

## Nebraska Extension

Research-Based Information That You Can Use

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# Nebraska's Rain: A Dance Through Time

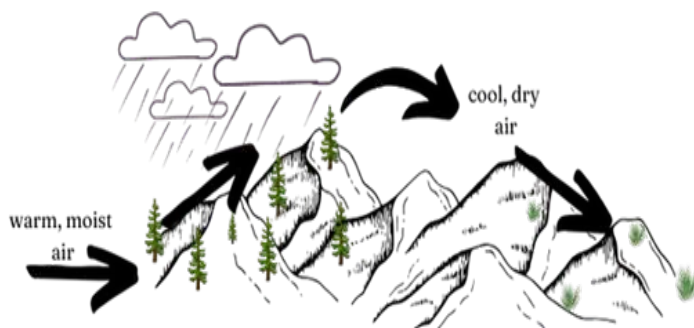
## Precipitation patterns across Nebraska over the last 30 years.

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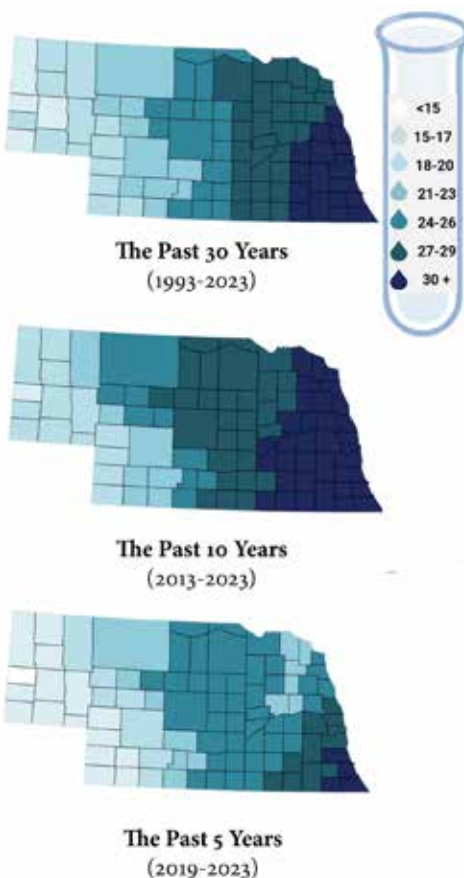
### WHY DO SOME PARTS OF NEBRASKA GET MORE RAIN THAN OTHERS?

Did you know that the weather in Nebraska is molded by a mountain range? Yes, the Rocky Mountains! Formed 75 million years ago, a significant tectonic event called the Laramide Orogeny lifted the mountains, increasing their influence on the weather and ecology of the western Great Plains to the east (USGS). Moist warm air rises up the western slope of the Rockies, cooling as it goes and dropping rain or snow, before descending as dry air down the eastern slope. This is called the Rocky Mountain Rain Shadow effect (**Fig. 1**). As you move east across Nebraska, away from the Rain Shadow, the amount of precipitation starts to increase. This is due, in part, to warm air from the Gulf bringing moisture north to the Great Plains.

Can you find your county? **Fig. 2** What is its average precipitation in the last 30 years? How about the last 10 years, and 5 years? Has it received more, less, similar, or a roller coaster of precipitation across the three maps? Drier and wetter periods are common in the Great Plains. Rainfall can also change over longer periods of time. That's why we look at long-term



**Figure 1:** The Rocky Mountain Rain Shadow



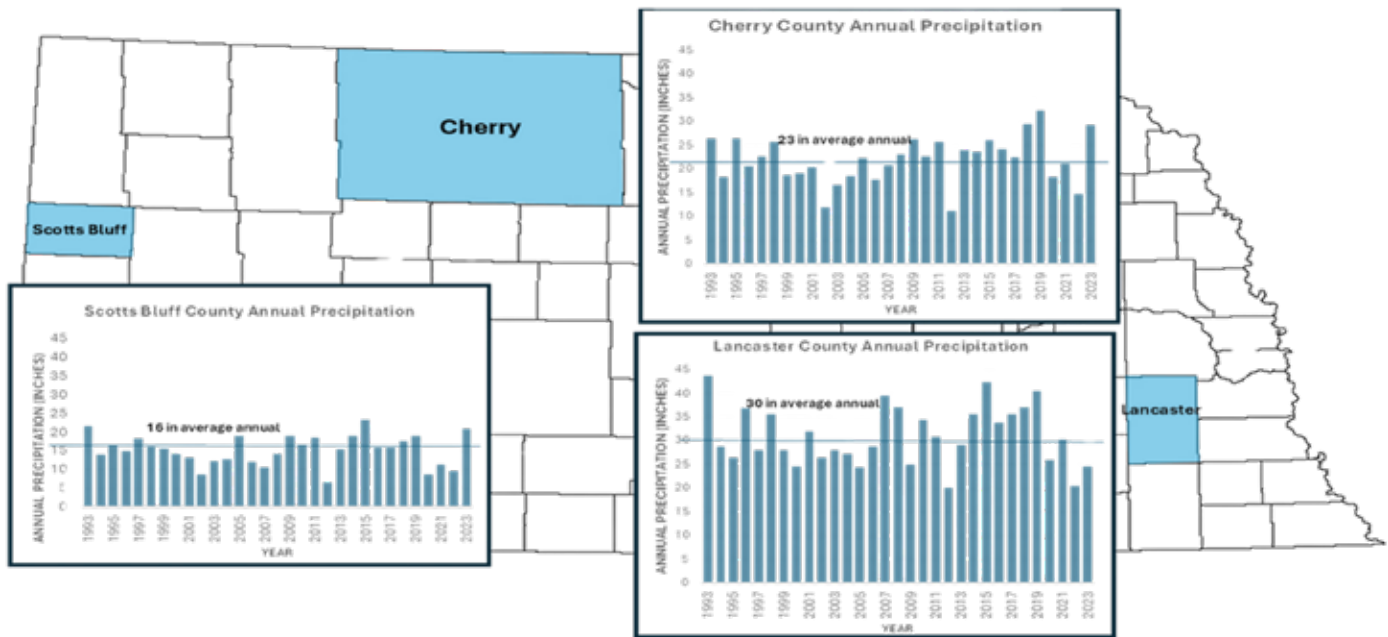
**Figure 2:** Average Precipitation Shifts through Time (Data Source: National Oceanic and Atmospheric Administration, NOAA)

