Dairy cows consume a great deal just to produce a bit of milk for us

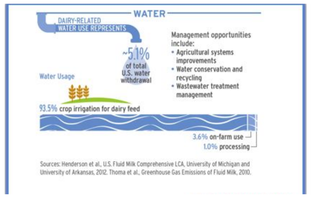
By Team Moo and the fluffy cow

Problem: Water is not used efficiently in the dairy industry.

Wicked Problem
Fall Semester, 2016

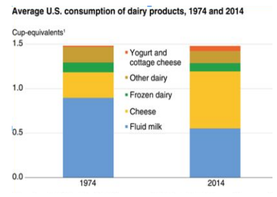
Trace Your Milk...It's an environmental connection.

Bad irrigation practices, on farm use, and processing account for most of the water usage.



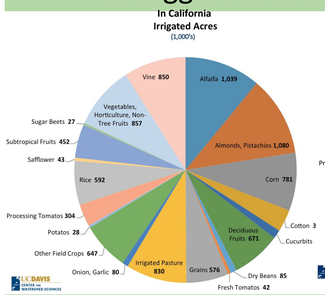
A large portion of the milk processed is not consumed, but wasted.

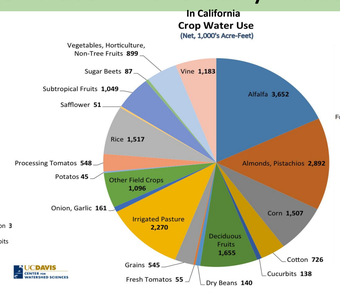
The amount of cheese in the overall dairy consumption has increased heavily over the years.

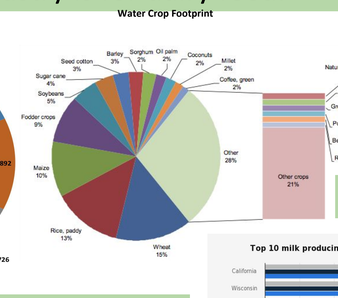


Manure slurry tanks spread manure at a greater distance and speed, but uses over five times the amount of water.

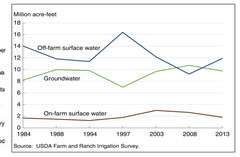
The biggest user of water in the dairy industry is for dairy feed.







Substitution between groundwater and off-farm surface water for irrigation



CA, WI, ID & NY are top dairy states: 21% coming from CA.

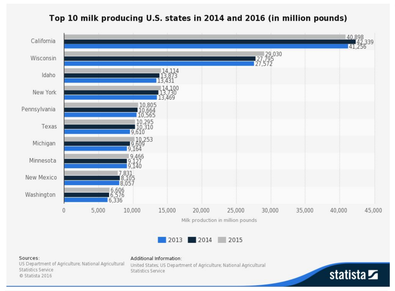


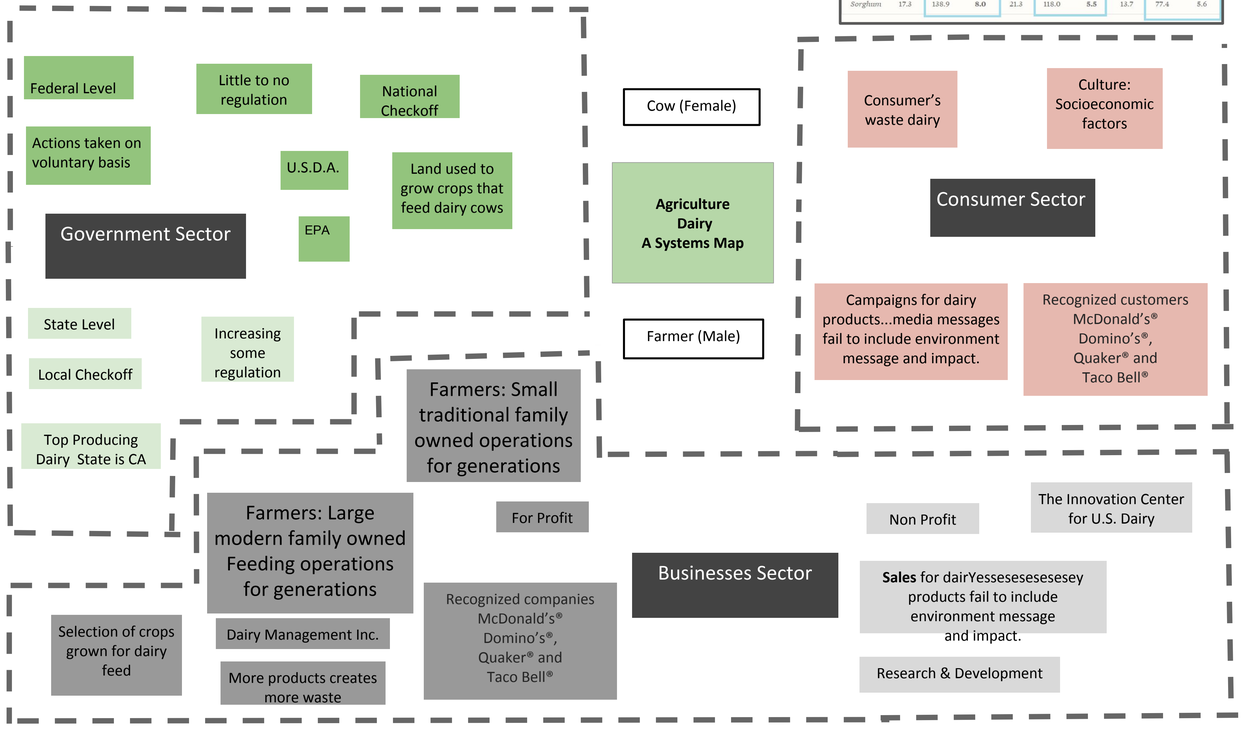
Table 1. Crop water use efficiencies in on-farm field trials conducted near Lawrence, Nebraska, 2009-1011.

