# TECHNOLOGY AND CROP VARIETIES - DRAFT

Key themes from stakeholder outreach:

- Promotion of irrigation efficiency technologies
- Adoption of less water intensive crop varieties
- Promotion of technologies for the treatment of alternative, lower quality sources of water
- Implementation of research-based technology aimed at better understanding our state's water supply

Questions and Common Themes from each breakout

**What policies, research and programmatic changes are needed to increase adoption of irrigation efficiency technologies and alternative crops?**

- People are not as concerned about water until it directly affects them when they turn on the tap and there is no water.
- Draw-down tubes illustrate in real-time how much water is being depleted during each use.
- Moisture probes inside the soil lets you know the amount of water in each zone to help schedule irrigation applications.
- Pivot manufacturers have the technology to sense the moisture conditions and then control the off/on of a pivot remotely. This technology isn't being utilized due to expense and because the need is not stressed when water is available.
    - Irrigation efficiency is a great tool to be used for any crop. While it does not reduce water use, it raises the value of the water you did use.
- Utility users receive an economic incentive when they save water, they save money. Agriculture misses out on the economic reward to conserving water - they do not see a cost. Identify the economic benefit of the value of water per drop to help Kansans better understand the economic impact irrigation can have.
    - Quantity savings?
- Develop markets for the alternative crops, a market, purpose/use that is economical.
- Identify a variety of sorghum that provides incomes equivalent to the profit of other crops.
- Provided incentives work a lot better than a big stick. Incentives have worked with EQIP, No-till, CSP with technology training, education and incentives.
- Market courses and market driven incentives are much more sustainable than incentives from public funds.

- With market driven incentives, some end-users have to show/demonstrate how they are using water such as McCarty Dairy and the savings they are creating.
- Keep market prices in mind when creating incentives. For example, interest in cotton in southwest Kansas generated a mill. It was very successful until corn prices went up and it was no longer popular to grow cotton again. Identify the right recipe for producing market pressures, if the price of corn is really high you are not going to diminish the production of corn for another crop.
- The government subsidizes corn, it caused the problem.
- If you incentivize a unique crop, such as cotton, then you need to be able to identify markets to purchase the crop, transport it, etc.
    - The state needs to develop the market for other crop varieties.
- Weeds are a major problem in grain sorghum and herbicide options are limited for grain sorghum therefore limiting the growth in acres.
- More money on research for grain sorghum, varieties and the market, is need to encourage farmers to plant more grain sorghum.
- If an area is going into a LEMA should there be a package that allows it to be easier to adopt, funding, etc.
- Use of cover crops, helps increase the efficiency of rainfall and current soil. Not the answer, but it's an aide. Added benefit of protecting the reservoirs, because the soil stays and reduces the use of fertilizers.
    - How: revise the crop insurance rules.
    - The research and the studies of where cover crops will and will not work.
- Systems like no-till, reduce the process of evaporation. The value of the cover vs. the moisture it uses.
- Identify the missing link between research and good business practices. Kansans have access to research but have not changed their methods long term because it ultimately did not make sense for their business. Need to identify what tools are needed to change Kansans lifestyles not just their methods.
- The water issue comes down to input budgets. Water has to become a measured input in your budget. Economic models show to pump it all now is the best choice economically until you are forced to pump less.

**What partnerships should be created and supported to develop affordable technologies for the treatment of alternative, lower quality sources of water?**

- We need to conduct a formal investigation into technology that removes salt out of water, define what technology is available today and identify what technology and processes work best for different applicators, city vs. irrigation, etc.
- We should work to identify ways to utilize salt water from the oil and gas industry that is currently being disposed. We can work to enhance the water to make it useable for either individual wells or aggregation.
- As water quality changes, it is also important to monitor the soil quantity.
- Western Kansas has access to poor drinking water. The water quality in the Arkansas River is lacking and it takes a lot more money to make it drinkable for Kansans.
- What is quality drinking water? Do we stretch the line too thin in an effort to identify and provide drinking water?
- Develop programs that help the water quality for appropriate uses - where can you use brackish water vs. fresh water standards.
- Well water users feel the state should pay for to make their water drinkable, but the state cannot support everyone - a solution is to look at what regions need the state's help versus those that do not.
- We have the technology of gas gathering lines. We need to identify technologies to treat the bad water and make it available through a pipeline system and develop an infrastructure around the treatment and pipeline system.
- Technology is needed to use fracking water. Fresh water needs to be used for fresh water.
- Work with the state and universities to provide incentives to Kansans to pilot new technology making the technology easier to adopt moving forward. This will need partnerships between the state and universities.
- We need to partner with universities and research and study new technologies here in Kansas. Research and development within Kansas universities allows us the opportunity to develop technologies first.
- K-State is positioned to work with the Army Corps of Engineers to identify ways to recapture water and has access to USDA funds - we need to capitalize on that more.
- Make sure K-State staff is a trained workforce.
- It is important to find the best niche for the final user, matching water quality to the water need.

