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Chris Malloy in Phoenix
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'In the sun they'd cook': is the US south-west getting too hot for farm animals?



▲ Cattle farming in the San Pedro Valley, Arizona. Photograph: Witold Skrypczak/Alamy

As temperatures rise, farmers are being forced to adapt, experimenting with new breeds and cooling methods

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South-west of Phoenix, Arizona, in the hottest desert in North America, Beth and Tim Wilson use sprinklers to cool their 300 pigs. Nearby, the Adams Natural Meats bison ranch employs shades and misters. North of the city, chicken farmer Dave Jordan says he cannot put his 10,000 birds out to pasture.

"If they were out in the sun, they would just get cooked."

Animal agriculture accounts for one-third of the US south-west's agricultural revenue. Like the rest of the world, however, the region is changing. Between 1901 and 2016, its average temperature increased by 0.9C (1.6F), and by 1.6C (3F) in some of its hottest places. Arizona recently struggled through a summer that was the hottest ever recorded in some parts of the state.

Animal farmers are now compelled to find ways to adapt to this climatic shift, exploring new ways of keeping chickens and cows cool, or importing more heat-resistant breeds. Lingering in the air is the question of whether the climate crisis is making animal agriculture in this part of the world impractical.

The American south-west - often defined as Arizona, New Mexico, Utah, Nevada and California - has deep roots in animal agriculture. Cities such as Phoenix arose thanks in part to hardy livestock operations.

Many of the region's pigs and poultry are raised indoors, where farmers combine methods such as fans, showers, misters and cooling systems. But these cost energy and money, and penning animals indoors can erode their wellbeing, so many farmers also take pains to pasture animals.

Jordan raises Cornish Crosses, a breed that grows so fast it outpaces its ability to feather, meaning it develops bald spots. Being so clunky, they are vulnerable to the elements, so Jordan uses evaporative and fan cooling, and shelters birds in shady pens. "If we don't do that with meat chickens, then we start going in by the end of the day and picking up dead bodies," he says.

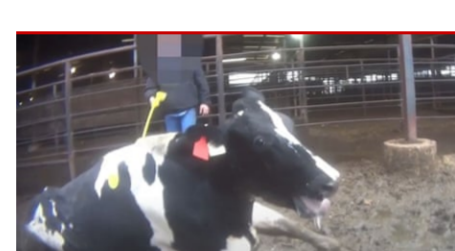
At a higher elevation of 6,000 ft (1,800 metres) in Lamolle, Nevada, Sue Kennedy keeps Freedom Rangers, a less prolific but hardier chicken than the Cornish Cross. If she raised Cornish Crosses, with her "combination of heat stress and altitude", she says she would have "50% or more mortality". Even her Freedom Rangers require cooling. So Kennedy sets sprinklers upwind, and constructs poultry houses amid pastures where misty breezes blow through.

Despite her efforts, her chickens have been growing slower in hotter, drier recent years. She thinks this might be due to heat stress. "When an animal becomes hot, just like when you become hot, you don't want to eat very much," says Tami Brown-Brandl, an agricultural engineer at the University of Nebraska-Lincoln.

In response to increased internal temperatures, animals eat less, drink more, have lower fertility rates and experience higher mortality rates. When heat-stressed, poultry drink two to four times the water they normally do. Pigs, meanwhile, cannot sweat and begin to feel heat stress at about 21C (70F) - Phoenix averaged 37.2C (99.1F) in August 2020 - meaning the pigs eat less and their feed spoils more quickly.

To escape the heat, pigs and chickens are usually kept inside in the south-west. This does not eliminate the danger. "You do lose some in the barn," Brown-Brandl says.

The prospects for cattle are unclear. Dairy cows, cattle and calves account for the bulk of the region's animal agriculture revenue. Cattle can be raised inside, but that would defy ranchland tradition. In the south-west, cattle roam under open skies even in summer.



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▲ A livestock farmer in Arizona fills up a water tank for his animals to drink from last month. Once upon a time, rain water would have been sufficient. Photograph: Stephanie Keith/Reuters

For livestock to thrive, ranchers employ many strategies. A crucial one is developing herds that can handle the heat.

Tim Petersen, a partner in Arizona Grass Raised Beef, runs cattle on 81,000 hectares (200,000 acres), and has bred his herd for heat and drought tolerance using four main cattle types. Gregg Vinson, who ranches cattle in the Sonoran and Chihuahuan deserts, has developed a similarly heat-tolerant herd in part by incorporating cattle with select arid-adapted bloodlines. Both herds have adapted to desert sun over time and can flourish with minimal active management. "Right now, with record temperatures, our cattle are great," Vinson said in August.

Vinson's neighbor raises Angus - the most popular cattle breed in the US. In the south-west, Angus cattle need extra care and extra water.

"If I bought one of your bulls, how'd he do?" Vinson once asked his neighbor, probing how Angus might fare under hands-off ranching. His neighbor answered: "He'd probably die."

A unique breed called the Raramuri Criollo may help keep ranchers ranching as the region reaches temperatures that would fell other cattle. Sheri Spiegall, a US Department of Agriculture (USDA) range management scientist, gathers data from across the south-west on the keenly heat-tolerant breed. First introduced by Spanish explorers, it has adapted to North American arid lands over 500 years.

"They continue their activity at really hot times of the day," Spiegall says. "When other breeds are ruminating, sitting in the shade, Criollo can be out and about and actively foraging."

The question of what farm animals can handle in the south-west has until now been most visceral for the farmers themselves, though that may be starting to change.

On a temperate edge of the Sonoran desert, Michael Muthart of Top Knot Farms strategizes to ensure his chickens, ducks and other fowl see a few weeks on scrubby pasture, where they eat bugs, seeds and green plants. He always gives them access to shaded barns and puts electrolytes in their water on especially hot days. This year he has also been selling Thanksgiving turkeys.

Some of the turkeys were supposed to have been raised in the metro Phoenix area by an urban farmer. But that farmer had news for his clients. He was going to have to send the birds outside town, to Top Knot. It turns out that Phoenix was simply too hot for them.

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