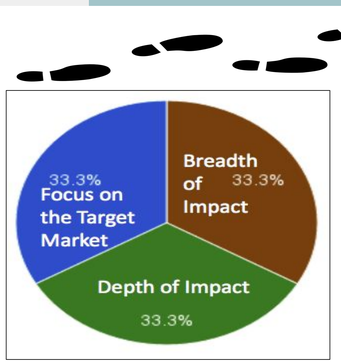
	2011 ET (in)	2011 Yield (bu/ac)	2011 CWUE (bu/in)	2010 ET (in)	2010 Yield (bu/ac)	2010 CWUE (bu/in)	2009 ET (in)	2009 Yield (bu/ac)	2009 CWUE (bu/in)
Corn	22.0	127.2	5.8	23.3	101.2	4.3	14.5	97.5	6.7
Soybean	21.3	61.3	2.9	22.0	44.0	2.0	14	33.4	2.4
Sorghum	17.3	138.9	**8.0**	21.3	118.0	**5.5**	13.7	77.4	5.6

Root Cause Analysis

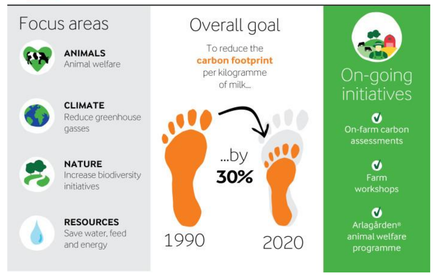
Water is not used efficiently in the dairy industry.	Dairy cow's feed requires a lot of water to grow the crops.	A large amount of water is used in irrigating crops such as corn and alfalfa.	Irrigation methods are not water efficient under current conditions.	Crops are grown in regions that are experiencing drought conditions and hot temperatures.

System Map





Sustainable dairy farming strategy



Milk is 87 % water.

Heat stressed cows drink double the amount of water.

It takes 4-5 lbs. of consumed water to produce 1 lbs. of milk.

Dairy Cows consume 25-30 gallons of water per day.

Roughly 2 lbs. of hay is consumed per 100 lbs. of the cow's weight per day and for 1 lb. of grain 3 lbs. of milk is produced per day.

The average dairy cow weighs 1,300 lbs.

Theory of Change

The adoption of using water more efficiently in the dairy industry begins with an understanding between the milk you drink and the environment around you.

→ A strong disconnect in the dairy supply chain from "cow to customer" results in water inefficiencies on many dairy farms and by many consumers.

→ A key driver will be a recognition by health conscious dairy consumers who want to practice dairy sustainability.

- Discover what farm your milk comes from...
- Learn what cows are eating...
- Locate where crops are grown…what state?
- Understand how much water is being used to grow the crows that feed the cows that provide you your high quality milk everyday...

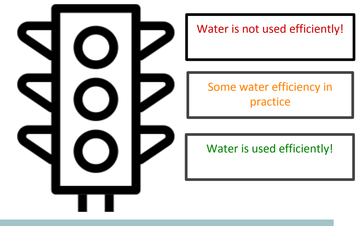
→ Leading the way towards a happier you & a healthier environment.

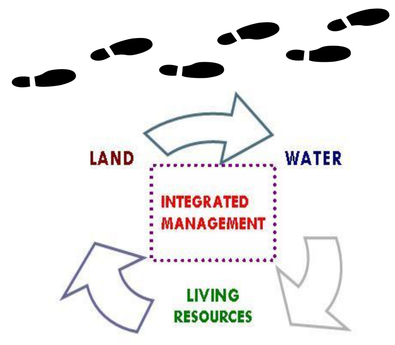
Framework for measuring water usage in the dairy industry

Benchmarks Include:

- → Ranking System of top producing dairy states by county
- → Crop Water Use Efficiencies
- → The Water Footprint for Crop Production
  - ◆ Green
  - ◆ Blue
  - ◆ Gray
- → Life Cycle Assessment in dairy industry
- → Number of Cows permitted at location
  - ◆ Concentrated feeding operations
  - ◆ Smallholders
- → Environmental and Operational Criteria of eco-efficiency on dairy farms

Evaluating water used as efficient, needs improvements or not efficient





Business Model

For our customers: Dairy consumers Family farms & Cows Companies that support sustainable change	Offer water efficiency information targeting the dairy industry	Create a website emphasizing the water usage in the dairy industry	Integrate relationships between customers through education on water usage in the dairy industry
Generate a menu of information on water efficiency so future adjustments can be made.	Gather data to generate information menu on water efficiency in the dairy industry.	Reach as many diversified groups as possible with our informative website	Continue maintenance on water efficiency practices keeping menu simple and clear

Timeline

September 2016 Ranking System	October 2016 Measure Crop Water Efficiencies	November 2016 Water Foot-print Color	December 2016 Life Cycle Assessment	January 2017 Number of Cows permitted
February 2017 Environmental Criteria	March 2017 Operational Criteria	April 2017 Signal Evaluation	May 2017 Discussion of Findings	June 2017 Resolution

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