- Eastern Kansas needs to have a better understanding of what the reservoir situation is before spending millions of dollars to dredge without data.
- Technology is available to help Kansans measure each gallon of water they apply, we need to establish the value of water of ground and surface water. We do not know the value of surface water and we need to.
- People using reservoirs do not want their water use to be evaluated the regulated in the same manner of agriculture use in western Kansas.
- Enhance our level of in-basin sediment profiles and the the sediment coming in.

**How can technology best be used to understand our state's water supply? What is the end goal of the research?**

- Real-time information allows the state to understand what is happening now, not a year from now, and allows us to address problems earlier. Draw-down tubes help make this real-time information possible.
- Draw-down tubes are an investment for Kansans, costing anywhere between $500-$1000 each. Assistance is needed to help incorporate the data collected from these tubes into software that can then be connected to irrigation sprinklers.
- Water quality monitoring systems has improved but is still labor intensive. We need telemetric information which will help track water quality and flow. This technology is available, Oklahoma has it, and helps you identify if the water quality is acceptable to irrigate and pump.
- Technology to shut gates down with the gauges to manage water released from storage is needed.
- Knowing how much water is where would be better equip Kansans to work with the Corps of Engineers to help manage water flow. Better data helps to better define how much flood control is actually needed.
- We need to coordinate better with all state agencies that work with water (KDA, KWO, KDHE, geological survey, etc.) to comprehensive data all in one place. Need to identify ables that do comparisons, educate Kansans on how to compare the data and integrate the information/data .
- The oil business has invested a lot of time and money into finding oil. We have tried to do research on "finding water" and it's not available or very accurate. We can learn from the oil industry and learn how to use their technologies for our purpose and invest money in these technologies.

- Identify cover crops that conserve moisture.
- Examine water rights. Examine yield and enforce criteria and restrict irrigation.

**Of the feedback related to Technology and Crop Varieties, what would lead to the greatest probability of achieving the Vision?**

- Identify where the most technology is used and learn from these practices. We need to identify better irrigation technology and crop varieties.
- Education is needed. We know the technology is there, but people need to use it.
- Syngenta has introduced the drought tolerant corn with the gene in the seed.
- Research backing what crop varieties have been tried and the results measured is critical. When water costs close to $7 an acre, Kansas have to be careful what crop variety they plant. They want to know, through research, what varieties saved the most water.
- It is hard to find seed corn varieties specific for western Kansas. More corn is grown and sold in Iowa and the most varieties catered to that environment.
- Priorities should focus on what crop varieties and technologies allows Kansans to get the most bang for the buck.
- More synergy is needed among water groups encouraging these groups to interact.
- Funding supporting LEMAs in western Kansas is needed to help promote the program and change the way Kansans think about water and using technology.
- Identify good concise ways to share technology, share success stories dramatize the urgency of water quality and quantity.
- Work with ethanol plants to also take grain sorghum in addition to corn and incentivise the use of sorghum.
- Remain aware of global markets and changes.
- Continue to remember that feedlots and dairies play a huge role in western Kansas and the livestock sector also drives the use of water .
- We cannot only focus on the Ogallala. Kansans in the eastern part of the state are beginning to use irrigation more and more.
- Develop and integrate data on water quantity available, the use of water, trends in water and forecasting water availability.
- Identify climates and locations where we can grow consistently in the NW, drip sub surface irrigation. If this can be done in concert with water rights, Kansans may be able to grow a similar crop variety without sacrificing

- Water management by the state may drive crop demand. Similar to what the federal government did with cards and MPG. We are not going to get long term crop transfer and technology implementation unless there is direct translation in economic benefit.
- Make sure to not overlook the residential side of consumers (lawn, golf course, etc. )
- Outreach and education needs to be a priority with consumers.
- Data sets have to be integrated.
- It may be best to reduce the use of water where we need it most. We may need to begin looking into a completely different approach where water is not necessarily the main driver.
- Look at the direct modeling between Cheney Lake and the irrigation that is going on in the area.
- Time is the key driver to reduce water input. Time is needed to get the research/technology together
- Shelter belts provide profitability (over 50 years of research) to the area immediately adjacent to the belt.
- You have to reduce the amount of water that is allowed.
- Education is crucial. Information about LEMAs is being passed through four people before getting to the farmers. The Risk Management Association is holding information up because of misinformation. Continued education is needed for all those that touch the information.
- Incentivize farmers and pay them to get educated on LEMAs.

**Are there other ideas related to Technology and Crop Varieties not reflected in this summary that the Vision Team should consider?**

- Insurance policies need to be reviewed to ensure they do not encourage reckless water usage.
- Distinguish what “efficiencies.” Application efficiencies is one thing, saving efficiencies is another.
- Look at USDA program that encourage acreage reductions that help support crop prices
- Look at changes in livestock and how livestock are managed. Take advantage of grasslands, cover crops and alternative crops.
- Landowner rights must be kept the same.
- Why did Nebraska do it and we haven’t?
    - Nebraska mandatorily cut water allocations for irrigators, and gave them the technology to better manage the water they had left.
    - The Nebraska story needs to be told, and understanding if it was successful
    - Incentivize the use of technology first then mandate