

# Sustainable (?) agriculture and water in California

David A. Bainbridge  
Associate Professor, AIU

# What does sustainable mean?

It depends who you ask

To many, including me,  
it means the ability to persist  
for a long time

# Sustainability includes

Ecological  
(environmental)

and

Cultural considerations  
(economics, politics, religion,  
community)

# Several thousand years old



*California's Bristlecone Pines and the creosote bushes of the Mojave desert are examples of ecological sustainability - with young seedlings beneath the patriarchs*

**Zoroastrianism** 2700 years young  
is a sustainable religious group

**The American Amish** *offer an example of a sustainable cultural/religious group (300 years). With the highest retention ever today (~90%)*



**With that as background  
let us consider water and  
agriculture in California**

# **The ecological question: Is agriculture as currently practiced sustainable in California?**

**In many areas it is not**

Water use exceeds reliable supply, there are drainage problems, salinity buildup, and pollution from overuse of biocides are common

The existing water supply system has severely damaged California's native ecosystems, degraded virtually every stream and river, destroyed the once massive salmon runs, and threatens many more

# The cultural question:

**Is agriculture economically sustainable in California?**

Many farms in the US survive thanks to enormous direct cash farm subsidies and crop insurance

In California the subsidies are more often related to water and power to run pumps and pump stations

# Water and Power below cost

- » Dams, canals, and pump stations are heavily subsidized
- » Farmers get water as low as 10% of cost
- » Farmers are also sucking groundwater at far beyond sustainable rates with ground subsidence and other permanent damage
- » Small farmers can't keep up in drilling deeper and deeper wells

# California subsidies also include

Subsidized cost for dealing with agricultural  
drainage and salt buildup

Largely uncontrolled damage to ecosystem and  
species biodiversity,

Destruction of valuable services once provided  
by Nature: including flood control, pollution  
cleanup, oxygen, etc.

Depletion of aquifers

# An example: rice production in California

*Several hundred thousand acres of rice are grown,  
using up to 3 acre feet of water per acre*

*Photo: Tom and Sally Myers*



**California grew rice worth \$485 million (1999-2000) with support of \$480 million in Federal farm payments**

More than a million acre feet of water with an open market value between \$200 and \$1000 per AF was used

California rice consumed between \$200 million and 1 billion dollars worth of water to make \$5 million

# Low value crops are on their way out

Even high value crops like avocados and pistachios can't compete with urban water buyers - who currently spend more than a \$1 million dollars an acre foot for bottled water.

Recent open market water sales have been up to \$5000 per acre foot in the Southwest

Farmers typically pay \$40 acre foot (some just \$15)

\$

Water flows uphill to money!

\$

# Can politics save the farmers?

The farm lobby is powerful, well-organized  
and has often been successful in  
defending illogical, expensive and  
environmentally damaging policies

and programs

They will resist and slow the change - but  
the pressure is too great

# Agriculture in much of California is ephemeral- not sustainable

The once profitable farms of Vermont and New Hampshire have vanished and states are considering subsidies to keep a few fields open and mowed for scenic values

A study of the European Union showed that 1/2 the farmland would fall out of production if some of the subsidies and supports were removed

**If subsidies and support payments were removed much farmland would fall out of production**

Farmland abandonment will recreate the environmental and cultural problems of the Owens Valley on a massive scale in the San Joaquin and Imperial Valleys

California must abandon 535,000 acres of farmland to meet water conservation goals

# The challenges ahead!

## 1. Create fair, visible and free markets

We do not really have a water supply problem:  
we have a water allocation problem

## 2. Making water cost visible should include water meters in the living room or kitchen of every home built from now on

### **3. Develop true cost accounting for water**

Today water is often considered a free good - with charges only for purification and delivery

San Diego has among the highest costs \$700 AF, but prices in Germany (where it rains!) are \$1600 AF

The value of Nature' Services must be considered

True cost accounting will drive efficiency improvement -- often dramatically

**Follow the money**

**4. Pay for the Colorado River water we have taken from Mexico, typically 10 -12 million acre feet a year with a value of between 1 and 2 billion dollars**

Payments could be earmarked for pollution control, water conservation, water harvesting, improved farm water use efficiency and building recycling and desalinization plants

Key projects will be cleaning up the New River and the Tijuana River

**5. Optimize water use on farms. Explore new high value crops, halophytes (salt tolerant plants), improved irrigation efficiency and use of reclaimed water**

Use more efficient irrigation systems!



Olla irrigation

## **5. Promote water harvesting and stormwater capture for urban area agriculture and landscaping**



Microcatchment Imperial Valley

**6. Higher prices** will encourage dramatic efficiency improvements (up to 90%) and will encourage more environmentally appropriate landscaping

If the Native Americans had conquered England  
would they graze buffalo on the lawns of  
Buckingham Palace?

Raise saguaro cactus?

# Our use of lawns in San Diego is equally inappropriate



In the latest drought most lawns in San Diego died - good riddance

- 7. Develop reclamation plans and programs** before land is abandoned and irrigation systems are dismantled. Fallowed land in arid areas does not recover quickly - it may take a thousand years without intervention
  
- 8. Develop retraining and relocation programs** to assist both farmers and farm workers adjust to new realities

- 9. Provide effective and continued support for water allocations to Nature to protect biodiversity, support ecological services and to protect future generation's options and opportunities**
- 10. Protect taxpayers and water users from more outrageous water payment schemes - where water is sold to the farmer and then resold to cities at cost multiples (or tie water profits to land restoration)**

**11. Provide meaningful and accurate information on water supply, use, cost and efficiency improvement in schools and colleges with demonstrations regionally or in every community.**

The Casa del Agua in Tucson is an excellent example.

# What will Global Change bring?

Hotter and drier is not a  
comforting trend!

What else?

Increased pests!  
Increased pressure from alien pest species  
Increased migration pressure

## A Turkish proverb

- *Millions of men have lived without love - none have lived without water*

# Books

- » Mark Arax. 2019. The Dreamt Land.
- » David Carle. 2000. Drowning the Dream.
- » Marc Reisner. 1993. Cadillac Desert.
- » Norris Hundley. 2001. Great Thirst.