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Creation of a Yield Probability Calculator

Dryland agriculture production in the Central Great Plains is risky because of limited and highly variable precipitation. Farmers need a decision support tool to help them make efficient use of water and financial inputs and help select profitable crops. My goal is to develop an Excel-based decision support tool that will provide users with the probability of producing a specified minimum yield of corn, canola, proso millet (for grain), foxtail millet, or triticale (for forage) in the Central Great Plains. I used Excel to create tables of simulated yield and probability that were previously published graphically in Agricultural Water Management. The simulations were run with the Root Zone Water Quality Model for two locations (Akron, CO and Sidney, NE) for 61 years and 7 starting soil water contents. Various Excel functions and logic were used to search the data tables based on user-input values for crop, location, plant available water at planting, and yield. Based on these values a probability of achieving the specified yield is provided to the user. An economics workbook was also created in which a user can specify costs of production and selling prices to determine net income for the specified yield. Knowledgeable users (famers/lenders/CSU extension agent) evaluated the tool and offered suggestions for improvement. This tool gives farmers and lenders the ability to quantify the probability of achieving the yield without taking the chance/risk. Overall, this tool helps farmers evaluate and quantify the probability for economic success with a new crop.