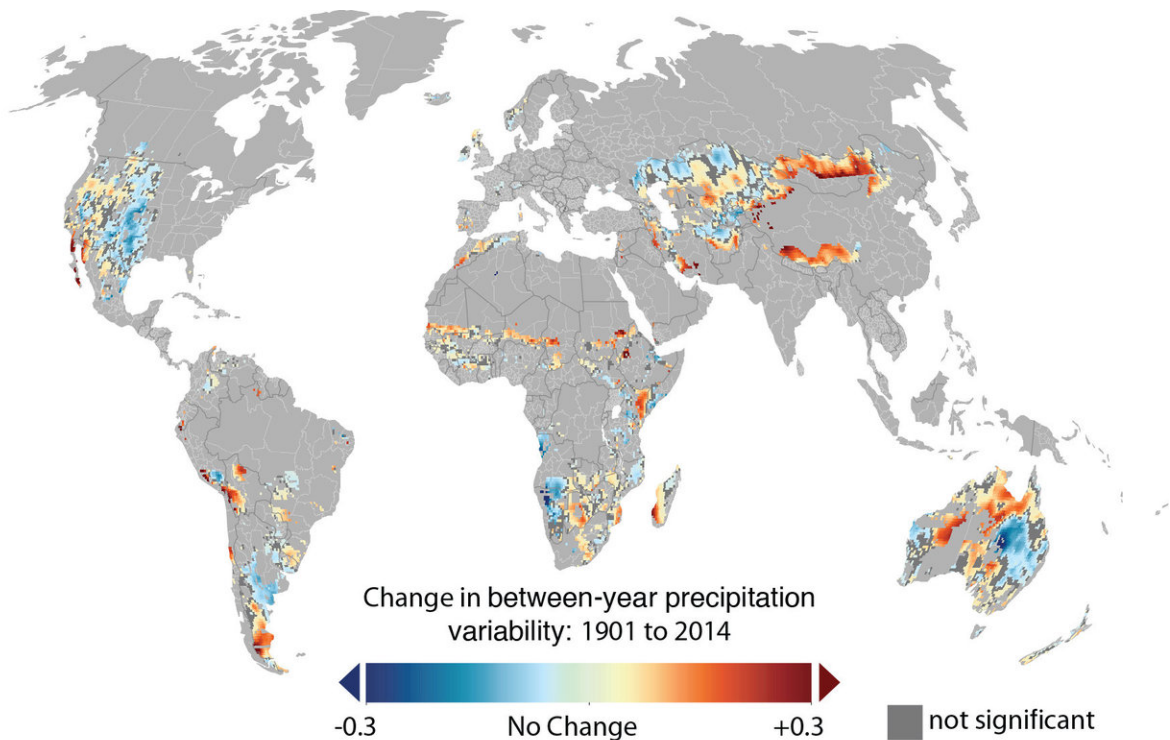


Global grazing lands increasingly vulnerable to a changing climate

February 19 2018



Overall, both within and between-year precipitation variability has been increasing for global grazing lands. This map shows the changes in between-year variability: Of the total land area considered pasture in this analysis, 20 percent did not experience significant changes (in gray), while 31 percent experienced significant decreases (cool colors) and 49 percent experienced significant increases in precipitation variability (warm colors). Credit: *Nature Climate Change*

Some 800 million people around the world depend on livestock that graze on natural vegetation for their livelihoods and food security. In a good season, grasses and other plants flourish, supporting robust herds. In a bad season, the system suffers - as do the people who rely on it. The difference between a good and bad year? One significant and increasingly volatile factor is precipitation.

A new study in *Nature Climate Change* reveals that over the past century year-to-year precipitation variability has increased significantly on 49 percent of the world's grazing lands, affecting vegetation and constraining its ability to support [livestock](#). The study's authors, led by a team from the UMN Institute on the Environment, used climate data from 1901 to 2014 to create global maps of precipitation variability trends. While some grazing lands showed decreases in [rainfall variability](#), the overall trend is an increase in fluctuation, both within and between years.

"Visualizing precipitation variability trends allows us to identify grazing lands that have undergone large changes - and to learn from those places where people have managed to adapt well despite increased variability," says lead author Lindsey Sloat, a postdoctoral research associate with IonE's Global Landscapes Initiative.

This insight is important, because grazing lands are already typically marginal: unsuitable for crops, either too dry or with poor soils. "Even small changes in rainfall put them at more risk," says Paul West, co-director of GLI. Furthermore, some grazing lands are even more inhospitable than others. Changes in precipitation variability especially affect these more vulnerable lands, which - adding to global risk - also tend to be home to the smallholder farmers and pastoralists who most depend on livestock for food. The researchers found:

- Global grazing lands already experience 25 percent more year-to-

year variability in precipitation than the average global surface land area

- Regions with high year-to-year precipitation variability support lower livestock densities than less variable regions
- Overall [precipitation](#) variability has increased the most in areas where grazing is predicted to be important for local food access

Where is livestock production “important”?

