

## ***Interactive comment on “Heat stress risk in European dairy cattle husbandry under different climate change scenarios – uncertainties and potential impacts” by Sabrina Hempel et al.***

**Grant Dewell (Referee)**

gdewell@iastate.edu

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Interesting manuscript evaluating climate change on heat stress impacts in European dairy cattle. Model development is appropriate and authors have acknowledged potential shortcomings. Paper is generally well written. I am not familiar with this journal but text was more conversational than most scientific journals I read. Generally try not to use we did this or our analysis.

Specific comments

Page 1, line 17, not sure what sentence means, especially “region respectively the

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barn”

Page 2, line 24, is there a reference for this or is this opinion? If opinion change considered to be believed. I would argue that livestock are not more efficient and genetic adaptation is slower.

Page 3, line 10-12, this sentence is self-defeating. The fact that economic drivers are not triggering mitigation strategies may be negating premise of paper.

Page 3, line 30, Adaption and recovery sentence seems unnecessary. I know you discuss recovery later in paper but this sentence seems like an afterthought here. Either expand on importance or delete.

Page 4, line 6, human health implication is a stretch, particularly without a reference.

Page 4, line 19, don't think you need this last sentence.

Page 4, line 22-32, very conversational, lot of we and our. Definitely delete Eventually in line 29

Page 12, line 20-24, very conversational again. I am not used to a having an introductory paragraph like this in front of each section, check if it is appropriate for journal

Page 18, line 5, I would delete this last sentence

Page 23, line 2-4, I like this intro better than the conversational intros in some of earlier sections.

Page 23, line 19, need to justify the 0.6 kg better a 50% inflation over what was reported in other studies seems like a pretty steep scale or drop it down a little if just a guess.

Page 24, line 13, I think you are over interpreting what has been reported in literature. Lower productive cows are less efficient and may have increased ammonia emission compared to high producing cows. Heat stress doesn't change the cow's genetic efficiency, it impacts their behavior and thereby their feed intake which decreases

productivity but if they are eating less they are producing less ammonia.

Page 25, line 10, need reference for increase in methane from manure. Think you are implying that at higher temperatures more methane is released from manure due specifically to methane volatility not to amount of methane in manure. Is this relevant? Pile of composting manure is hotter than ambient temperature so is ambient temperature relevant to methane release?

Page 26, line 26, may be useful here to add short discussion about Middle-Eastern and Tropical dairies. You are kind of concluding that Mediterranean region will be too hot to allow for dairy industry but they have dairy cattle in hotter environments already.

Page 28, line 11-12, think you are stretching human health impact. Most of health issues seen in heat stress are metabolic in nature and therefore no need for antibiotics.

Technical corrections

Page 1, line 1, delete exceptional. There is a warming trend not sure we can call it exceptional

Page 1, line 5, delete however

Page 1, line 6, delete Moreover

Page 2, line 17, change was to is expected to be,

Page 3, line 31, delete The

Page 17, line 3, diverse is misspelled, also delete While for at beginning of next sentence

Page 25, line 21, breaths per minute not beats.

Page 26, line 8, muscles of the animal tend TO fatigue

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Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2019-15>,

2019.

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