averages, as in **Fig. 2**, so we can understand how much rain an area usually gets and if it has changed.

As you probably noticed, precipitation in Nebraska doesn't follow the same pattern every year. It's constantly changing, like dance has through time!

Look at **Fig. 2** again. Did you notice how rainfall patterns shift between the maps? See how the dark blue areas move around, showing more precipitation in some periods and less in others? It's like Nebraska's own dance through time, where rainfall sways from one region to another.

Let's dive even deeper into Nebraska's precipitation by comparing three counties across the state: Scotts Bluff (in the west), Cherry (in the north-central Sandhills region), and Lancaster (in the east). Check out **Fig. 3**, below, which shows rainfall data from 1993–2023 for these three



**Figure 3:** Annual Precipitation in Three Counties

counties. What do you see? Scotts Bluff Co., located closest to the Rain Shadow, typically gets less rain (16 inches on average per year), while Lancaster Co., in the east, receives more (30 inches).

Even within the same county, there's a lot of variation from year to year. Cherry County sometimes receives amounts of precipitation more like the east, and other times more like the west. The differences between years and counties show just how variable Nebraska's weather can be! One year, Scotts Bluff might be especially dry, while Lancaster gets drenched. The next year, it could be the opposite. This wide variation makes it challenging for farmers, ranchers, and communities to plan for the water needs of crops, livestock, and municipal uses.

Next, let's look at **Fig. 4**. It shows a map of precipitation for the year 2023. Surprised? There's no clear pattern or

gradient like before! What's going on? Did the Rocky Mountains disappear? Nope, they're still standing tall!

While the Rocky Mountain Rain Shadow is the lead dancer, other factors can throw in some unexpected moves. Localized thunderstorms, temperature swings, long-term climate trends, and global patterns like El Niño and La Niña can all shake up Nebraska's weather, making rainfall patterns unique each year and tricky to predict more than a few weeks or months ahead of time.

Nebraska's agriculture depends on reliable rainfall. But given year-to-year variability, farmers and communities

### WHY IS THIS IMPORTANT FOR NEBRASKA?

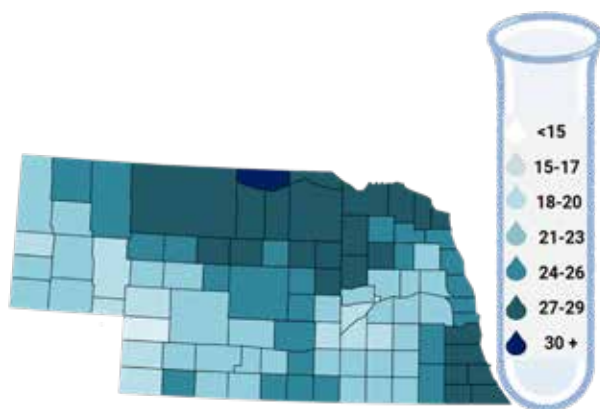
have to be prepared for droughts, floods, and everything in between! These events affect crops, livestock, wildlife, and communities' water supplies. That's why it's so important to understand Nebraska's weather and climate through time!

Resources from weather and climate experts like **NOAA** (National Oceanic and Atmospheric Administration) take these complex factors into consideration when forecasting precipitation's next two-step or brand new dance moves!

**For more information visit:**

<https://www.drought.gov/states/nebraska#outlooks>

<https://nsco.unl.edu/articles/weekly-weather-update>



**Figure 4:** Annual Precipitation in 2023 (Data Source: NOAA)



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