Perception of Weather Variables and Crop Production Yields

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REACCH Internship at OSU

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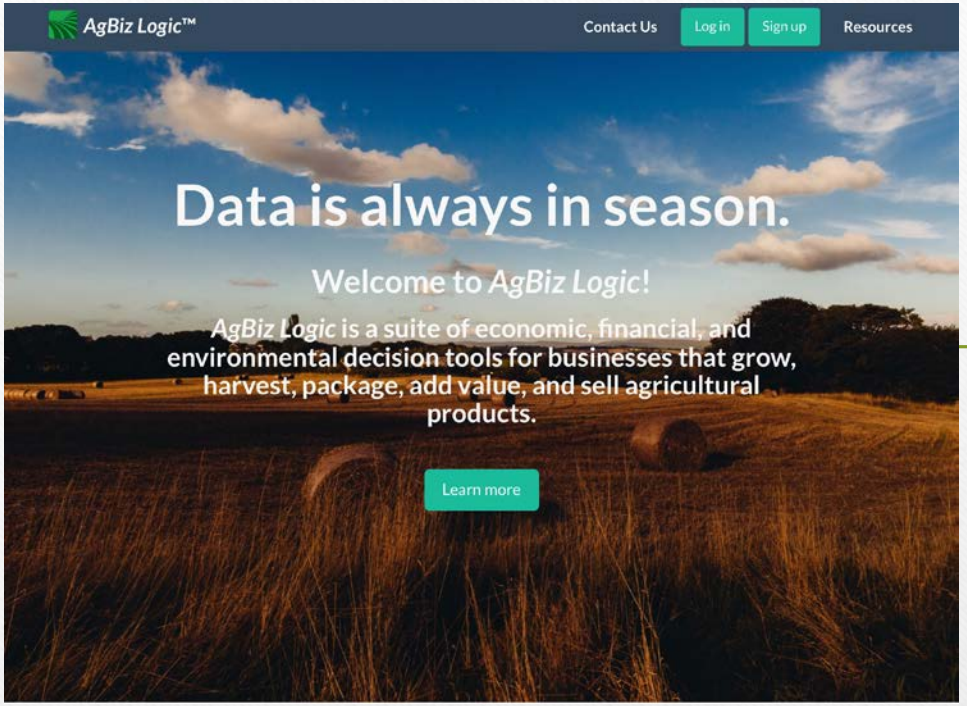

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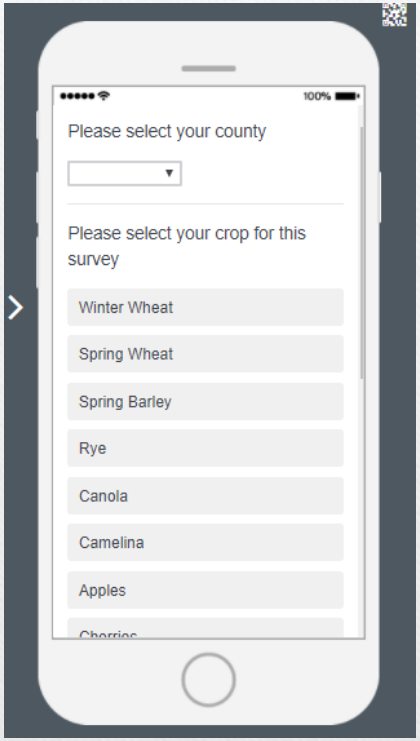
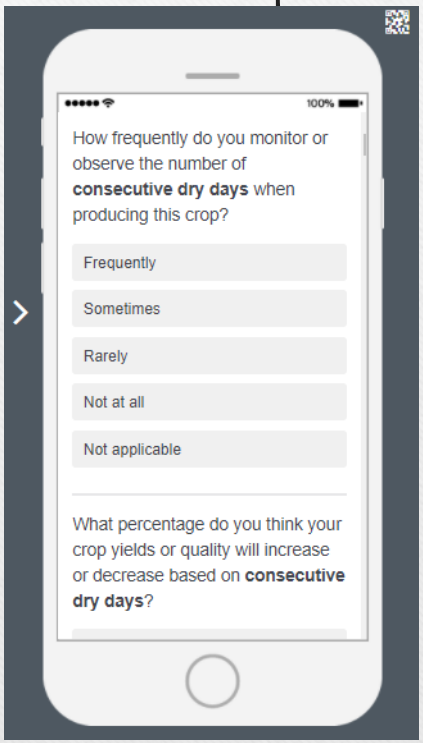
Past Research

