





SUSTAINABLE LIVESTOCK SECTOR UNDER CLIMATE TRANSITION (CT)

A bibliometric analysis

Anatoli Rontogianni, Panagiotis Grammelis

Centre for Research & Technology Hellas,

Chemical Process and Energy Resources Institute



regarding livestock sector under C.T.

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- Intergovernmental Panel on Climate Change(IPCC) highlights the <u>substantial contribution of fossil</u> <u>fuel use in the livestock farming</u>, <u>indirect emissions</u>, on farm emissions and post farm emissions and the immediate need for the sector to meet the demands of Paris Agreement.

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- There is no one-model size approach to reducing emissions from livestock ecosystem.

Each production system, species and location possesses unique characteristics, costs and benefits

LIVESTOCK (vs) GHG GHG (vs) LIVESTOCK

Increase of **Temperature**

Impact of Climate Change

on Livestock

Water

> Increase water consumption 2 to 3 times

Forage

- > Decrease nutrient availability
- ➤ Increase herbage growth on C4 species (30-35°C)
- > Decreases feed intake and efficiency of feed conversion (mostly livestock that are fed large amounts of high-quality feeds)

Production

- ➤ High producing dairy cows decrease milk production
- > Meat production in ruminants decreases because of a reduction in body size, carcass weight, and fat thickness

Reproduction

- > Decreases reproduction of cows, pigs and poultry of both sexes
 - Reduce reproduction efficiency on hens and consequently egg production

Health

- May induce high mortality in grazing cattle
- > New diseases may effect livestock immunity
 - > Prolonged high temperature may affect livestock health (e.g. Protein and lipid metabolism, liver functionality)

Forage

- > Long dry seasons decrease:
 - -Forage quality
 - -Forage growth -Biodiversity
- > Increases:
- -Pathogens
- Parasites -Disease spreading
- -Disease transmission
- -New diseases
- -Outbreak of severe disease
- -Spreading of vector-born diseases

Increase

Forage

- Changes in herbage growth (more effect on C3 species)
- Decreases forage quality (more effect on C3 species)
- > Positive effects on plants:
- -Partial stomata closure
- -Reduce transpiration
- -Improve water-use efficiency



- > Affect composition of pasture by:
- -Shifting of seasonal pattern
- -Changing optimal growth rate
- -Changing availability of water



- > Floods change:
 - -Form & structure of roots
 - -Leaf growth rate

Manure > Manure management Feed production Feed Feed production production > Crop residue > Feed: flooded rice **Feed production** management cultivation > Fertilizers > Leguminous application feed crops Manure Processing > Manure ➤ Atmospheric and decomposition nitrogen transport depositions > Transportation of live animals > Agricultural Animal production > Animal-product nitrogen fixation processing and > Enteric transportation Manure fermentation by Direct and indirect on-farm ruminant livestock energy use ➤ Applied and deposited manure **Feed production** > Manufacturing, packaging and ➤ Manure storage transport of fertilizers Land use change ➤ Land degradation > Cultivated soils Deforestation Impact of Livestock on Climate Change

Source: M.M. Rojas-Downing et al. / Climate Risk Management 16 (2017) 145-163

A BIBLIOMETRIC ANALYSIS ON TREND PRACTICES FOR

Clusters

- I. animal comfort,
- II. animal feeding,
- III. lowering the overall emissions
- IV. market need for adaptation
 - In order to underline the trends and the shortcomings in this critical issue

BUT WHY A BIBLIOMETRIC ANALYSIS





BIBLIOMETRIC ANALYSIS

IS

Summarizes large quantities of bibliometric data to present the state of the intellectual structure and emerging trends of a research topic or field.

- Quantitative (evaluation and interpretation)
 - Qualitative (interpretation only)

- Van Eck, N.J., & Waltman, L. (2014). Visualizing bibliometric networks. In Y. Ding, R. Rousseau, & D. Wolfram (Eds.), Measuring scholarly impact: Methods and practice (pp. 285–320)
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- Gaur A.and Kumar M. (2018) A systematic approach to conducting review studies: An assessment of content analysis in 25 years of IB research, Journal of World Business 53 (pp. 280–289)

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WILL DO

In current research: Science mapping with

Co-word analysis

technique that examines
the existing or future relationships
among topics in a research field by focusing on
the written content of the publication itself.





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WEB OF SCIENCE

PRELIMINARY METADATA ANALYSIS UNDER TEXT MINING FUNCTIONALITY

Α.

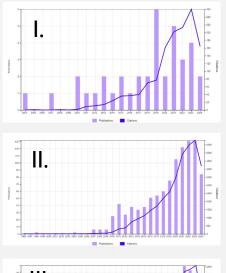
Livestock, climate change, animal **comfort**: 38 results (2003-2024)

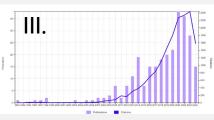
II. Livestock, climate change, animal **feeding:** 1046 results (1996-2024)

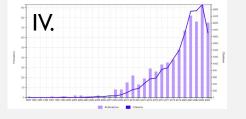
III. Livestock, climate change, energy consumption: 275 results (1993-2024)

IV. Livestock, climate change, market:

697 results (1993-2024)



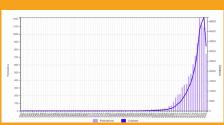




В.

