Fighting Scarcity: Innovation & Comprehensive Strategies to Address Our Water Challenges

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Water Scarcity is a Growing Problem

- Drought is somewhere every year
- Climate change only exacerbates problems and increases uncertainty

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Saving Water Provides Multiple Benefits

- Water efficiency improves resilience to water shortages
- Water, sewer, and energy costs are rising; water efficiency helps reduce these operating costs
- Saving water saves energy

www.epa.gov/watersense
Savings Add Up Quickly!

2006 – 2012

487 billion gallons of water saved since 2006!

That’s enough water to supply all the homes in Colorado and Arizona for a year!

WaterSense has helped reduce the amount of energy needed to heat, pump, and treat water by 64.7 billion kilowatt hours, enough to supply a year’s worth of power to more than 6.1 million homes...

202 billion gallons saved in 2012

Saving consumers $8.9 Billion in water and energy bills!

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Pursuing Net-Zero Water Use for Ag
U.C. Davis: Jess Jackson Sustainable Winery Building

Showcasing “smart” technology that maximizes environmental capabilities of winery, brewery, and food-processing complex.

- Automated systems to clean equipment
- High-purity filtration of rainwater
- Off-peak processing, …and more!

90% of water & chemicals from each cleaning cycle is captured and processed for future use in the complex, eventually being used as many as 10 times.

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CA Roundtable on Water & Food Supply

- Launched in 2010
- Consensus-based process
- Diverse Stakeholders
- Objectives:
  - Build relationships between agriculture and other key stakeholders
  - Generate common principles and recommendations for decision-makers and the public

A project of Ag Innovations Network

www.aginnovations.org
Module 1: Ag Water Stewardship
Outlines an agricultural water stewardship framework – conservation & efficiency

Module 2: From Storage to Retention
New approaches to storing water – expanding options and site-specific parameters
Identifies priorities for action
Module 3: From Crisis to Connectivity

- Examines historical disconnections that have led to water crises in CA
- The connectivity approach offers a model for designing strategic and systemic solutions

Offers guiding principles for implementing a resilient water infrastructure

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Rural Development

Rural-Urban Connections Strategy
Sacramento Area Council of Governments • www.sacog.org/RUCS

Crop Map

Modules Informing Scenarios

Market Affects on Crops

FUEL PRICES
STABLE

FUEL PRICES
DOUBLE

0%
25%
50%
75%
100%

ALFALFA
RICE
GRAIN
TOMATO
RANGELAND
FALLOW

Local Market Food Production

NUMBER OF PEOPLE
LOCAL
TYPE OF CONSUMPTION
HOW MUCH LAND NEEDED

ROI
Water Demand
Trucking
Labor Demand

RUCS Scenario Analysis Tool
Understanding diverse “reservoirs” can bridge gaps in natural availability of water.

http://aginnovations.org/images/uploads/CRWFS_Storage_FINAL.pdf

Healthy watersheds in the Sierra & Cascade Ranges can produce 9 – 16% more water.
Opportunity: Cellulosic Nanomaterials (CNC)

- Stronger
- Lighter
- Cheaper
- Renewable

Wood pellets
$155 \text{ (100\% conversion)}$

Fuel Ethanol
$255 \text{ (@100 gallons/ton)}$

High Brightness Paper
$500 \text{ ($1,000/ton - 45\% yield)}$

Cellulose Nanocrystals
$1,350 \text{ ($6,000/ton - 22.5\% yield)}$
Strategy for a Sustainable Economy

= SYNERGY

Synergia (Greek): creation of a whole greater than the simple sum of its parts.

Synergos (Greek): "working together".

✓ WORKFORCE & TRAINING
✓ SUPPLIER NETWORKS
✓ ACCESS TO CAPITAL
✓ INFRASTRUCTURE
✓ BUY / PROCURE LOCAL
✓ TRADE / NEW MARKETS
✓ RESEARCH AND INNOVATION
✓ OPERATIONAL IMPROVEMENTS

Triple Bottom Line:
PEOPLE ~ PLANET ~ PROSPERITY

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Sustainable Food, Fiber & Natural Resources Need Fresh Technologies

Multispectral Imagery

Ag Drones

Wireless Soil Sensors

Variable Rate Irrigation

Precision Applications

Test kit detects foodborne pathogens

Food Safety

A dynamic global network infrastructure

- have identities, physical attributes, and virtual personalities

- use intelligent interfaces, and are seamlessly integrated

- based on standard and interoperable communication protocols

- with self configuring capabilities

- where physical and virtual “things” are integrated into the information network.

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April 17 – 19: West Hills College Coalinga hosts a competitive hackathon designed to partner young farmers with mobile application developers from California Farm Bureau Federation informing invited developers of business needs. Coder teams spend weekend creating apps and judges render verdicts Sunday night.

Organized by the California AgTech Roundtable, formed in 2013 to create jobs in rural California through ag technology.
How It Works

Soil moisture data automatically collected every 15 minutes.
Pressure switch communicates when water is on/off.

Weather, soil and pressure switch data sent to a secure server via cell signal.

Growers make irrigation decisions based on information they know is correct.

Average Water Use Decreased by 10%
Average Production Increased by 10%
Water Savings 5 Times More Per $ Invested Than Changing From Flood to Drip Irrigation
Equity capital invested in rural areas is just as successful as in tech-oriented metro regions.

A study of 18,000 investments found no statistical difference between rural and metro regions measuring key variables: jobs created, type of industry, length of venture, exit, or performance.

Patricia Scruggs et al, “The Role of Equity Capital in Rural Communities,” 2010

www.rurdev.usda.gov/Reports/CA-CalFOR.pdf
Potential New Funding Streams

- **California Organized Investment Network (COIN)** can fund a wide array of infrastructure.

- Counties, cities, special districts, or joint powers authorities can utilize **tax increment financing** for rainwater harvesting & small water storage projects.

- **AB 32 cap-and-trade funds** where storage or retention projects deliver climate benefits, such as through reductions in energy use.

- **Expanded Infrastructure Financing Districts (EIFD).**
Potential New Funding Streams

A proposal in President Obama’s State of the Union: Qualified Public Infrastructure Bonds (QPIB) would expand existing financing tools that allow state and local governments to issue tax-exempt bonds to pay for public infrastructure projects.

If approved by Congress, the QPIB program would expand these tax advantages to financing for airports, ports, mass transit, solid waste disposal, sewer, and water, and more.

Tax exempt bonds allows the government issuer to pay back investors at a lower interest rate. Also, the new bonds would also have no expiration date and no limit to how many a government can issue each year.
"Layers" of Funding & Economic Activity Will be Needed

Value of Biobased Products will help finance forest health activities – probably not enough.

Augment that with:

Cap & Trade Credits

Need to also monetize value of "reclaimed" water produced from forest health activities!
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