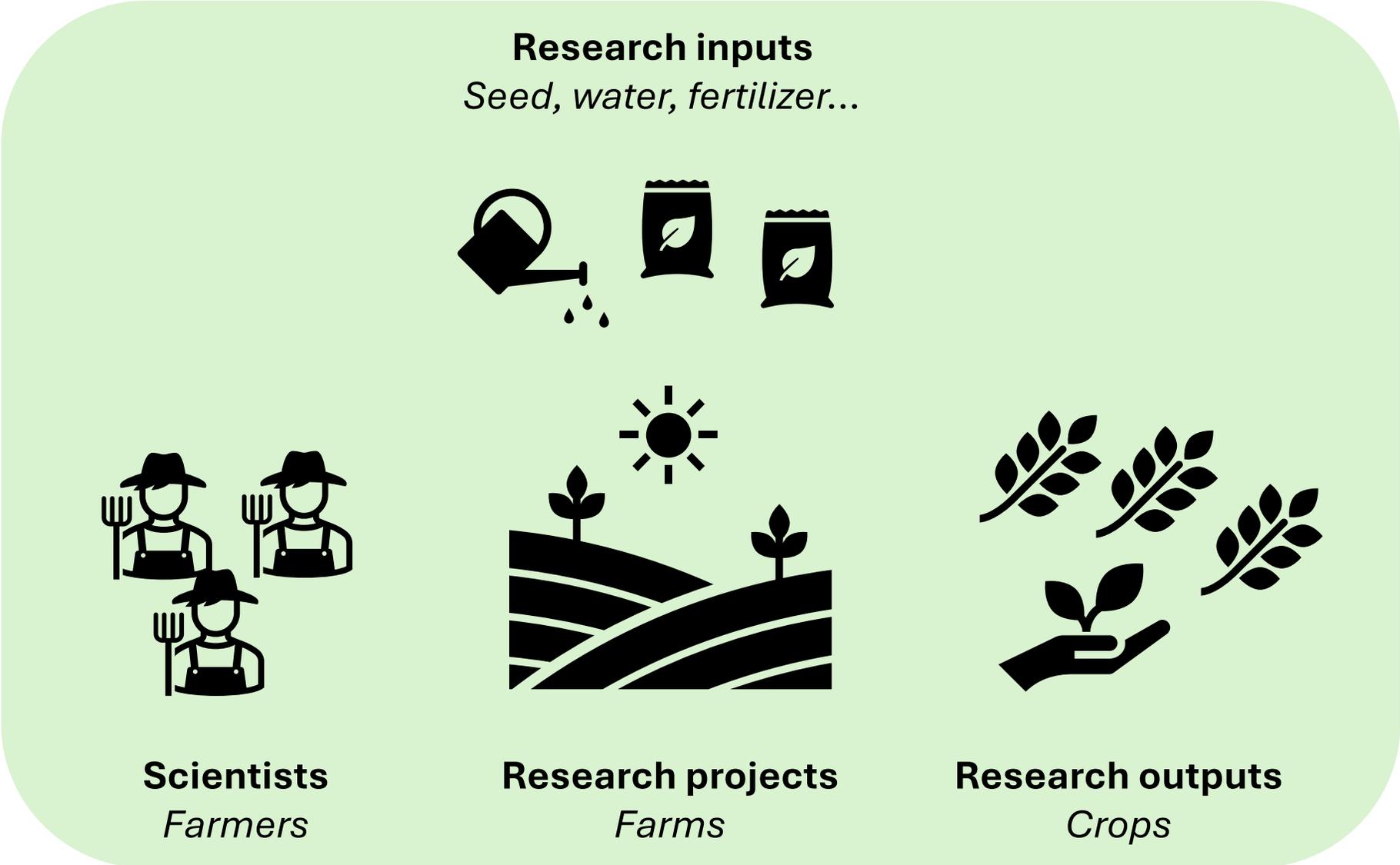


@deltastewardshipcouncil

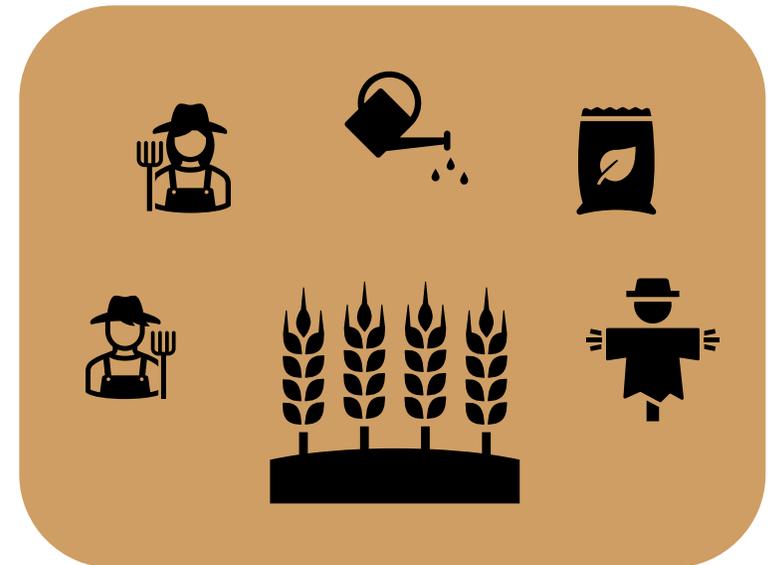
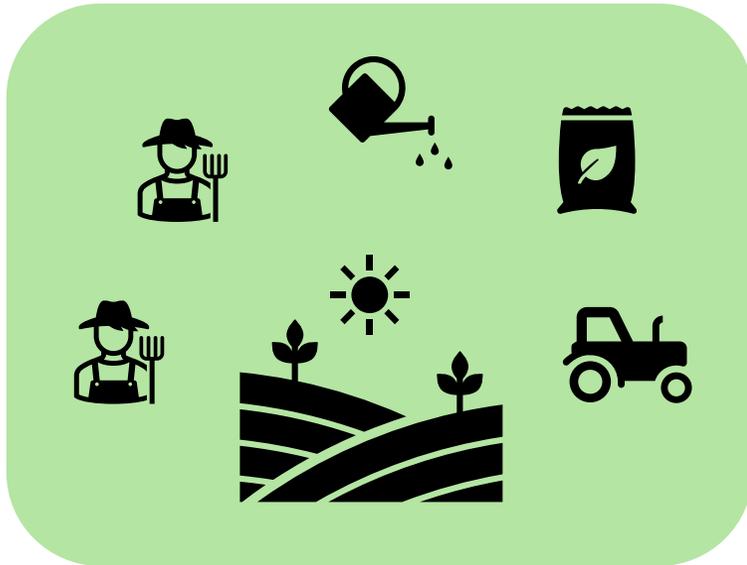
A photograph of a long, multi-lane concrete bridge spanning a wide body of water. The bridge is supported by numerous cylindrical concrete piers. The sky is overcast with grey clouds, and the water is calm. In the foreground, there is a patch of dry, brownish grass. The word "Questions?" is written in white, sans-serif font in the upper center of the image.

Questions?

Let's pretend we're farmers...

