Water Data: Myths versus Realities
A Presentation to the Aspen Institute

May 29, 2015
The Age of Data Means Numerous New Players

Farm and irrigation data collection and analysis tools have become a popular topic and various companies are focused on capitalizing on the idea

*A few examples include:*

[LOGOS] HORTAU, Conservis, Farmlink, SWIM, Climate Corporation, FarmLogs, Granular, Farmobile
The Age of Data Results In Numerous Articles

• How big data is going to help feed nine billion people by 2050

• Big Data Comes to the Farm, Sowing Mistrust
  – http://www.wsj.com/articles/SB10001424052702304450904579369283869192124

• Cropping up on every farm: Big data technology
  – http://fortune.com/2014/05/30/cropping-up-on-every-farm-big-data-technology/

• Digital disruption on the farm

• Seven big data lessons for farming
But The Age Of Data Also Produces A lot of Myths
Myth Versus Reality: It’s All Good

- **Myth:** All data is good data
- **Reality:** Profitable data is good data
- **Explanation:** Data must be capable of being easily manipulated into actionable information enabling thoughtful analysis which can lead to better decisions, cost savings or greater yields
Myth Versus Reality: Just Stop Wasting

- **Myth**: Improved efficiency produces excess water for other uses
- **Reality**: Improved efficiency increases crop yields and in most cases increases consumptive use per acre
- **Explanation**: Inefficient irrigation produces greater amounts of return flows which recharge aquifers or provide water to downstream water users
• **Myth:** Increased efficiency produces excess water for other uses

• **Reality:** Changing cropping produces excess water for other uses

• **Explanation:** The most efficient way to produce excess water for other uses is to fallow or to replace high consumptive use crops with lower consumptive use crops.
  – For example, the consumptive use of alfalfa can be upwards of 5 acre feet per acre as compared to wheat which uses approximately 2 acre feet per acre.
Myth Versus Reality: Just Trust U.S.

• **Myth:** Good governance requires good data for good outcomes

• **Reality:** Bad actors can manipulate any data to justify a desired outcome

• **Explanation:** There is a high degree of distrust between those producing the data and those wanting the data and very little will change until that misunderstanding is resolved to the satisfaction of both parties
Myth Versus Reality: GD Farmers

- **Myth:** Farmers are the problem and they can’t be trusted which is why we need the data to monitor their behavior.

- **Reality:** Farmers are the solution and they are willing to share their data provided they are able to benefit in some manner from their actions.

- **Explanation:** The western U.S., for the most part, was initially populated by farmers and the cities that followed in their footsteps have done everything they could to acquire the water they need for their growth at the lowest possible cost which historically has meant casting numerous dispersions on the inhabitants of rural communities in general and on farmers in particular.
Myth Versus Reality: Let It Shine, Let It Shine

- **Myth:** Focusing on water data will enable the system’s flaws to be visible to all
- **Reality:** Focusing on data could delay the changes necessary to fix the system
- **Explanation:** The prior appropriation system which serves as the basis for water law in the western U.S. is severely flawed and needs to be updated. Any action that delays that recognition only serves to benefit the entrenched interests who stand to gain financially and/or politically from the status quo.
Conclusion

• Although there are tremendous benefits to be gained for farmers and the communities they serve directly and indirectly by increasing the generation and collection of agriculture related water data, that activity cannot occur in a vacuum which ignores the historical reality of farming economics and/or the significant challenges faced by farmers by the outdated and overreaching regulatory, legal, political and social obstacles they are forced to overcome in order to stay in business.
Fallowing programs are, in general, an agreement between a water buyer and agricultural water user, in which the water buyer reaches an agreement with the agricultural water user to forgo farming, or fallow, a certain percentage of their farmland and enable the water buyer to use that water elsewhere.

Example: Metropolitan Water District of Southern California’s (MWD) program with the Palo Verde Irrigation District (PVID)

- In 2004, approximately 26,000 acres of PVID’s approximately 100,000 irrigated acres enrolled in MWD’s long-term (35-year) fallowing program
- MWD paid farmers $3,170 per acre committed to the program (a maximum of 35% of a landowners total acreage could be enrolled)
- MWD also pays $602 per acre fallowed per annum (2005$) which is escalated each year by 2.5% for the first ten years and between 2.5 - 5% per annum therefore
  - The current payment per acre fallowed is $752
Company Summaries

- **Hortau**
  - When it comes to real-time soil moisture monitoring, nobody has been doing it longer — or with more precision — than Hortau.
  - For more than a decade, Hortau has been an industry leader in precision soil moisture monitoring, developing one of the first web-based irrigation management systems on the market and helping growers take the guesswork out of irrigation management.
  - Using soil tension to determine the precise amount of water to be applied, Hortau’s proprietary system has helped growers of countless crop types improve plant health, boost yields and cut irrigation costs.
  - Hortau’s wireless irrigation field technology, combined with its simple, cloud-based software, securely reports to owners and ranch managers how crops are faring in real time.

