



RESEARCH BRIEF SUSTAINABILITY

BEEF RESEARCH

Estimation of the Requirement for Water and Ecosystem Benefits of Beef Production on California Rangelands

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Abstract

Among other agricultural sectors, beef production is accused of using large amounts of water, and in an effort to reduce water use, some recommend decreasing or halting meat consumption. Beef production water footprints vary and most do not consider the tradeoffs associated with ecosystem benefits provided by cattle on rangeland. A static model depicting water use for cow-calf production on California rangeland was developed on an Excel spreadsheet. Range water use for beef production was modeled at two UC Agriculture and Natural Resources (ANR) Research and Extension Centers: Hopland (HREC) and Sierra Foothill (SFREC), and at the USDA Forest Service San Joaquin Experimental Range (SJER). These three locations were chosen based on evapotranspiration (ET) zones and differences in forage production and rainfall. The model accounted for green water (i.e., water used for range forage production) and blue water (i.e., water used to grow alfalfa and irrigated pasture). As liters per kg of live weight, green water consumption was estimated to be 42,492 for HREC, 28,106 for SFREC, and 22,102 for SJER. Blue water consumption as liters per kg of live weight was estimated to be 4,631 for HREC, 12,784 for SFREC, and 9,140 for SJER. The model was sensitive to changes in range forage production and irrigated pasture use. Green water usage appears large; however, cattle consume less than 18% of the total water range forage plants use to grow. It is important to consider the water use associated with beef production in the context of ecosystem services cattle provide to rangelands, such as preventing grasslands from being converted to shrub lands, woodlands, or even forests, and the role grazing cattle play in managing and improving rangeland.

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