Impact of global warming on livestock inside confined buildings

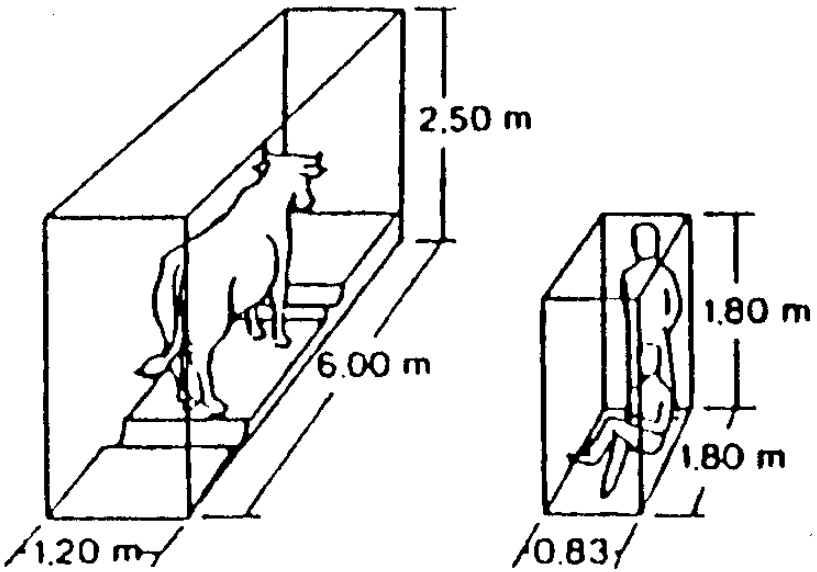
Günther Schauberger

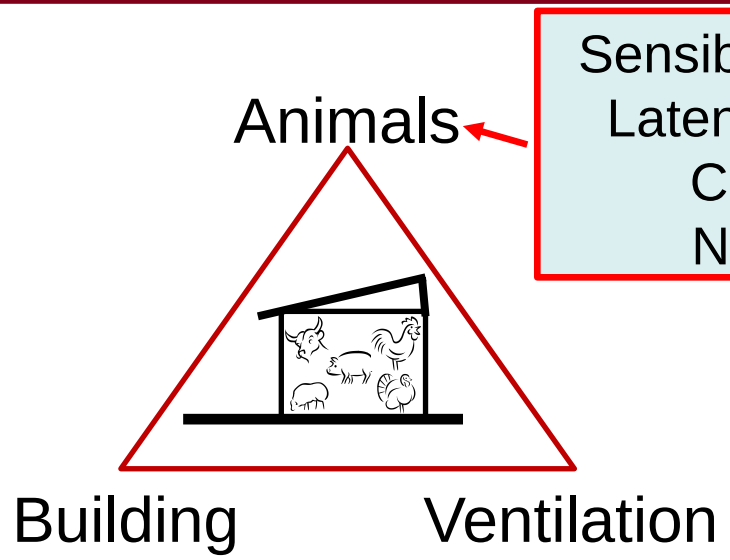
Speaker of the PiPoCooL Consortium

funded by klima+ energie fonds

COP 24 *Katowice Dec 6, 2018*
Climate Change Centre Austria CCCA
Accelerating the Transformation to Carbon-Neutrality: Perspectives on Technology, Economy and Agriculture

Confined Livestock Buildings





Implication

Indoor temperature during summer time
at least 3°C higher than **outdoor temperature**