- **Conservis**
  - Conservis provides farm management software to help you see your operation from the dirt up. Track field activities, manage inventories and analyze yields. The Conservis platform connects your information to manage your progress today and harvest opportunities ahead.

- **FarmLink**
  - FarmLink Analytical Solutions aggregates data from public and proprietary sources to identify relationships and insights necessary to solve the most complex problems related to agriculture and natural resource management. FarmLink’s analytics engine is designed to harness analyst-guided machine learning to help solve complex challenges in agriculture and natural resources.
  - FarmLink TrueHarvest is the first and only yield benchmarking service that uses objective, unique and accurate data to show your farm’s full range of yield potential and actual yield performance, down to the 150 square foot area we call a micro-field.
  - By comparing each of your fields to similar fields with similar growing conditions, you can better understand yield improvement opportunities and make better input and management decisions.
SWIIM

- The SWIIM® System is a software suite, instrumentation and remote sensing package that enables agricultural water users to optimize water rights, conserve water and increase net income for farm and ranch operations. We call it SWIIM®, or Sustainable Water and Innovative Irrigation Management®. A blend of science and technology, SWIIM gives owners the opportunity to increase income by leasing a portion of their consumptive use water rights to municipalities, private industry and conservation groups, without compromising the underlying water right.
- SWIIM provides an alternative to the non-sustainable, agricultural dry-up option. It has been academically tested and vetted by industry leaders. Designed to be an efficient and profitable solution for fresh water stakeholders, SWIIM uses a groundbreaking blend of technological capabilities to transform water rights into a valuable revenue stream.

The Climate Corporation

- Climate Corp provides various features including:
  - **Nitrogen Advisor**
    - Prevent crop stress instead of simply reacting to it
    - See field-level nitrogen supplies based on applications, crop stage and weather, along with how much N crops will require
    - Explore custom scenarios to determine the smartest amount of N to apply and the best time to do it
  - **Field Health Advisor**
    - Use in-season and historical field imaging to evaluate crop health and identify issues before they impact yield
    - Prioritize scouting activities and save time by identifying which areas need your attention before heading into the field
    - Gain a new perspective on how decisions are impacting crops and get a head start on planning for next year
Company Summaries

- **FarmLogs**
  - Includes various features, including:
    - **Yield Maps**
      - Import yield files from almost any hardware, and start managing variability
    - **Automatic Activity Recording**
      - Harness the power of your smartphone's GPS to log field activities automatically
    - **Field Rainfall**
      - See how much rain your crops received without driving to your fields
    - **Crop Health Monitoring**
      - Prioritize field scouting using remote-sensed crop health
    - **Soil Maps**
      - Understand field soil makeup and nutrient impact
    - **Growth Stage Analysis**
      - The most advanced remote-sensed growth stage product on the market

- **Granular**
  - Granular, a new farm management and analytics platform, helps you improve efficiency, profit and yield so you are ready to farm more acres.
  - Turn Data into Decisions: Granular helps you measure, analyze and improve your entire operation.
  - As you enter and adjust your production plans, Granular automatically updates your operational schedule and budget.
    - Growth model driven scheduling tools
    - Input inventory tracking
    - Expected profitability updated by activities
Farm Mobile

- Simplify data from machine to decision.
- Farmobile was founded in the fall of 2013 with the strong spirit of Midwest pragmatism and a huge vision: To simplify data collection from machines to decisions. Delivering the simplest way for farmers to get their data in one place was crucial. We knew most farmers already worked with other parties to analyze their data. So, data analysis could be left to others. Farmobile put together the business model, technology, and team to make our vision a reality.
- We engineered a simple, fresh approach we call a PUC, or Passive Uplink Connection. Modern farms cover a lot of ground in and out of the field. So, we designed the PUC to integrate into modern farm machinery, semi-trucks, and heavy-equipment. As it turns out the PUC is the first of its kind—the only solution that truly works with all iron and iron of all colors. For farms who do it all it’s the one-stop device for mixed-fleet management.
- To make a PUC truly simple we eliminated a need for smartphones. They are expensive. Expecting hired hands to keep them charged, safe, to pair them properly, or to even remember them would be challenging. We integrated cellular to ensure fleet visibility and data transmission would be constant. The pricing had to be simple too, so we bundled the data plan in the annual subscription.