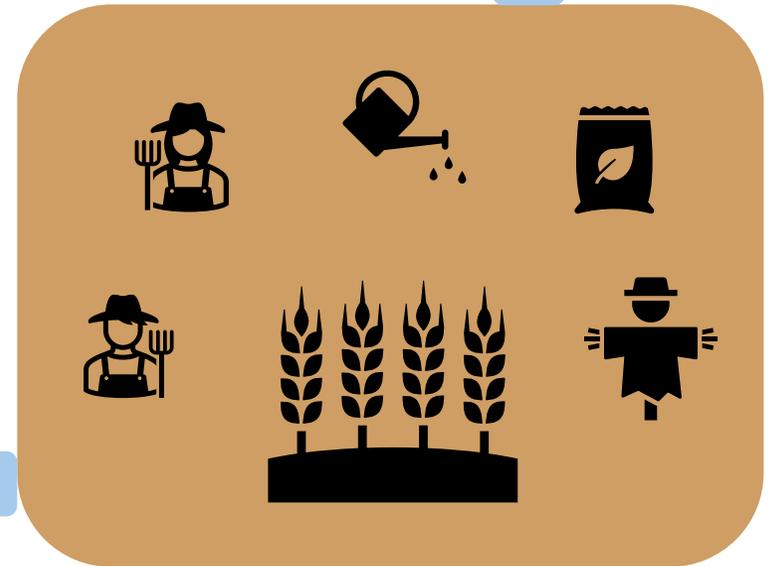
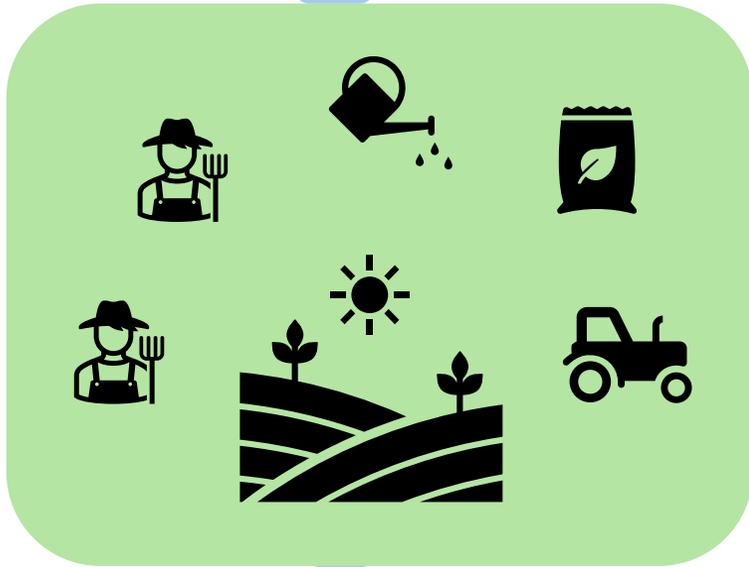


Scenario 1:
Three separate farms all
growing crops

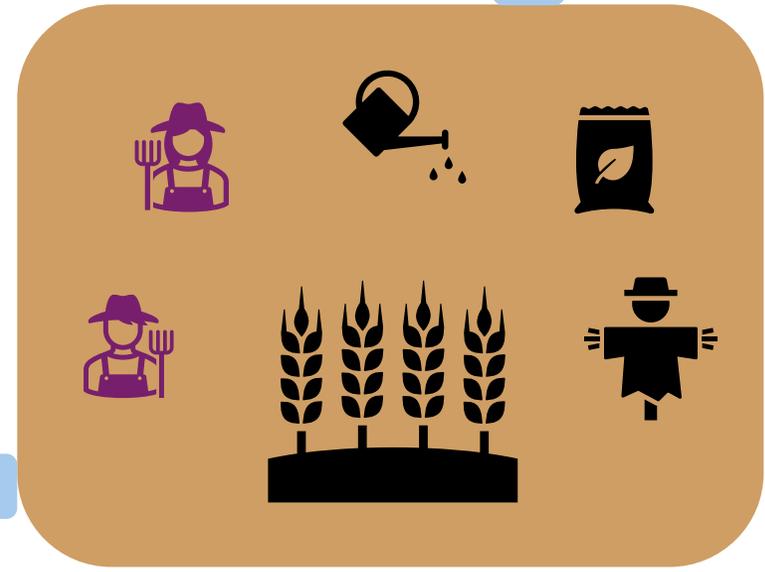
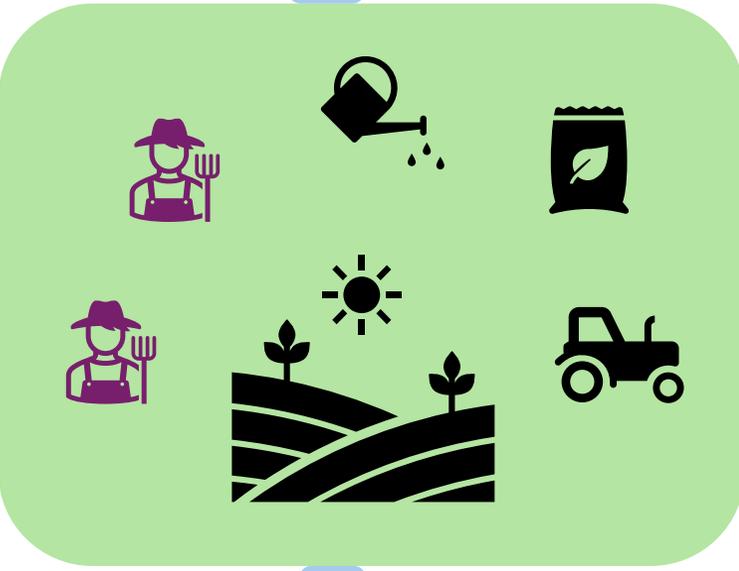


