

**WATER CHALLENGES TO THE AGRICULTURAL INDUSTRY:
A PRO-ACTIVE LOOK AT THE NEEDS AND TECHNOLOGY'S ROLE**

**THINK TANK SESSION
APRIL 15, 2011**

SESSION NOTES

On April 15, 2011, Project 17, in collaboration with the Grower-Shipper Association of Central California and Hartnell College, convened an invitation-only think tank session to delineate the challenges faced by large agricultural companies relative to water in and around the Monterey Bay Area. Fourteen representatives of regional agricultural companies defined current and future water challenges that could be responded to by technological innovation. Several technologists contributed to the delineation of the issues faced by agriculture. The session was not focused on policy or legislation; rather it focused on establishing a clear understanding of current and future concerns about the usage of water, the treatment of it, access to it, and its quality for the continued success of the agricultural industry in the region. Additionally, the session addressed how best to support future collaboration between the agricultural and technology sectors.

After a group exercise outlining the top three water issues facing their companies, the group selected three key themes for further exploration during the Break-out Groups. The following notes are drawn from group discussions, written exercises, and from the input from break-out groups during this half-day session.

Participating companies included:

- Dole Fresh Vegetables
- Driscoll Strawberry Association, Inc.
- Dole Fresh Vegetables
- Duda Farm Fresh Foods
- Luis Scattini and Sons
- Muller Irrigation
- Ocean Mist Farms
- Paraiso Vineyards
- Rio Farms
- Rose Royal Radicchio
- Tanimura & Antle
- Taylor Farms
- Grower-Shipper Association of Central California
- Western Growers Association
- Anzu Technology
- APT Water, Inc.
- BioVantage, Inc.
- Hartnell College
- Project 17
- SAP
- Smart World Center
- Watch Technologies
- Wise Solutions, Inc.

TOP THREE WATER ISSUES FACING YOUR COMPANY THAT CAN BE RESPONDED TO BY TECHNOLOGY INNOVATIONS

Group Discussion Ideas

- Water supply
- Water quality
- Flood control (channel capacity; conveyance of storm flows)
- Sea water intrusion
- Mineralization in water sources
- Water discharge tile and cleanup (de-nitrification)
- Storm water runoff, including flood control and management of outflow
- Use of recycled water (reduction of contaminants in source)
- Uniformity of applied water – distribution uniformity
- Increased salinity and ph of well water – well water quality
- Nitrogen
- Calculating amount of nitrogen from well water
- Keeping nutrients in root zones
- Monitoring for optimal water usage
 - Usage
 - Movement
 - Optimization of nutrients

Generated Ideas from Written Exercise

Water Quality

- Nitrates – well contamination
- Nitrate levels in ground water, runoff water, surface water
- Nitrate levels in runoff water – reduction
- Reduce nitrate flows in to the Monterey Bay
- Use of nitrate in well water for nutrient
- Reduction of Na and CL in our recycled water: toxins with emerging concerns

- Surface, runoff and ground water de-nitrification
- Incorporating / utilization of nitrate from well water into a crop fertility program Reservoir – eColi issues
- Practical and affordable methods to remove nutrients and chemicals from irrigation runoff Clean runoff water
- Managing the quality of water leaving the farm
- Evaluating and benchmarking movement of nutrients in irrigation applications
- Ag Runoff: surface water to better than drinking water
- Ground water ph and TDS
- Safe water
- Ensure water quality and safety
- Ground water to drinking water standards or better
- Water quality
- Quality
- Water source quality
- Polluter pays
- Marine sanctuary
- Microbiology – safe bacteriological irrigation water
- Chemical quality (ph, EC, etc.)
- Water for cities: reclaim, reuse, reduce
- Keeping applied N in root zone
- Way to utilize water to meet requirement generated by Clean Water Act
- There isn't a consistent tool (BMP) that can be used on all ranches to reach the same water quality result.

Water Management

- Control flooding during rainy season
- Management of storm water runoff as non-point with other land uses draining
- Storm water runoff Over irrigation crop water demand matching application Creating benchmarks for optimum water usage by crop
- Water application uniformity (to reduce runoff)
- Tile water discharges: clean up NO₃
- Tile water discharges
- Waste discharge
- Increased reuse of water
- Water reuse
- Development of water storage reservoirs
- There's not a lot of understanding about how current practices impact deep aquifers
- Continuing clean, affordable source of water

Conservation

- Conservation strategy
- How to grow more with less

BREAKOUT GROUP DISCUSSIONS

Group # 1: Storm Water Runoff

Group Chair: Susan Barich, Mike Veres

Group Members: Steve Allison, Darlene Din, Andrew Fernandez, Jack Goldwasser, Dave Hart, Dale Huss (presenter)

1) Outline the key components of the chosen water issue. This needs to be detailed enough for a technologist to feel confident that they have a clear picture of the problematic. BE SPECIFIC.

- Flooding sedimentation (erosion control)
- Pesticides
- Fertilizers
- Receiving waters
- Flood conveyance
- Crop loss
- Food safety
- Water quality
- Foreign pollution responsibility
- Nitrates (excess water off fields)
- We all know the problems; outcome, refocus our thinking to source points
 - Mechanical solution
 - treatment solution
- Trapping points for water?
 - Lake Nacimiento
 - San Antonio
 - o Flood control
 - o Water recharge
 - o Recreation
 - o Diversion facility (rubber dam)
- Cities waste treatment on the river
- Manage the water flow

2) What is the time imperative for deploying a solution? (In other words, how important is this to your company and to the industry?)