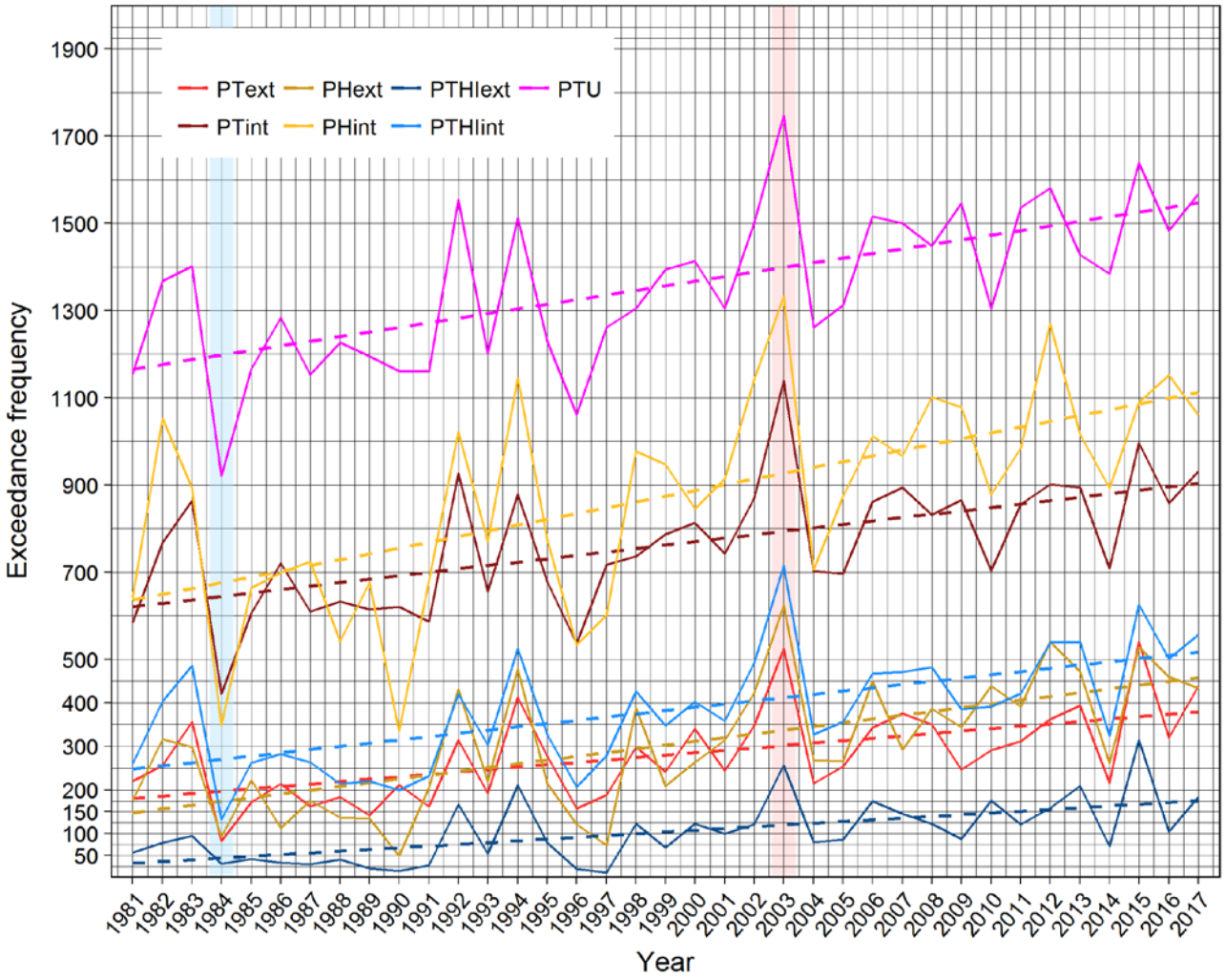
Starting point

- Impact of heat stress on farm animals

- Limitation of animal performance
  - Well-being
  - Health (e.g. increase of mortality)
  - Performance (e.g. daily weight gain, milk yield, laying performance, feed conversion ratio)

Outcome

Example: Fattening pigs in Central Europe



Time trend of heat stress

Indoor 8 h / a
~ 13% / 10a

Outdoor 6 h / a

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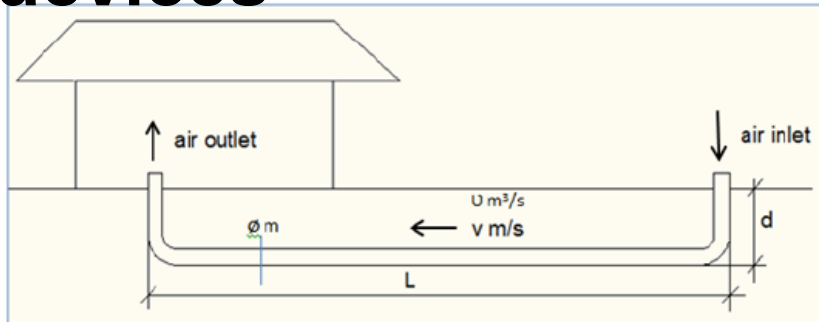
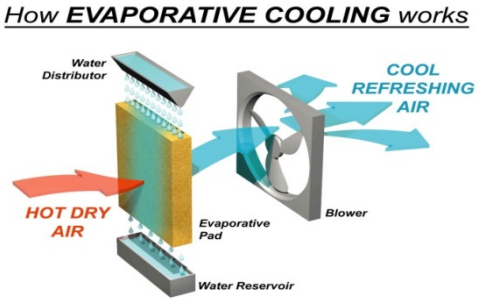
Solutions to mitigate heast stress

Energy saving air treatment devices

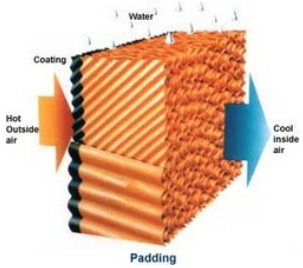
- **Earth-air heat exchanger EAHE**



- **Direct evaporative cooling: Cooling pads**



- **Indirect evaporative cooling: Cooling pads combined with a regenerative heat exchanger**