Scenario 2:

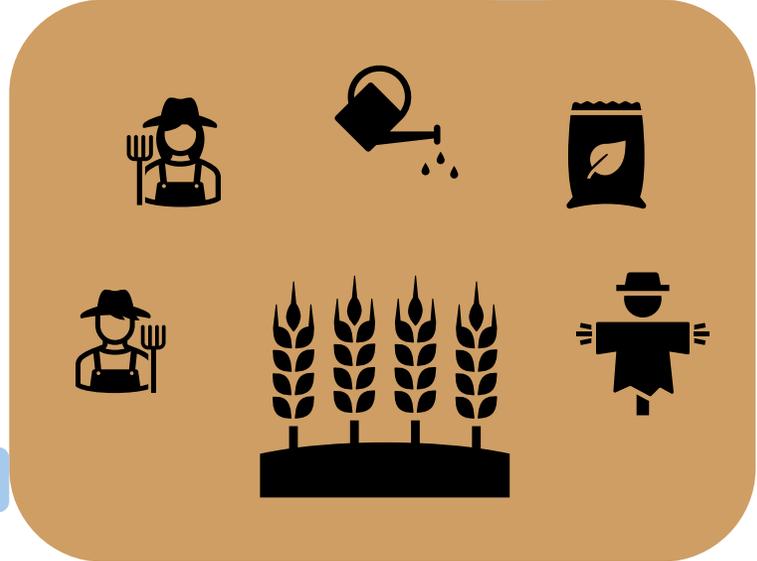
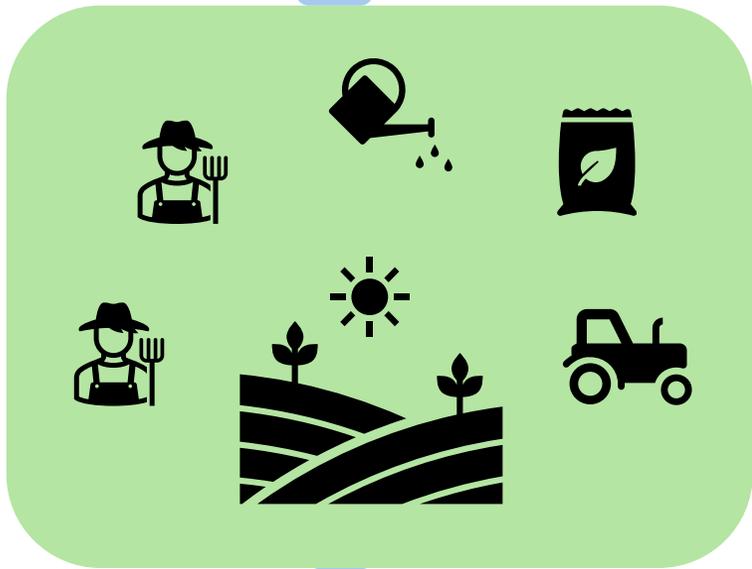
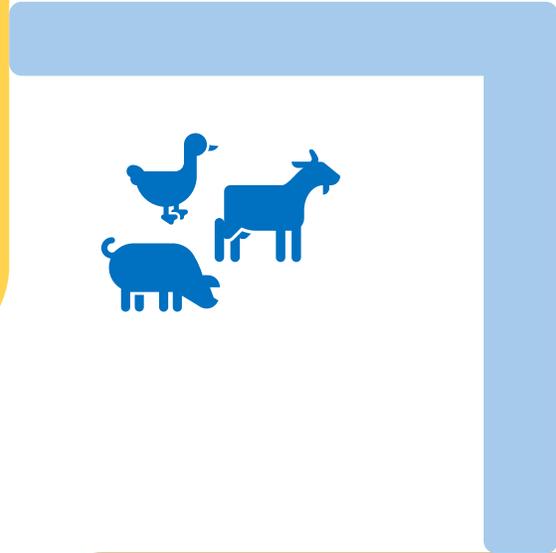
Three separate farms all growing crops in a community space