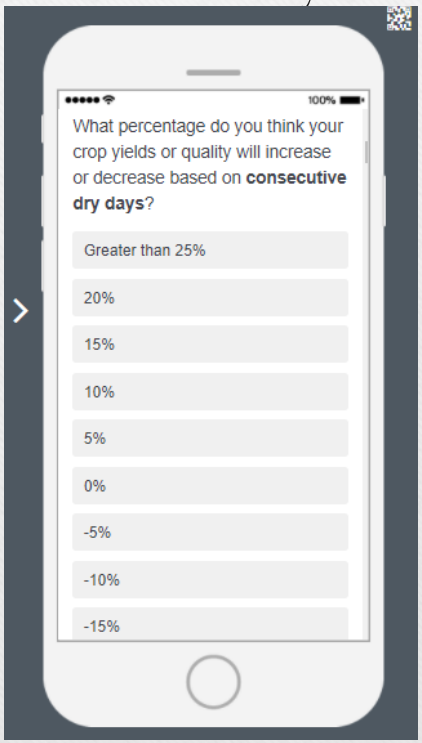
- Growers tend to use a holistic approach when making farm management decisions (Singh et al., 2016)
- Increased climate variability, cooler and wetter springs, hotter and drier summers, frequency of storms, and warm winters were found to be important weather variables (Roncoli et al., 2006)
- Farmers expressed the need to be able to assess climate impacts and also develop new adaptation strategies for climate variability (Capalbo & Seavert, 2016)
- It was found that farmers wanted to see ways of minimizing and managing climate and weather risks (Mase & Prokopy, 2013)

Research Procedure

- Growers were asked to complete a 15 minute survey.







Hypothesis(es)

- It was predicted that the weather variables presented would all have at least a 10% impact on crop production yields.
- Weather variables included:

Consecutive dry days
Consecutive wet days
Nights below freezing
Length of growing season
Number of warm nights
Extremely cold days
Diurnal temperature range
Total seasonal precipitation
Seasonal minimum temperature
Seasonal maximum temperature
Total chilling hours
Total growing degree days
Number of heat wave events
Very heavy precipitation days

Results

- It was predicted that the weather variables presented would all have at least a 10% impact on crop
- Little to no trends were found due to lack of responses

Conclusions and Discussion

- Things I would've done differently:
  - Would have liked to have more time
  - More participants
  - Taken in account crop type

Extension Products

AgBiz Logic Intro Video

- https://youtu.be/1yZij1Mck1U

Thank You

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Questions?

References

- Bartels, W. L., Furman, C. A., Diehl, D. C., Royce, F. S., Dourte, D. R., Ortiz, B. V., ... & Jones,
- J. W. (2013). Warming up to climate change: A participatory approach to engaging with agricultural stakeholders in the Southeast US. *Regional Environmental Change*, 1-11.
- Burke, B. J., & Heynen, N. (2014). Transforming participatory science into socioecological praxis: valuing marginalized environmental knowledges in the face of the neoliberalization of nature and science. *Environment and Society*, *5*(1), 7-27.
- Cabrera, V. E., Breuer, N. E., & Hildebrand, P. E. (2006). North Florida dairy farmer perceptions toward the use of seasonal climate forecast technology. Climatic Change, 78(2), 479-491.
- Capalbo, S. M., Antle, J. M., & Seavert, C. (2017). Next generation data systems and knowledge products to support agricultural producers and science-based policy decision
- making. *Agricultural Systems*, *155*, 191.
- Dilling, L., & Lemos, M. C. (2011). Creating usable science: Opportunities and constraints for climate knowledge use and their implications for science policy. *Global environmental change*, *21*(2), 680-689.
- Mase, A. S., & Prokopy, L. S. (2014). Unrealized potential: A review of perceptions and use of weather and climate information in agricultural decision making. *Weather, Climate, and Society*, *6*(1), 47-61.

References cont.

- Meadow, A. M., Ferguson, D. B., Guido, Z., Horangic, A., Owen, G., & Wall, T. (2015).
- Moving toward the deliberate coproduction of climate science knowledge. *Weather, Climate, and Society*, *7*(2), 179-191.
- Oregon State University & Climate Hub. (2017). County weather variable graphs
- Prokopy, L. S., Carlton, J. S., Haigh, T., Lemos, M. C., Mase, A. S., & Widhalm, M. (2017).
- Useful to Usable: Developing usable climate science for agriculture. *Climate Risk Management*, *15*, 1-7.
- Roncoli, C., Paz, J., Breuer, N., Ingram, K., Hoogenboom, G., & Broad, K.
- (2006). *Understanding Farming Decisions and Potential Applications of Climate Forecasts in South Georigia*. Southeast Climate Consortium.
- Singh, C., Dorward, P., & Osbahr, H. (2016). Developing a holistic approach to the analysis of farmer decision-making: Implications for adaptation policy and practice in developing countries. Land Use Policy, 59, 329-343.