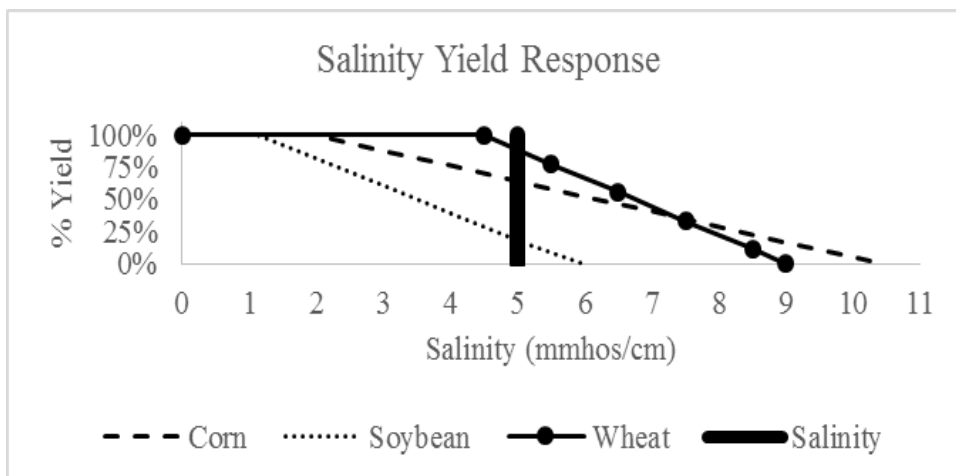




Soil salinity impacts crop growth, resulting in reduction in plant yields. This has significant impacts on revenue, input costs, profitability and land values. Yields of common North Dakota crops are impacted differently by varying levels of salinity – some crops are more tolerant than others. Knowing which crop to plant on different levels of soil salinity is an important part of on-farm decision making. Previous studies conducted in other regions identified thresholds where yields would decline; however, recent studies (2013-2016) at NDSU have redefined thresholds and slopes/declines to make the information more regionally relevant (table below).

	Previous Studies		NDSU Studies (2013-2016)	
	Threshold (mmhos/cm)	Slope (% decline)	Threshold (mmhos/cm)	Slope (% decline)
Corn	1.3	12	2.0	12
Soybean	1.9	20	1.1	21
Wheat	3.4	14	4.5	23

The NDSU Soil Salinity Economics Decision-Making Tool allows users to enter salinity levels to visualize impacts on yields, revenue, input costs and returns. On moderately saline soil (5 mmhos/cm), soybean yields are 16%, corn yields are 65% and wheat yields are 80% of relative yield (figure below).



ECONOMICS OF SOIL SALINITY

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The big picture...

The impact of salinity on profitability varies greatly by crop as it impacts revenue and costs.

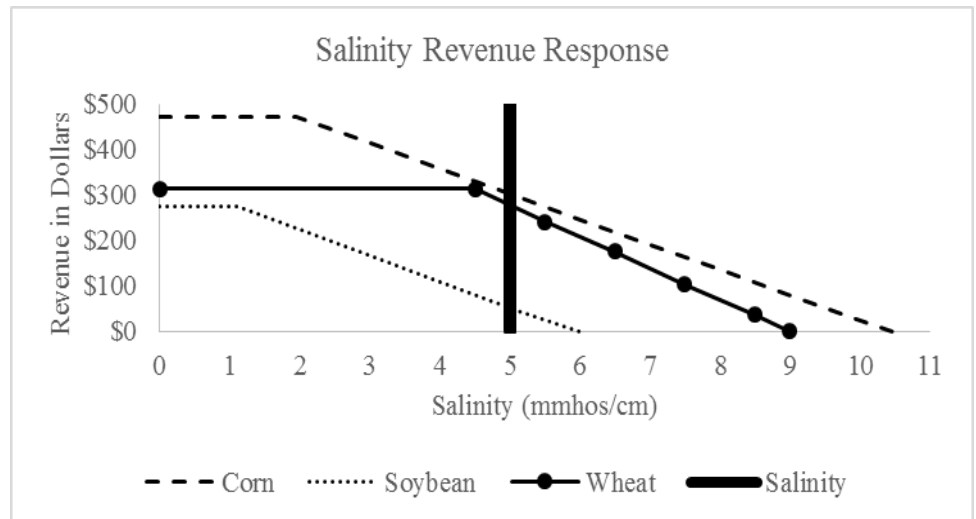
In fields with moderately or strongly saline soils, salt sensitive crops may no longer be viable as profitability is dramatically reduced.

High levels of salinity limit a farmer's flexibility in responding to changing market conditions as they may not profitably grow salt sensitive crops even during periods of high prices.

Ultimately, the lower productivity of saline soils is capitalized in the price of land. With fields with higher saline soils having lower prices than those with lower saline soils.

Cropping practices that impact salinity may have significant impacts on the profitability of crop production and land value.

The tool includes baseline market prices and expected yields from 2016 Crop Budgets for the Southern Red River Valley prepared by NDSU Extension. Using these numbers, expected per acre soybean revenues fall from \$276 to \$50 per acre, corn revenues fall from \$472 to \$305 per acre and wheat production falls from \$314 to \$278 per acre when soil salinity is 5 mmhos/cm.



A lower yield goal resulting from high salinity should cause farmers to revisit input application rates. This includes optimal seeding rates and fertilizer application rates. A reduction in inputs to optimal levels will increase profitability. Corn cash returns, before fixed costs and returns to management and labor, are \$161 per acre at the salinity threshold (where relative yields are 100%) and \$60 at a salinity level of 5 mmhos/cm where relative yields are 65%.