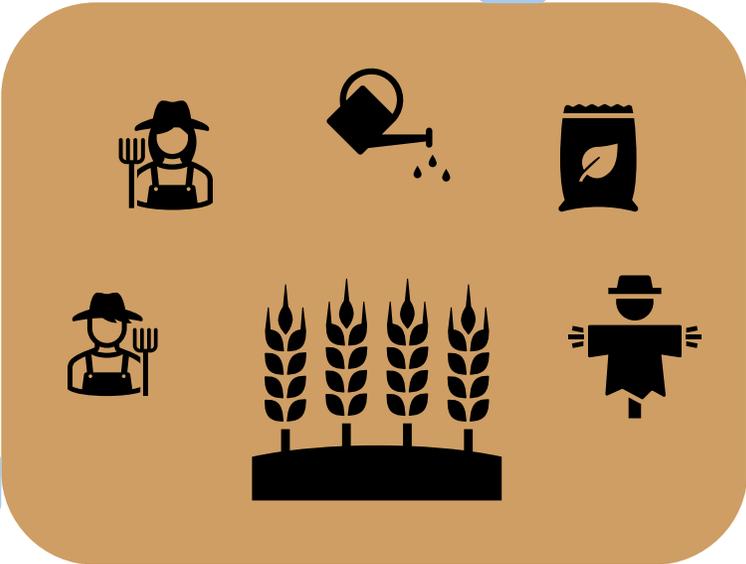
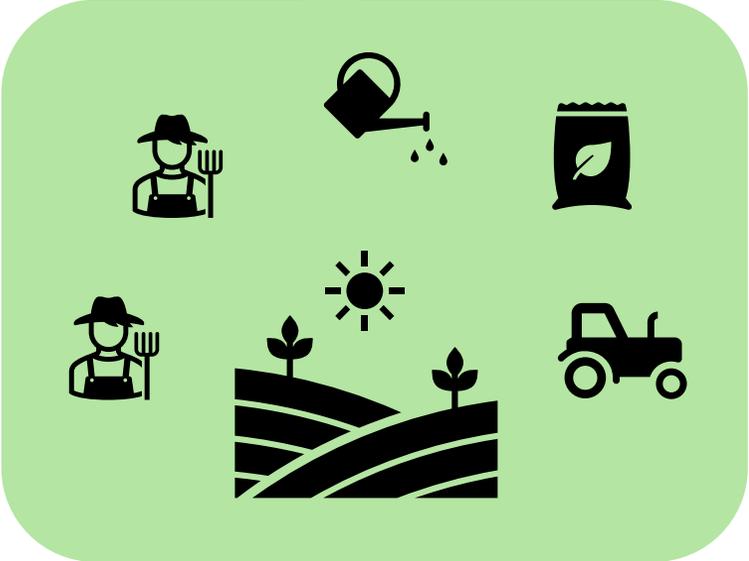
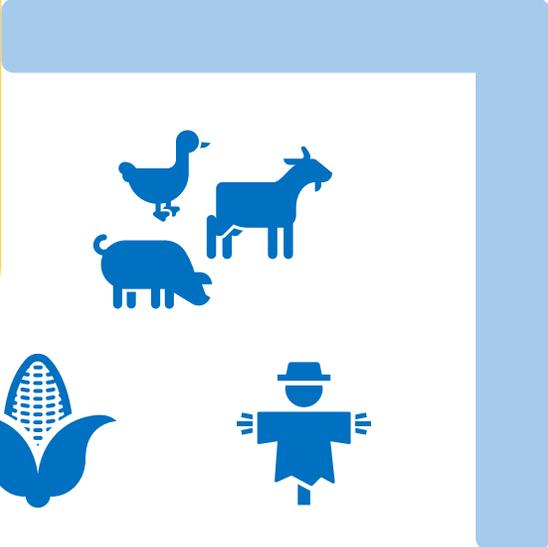
Where farmers communicate and coordinate with support farmers