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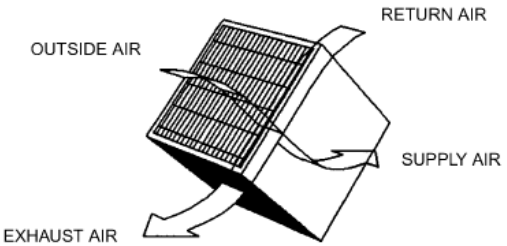

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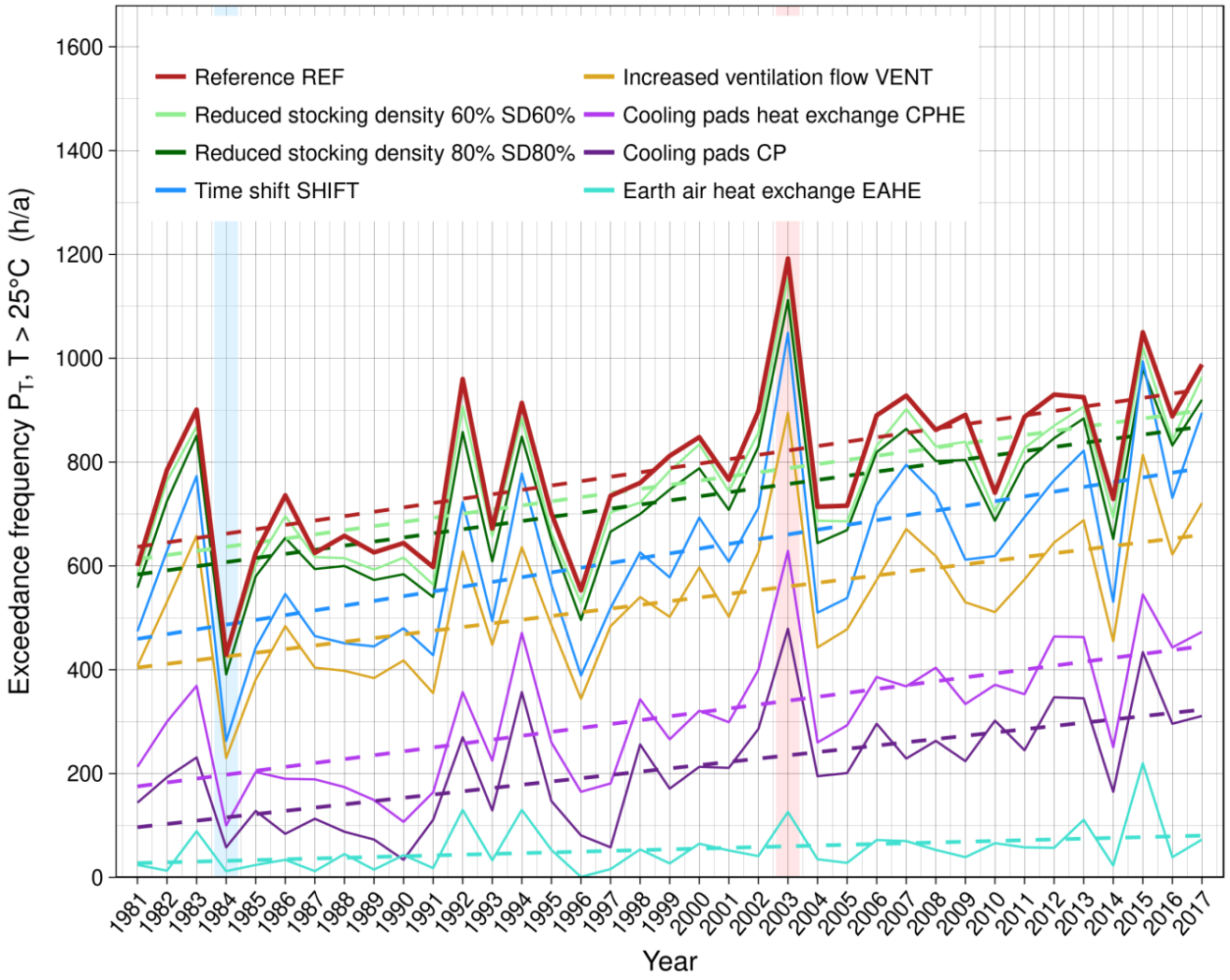
Adaptation measures AM

Example: Fattening pigs in Central Europe



Reference w/o AM

Air treatment

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Conclusions

Impact of global warming on farm animals in temperate climates

- Adaptation measures reduce heat stress
- Resilience can be increased
- Energy saving air treatment devices are most effective
- Heat stress reduction between 60 and 100%