- Immediate
- Would more trapping points help? (Mike)

3) What are the obstacles to attaining the technology needed solution? List them.

- Soil types (granite hills, sediment falls, etc.)
- Natural occurring elements create high baselines
- Data gaps in coming water
 - Need to know baselines
 - Being collectively held to the same standard
- If individual producer in shared watershed does not meet standards, they can be litigated.
- Loss of vegetative buffers due to e coli / pathogen management rules
- Storm water overflows the “packages.”
- Salt profiles

4) What factors could assist in gaining the needed solutions? List them.

- Understand what each grower is starting with
- Collect water (mechanical)
- Treat water
- Remove pollutants 100 miles from the headwater to the mouth of the river.
 - Sediment
 - Fertilizers
 - Nitrates
- Co-management of food safety and water quality
 - Where do we get the individual “off the hook”
 - Monitoring at the beginning of each watershed “package”.

PRESENTATION COMMENT

- Would water shed management (inflow and outflow; quantity and quality) address the problem?

BREAKOUT GROUP DISCUSSIONS

Group # 2: Irrigation, Water Runoff (Managing Nitrogen Use, ETO)

Group Chair: Dennis Donohue, Terry Applebury

Group Members: Hank Giclas, Zahi Kannan-Atallah (presenter), Seth Kincade, Bob Martin, Mike Scattini, Ron Yokota

- 1) **Outline the key components of the chosen water issue. This needs to be detailed enough for a technologist to feel confident that they have a clear picture of the problematic. BE SPECIFIC.**
 - Guidelines for water with a variety of chemicals
 - nutrients
 - pollutants
 - Soil and plant requirement
 - Matching of guidelines for water and soil/plant requirements
 - Research on alternative fertilizer applications
 - Breeding of crops tolerant to:
 - Drought
 - Salt
 - Low fertilizers
 - Accumulation of salts from application of fertilizers
- 2) **What is the time imperative for deploying a solution? (In other words, how important is this to your company and to the industry?)**
 - None noted.
- 3) **What are the obstacles to attaining the technology needed solution? List them.**
 - Cost of technology
- 4) **What factors could assist in gaining the needed solutions? List them.**
 - None noted.

BREAKOUT GROUP DISCUSSIONS

Group # 3: Nutrient Management (includes Ground Water Management, Quality

Group Chair: Alan Barich, Sue Kuntz, Chris Kahn

Group Members: Ko Cooper, Sammy Duda (presenter), Dennis Lebow, Jeremiah Ridenour, Richard Smith, Abby Taylor-Silva, Andreas Vogel, Joel Wiley

- 1) **Outline the key components of the chosen water issue. This needs to be detailed enough for a technologist to feel confident that they have a clear picture of the problematic. BE SPECIFIC.**
 - Decision-making is historical.
 - Some water must go down the root zone.
 - Nitrate is temperature-driven.
 - Data's partially there.

- 2) **What is the time imperative for deploying a solution? (In other words, how important is this to your company and to the industry?)**
 - September 2011

- 3) **What are the obstacles to attaining the technology needed solution? List them.**
 - Art versus Science
 - Confidence → insurance
 - Cultural → educate
 - Benchmarks by crops, soils, micro-climates
 - Cost (yield decrease and implementation)

- 4) **What factors could assist in gaining the needed solutions? List them.**
 - Benchmarks
 - Measure N where plant uses
 - Test beds
 - Collective treatment systems

Other Notes

- Measure where the plant uses the N better measurement
- Cultural → educate → confidence → insurance → green
- Test beds – center of competency UC did decrease \$, now private companies
- Tile drains carry N
- Liability when it doesn't work
- Benchmarks can be anecdotal and empirical
- Salting the soil – must allow water below root zone.
- Nitrate solubility means nitrates want to move down with water
- Bacteria are a way of keeping N in a shallow root area – but it's a balance
- N is temperature-driven: is that something that can be addressed?
- Biologicals as N source is not affordable
- Salinas Valley = biological flourish capability
- By re-using N, you're also re-using "bad" inputs
- Much of the decision-making is historical
- Chemistry and yields increase (1940s, 1950s)
- Management improvement increase (1990s, 2000s)
- Some N tools aren't used
- Need to establish benchmark

HOW BEST TO COLLABORATE WITH TECHNOLOGY PRODUCERS

- Ag wants/needs confidence in technology
 - Attacked by the Snake – Oil approach to technology solutions for agriculture
- Need from technology: proof of concept by peer review
 - Set up trial with large Ag
 - Work with cooperative extensions
 - Pro: coop extensions getting budget cuts
- Vendors should put some of their own money in trials – but someone else can analyze the data.
- Work with USDA for trials
- Some trials take years
- From large technology point of view they identify corporate “partners” to try ideas at no cost to companies
- Larger technology companies have an immediate legitimacy
- Check out oil and gas industry for possible ideas and solutions to transfer to agriculture
 - Follow the money
- Need a database of agricultural data then team up with technology partners to analyze
- Word of mouth technology transfer between ag companies
- Ag should adapt to existing technologies that could be deployed