Low pasture area, low market influence

Cattle fed from pasture may not be a primary component of local food security

High pasture area, low market influence

Cattle fed from pasture may be important for local food security

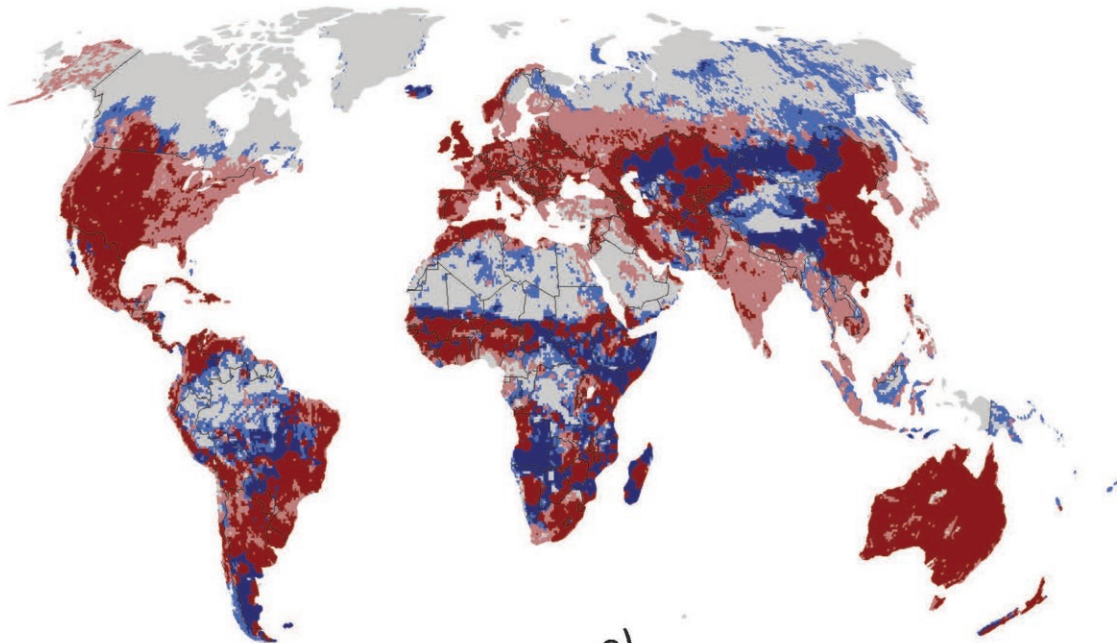
Low pasture area, high market influence

Cattle fed from pasture are likely not an important aspect of local food security or economics

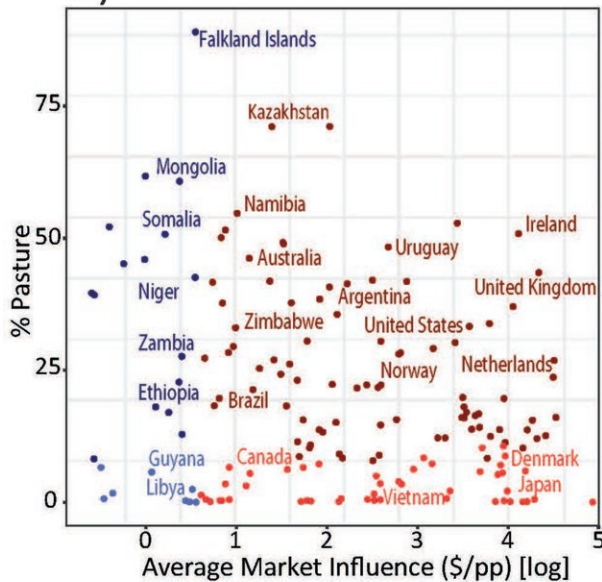
High pasture area, high market influence

Cattle fed from pasture may be economically important

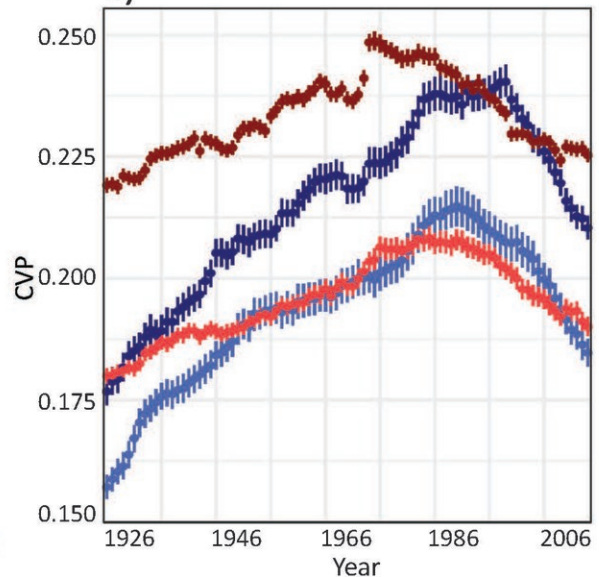
a)



b)



c)



Areas where livestock grazing is important, economically or for food security,

are mapped globally (a), summarized by country (b), and between-year precipitation variability trends between 1901 and 2014 are analyzed for each region (c). The importance of pastured livestock is defined by combining information on the area devoted to pasture and market influence. Overall between-year precipitation variability is highest in areas where livestock grazing is economically important (dark red), but it has increased the most over the past century in areas where livestock grazing is suspected to be important for local food access (dark blue). Credit: *Nature Climate Change*

"This study is showing us that grazing is potentially highly vulnerable to climate change, right across the world, from Australia to Central Asia, sub-Saharan Africa and the Americas," says co-author Mario Herrero of Australia's Commonwealth Scientific and Industrial Research Organisation.

More information: Lindsey L. Sloat et al, Increasing importance of precipitation variability on global livestock grazing lands, *Nature Climate Change* (2018). [DOI: 10.1038/s41558-018-0081-5](https://doi.org/10.1038/s41558-018-0081-5)

Provided by University of Minnesota

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