Where commonly needed resources like seed, water, fertilizer are freely available



Where unique needs for each farm are acquired, for the ultimate benefit of all farms



New abstract for 3/28/25

The Delta Science Program's collaborative open science initiatives

Presenter: Lisamarie Windham-Myers (USGS, Delta Science Program)

California's Mediterranean climate is rapidly evolving toward unprecedented volatility, where droughts, floods, heatwaves, and wildfires are becoming more frequent and severe. This volatility challenges the current infrastructure, resource allocation models, and science-informed approaches used to govern and manage the state's natural resources. In this presentation, I will introduce a suite of collaborative open science initiatives supported by the Delta Science Program aimed to address our new climate realities. First, I will explore key findings from the 2025 State of Bay-Delta Science (SBDS) review articles focused on the current state of science and management of extreme climate and weather in the Delta. Next, I will highlight the SBDS editorial board's perspectives on promising avenues to advance science and governance in the era of climate change. Finally, I will showcase new and existing efforts to build capacity in collaborative open science and synthesis, including the start of three projects in 2025 to support development of the Delta Collaboratory. Throughout this presentation, I will focus on solution-oriented initiatives to advance science-informed management, which is a main focus of the upcoming revision to the Delta Science Plan.

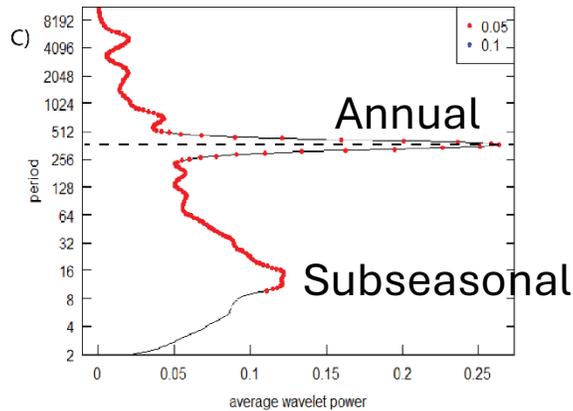
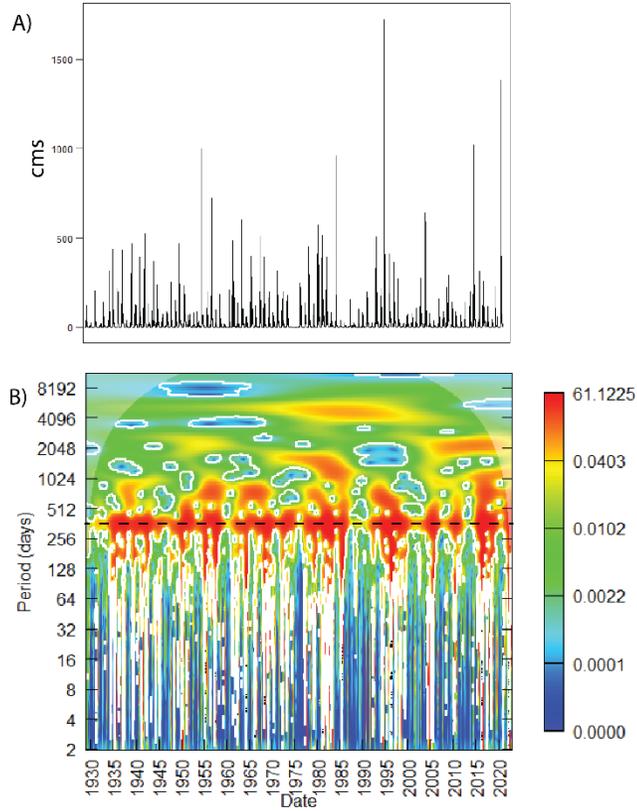
Discharge time series
1929-2023

Wavelet analysis:
Time domain vs.
Frequency domain

Changes in
periodicity due to
reservoir operations

Subseasonal vs.
interannual

Cosumnes River
Unimpaired flows



Mokelumne River
Impaired flows