THE GENERIC CASE

☐ Livestock, Climate change: 9.446 results (1939-2024)



Methodology:

Database: Web of science

Keywords:

Livestock [AND] Climate change

Sample: 9.446 different peer reviewed papers

Co-word analysis

Limitations:

Minimum citations: 10

Limitations on Clustering

Minimum resolution (1.0) (cluster formed under at least 20 iterations → strong interconnection)

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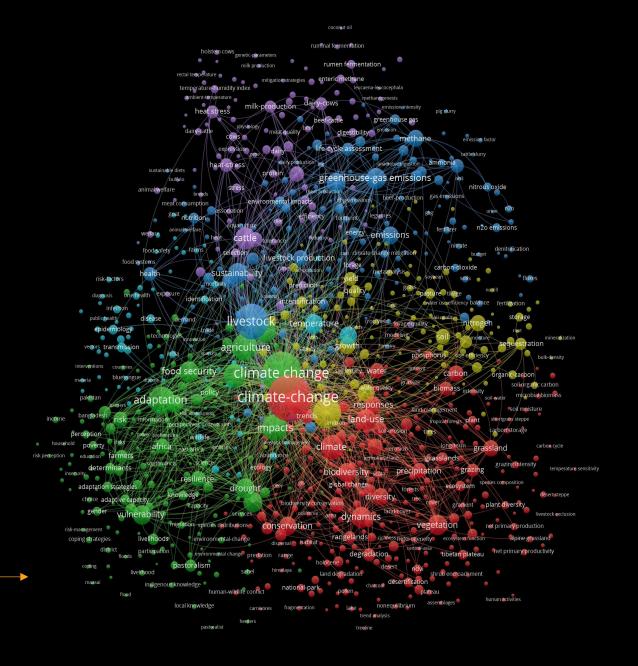
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Purple Clusters interconnections

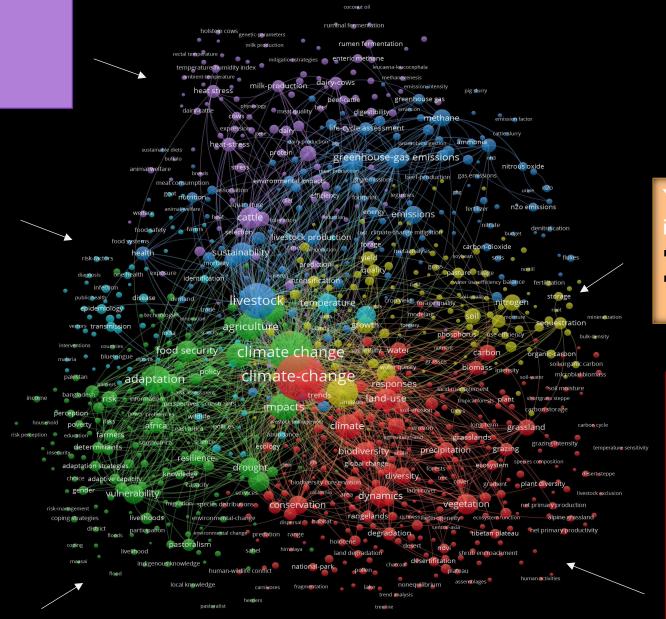
- Dairy-cows
- Holstein Friesian (breed)
- Rumen fermentation (process)
- Coconut oil (animal feeding)

Blue Clusters interconnections

- Livestock
- GHG
- Welfare
- Climate policy
- Mature management
- Denitrifications
- Zoonosis | Malaria | Infection

Green Clusters interconnections

- Vulerability
- Pastoralism
- Local knowledge
- Farmers
- Income



5 Clusters

Yellow Clusters interconnections

- Nitrogen
- (Soil Carbon) Sequastration

Red Clusters interconnections:

- Biodiversity
- Plant diversity
- Dynamics
- NDVI: NormalizedDifference VegetationIndex
- Grazing
- Alpine grassland

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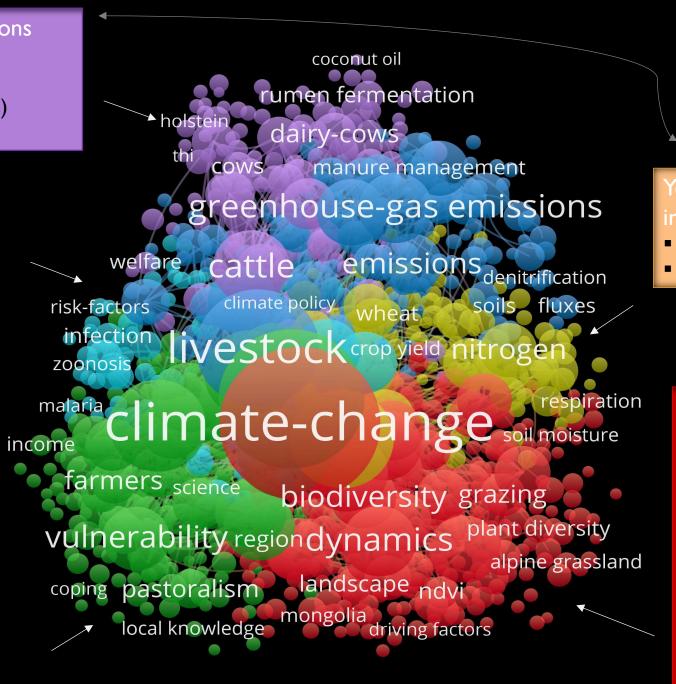
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`→Animal wellbeing

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→ Market



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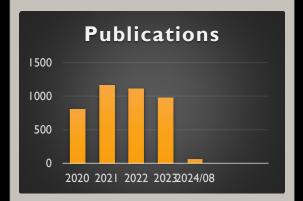
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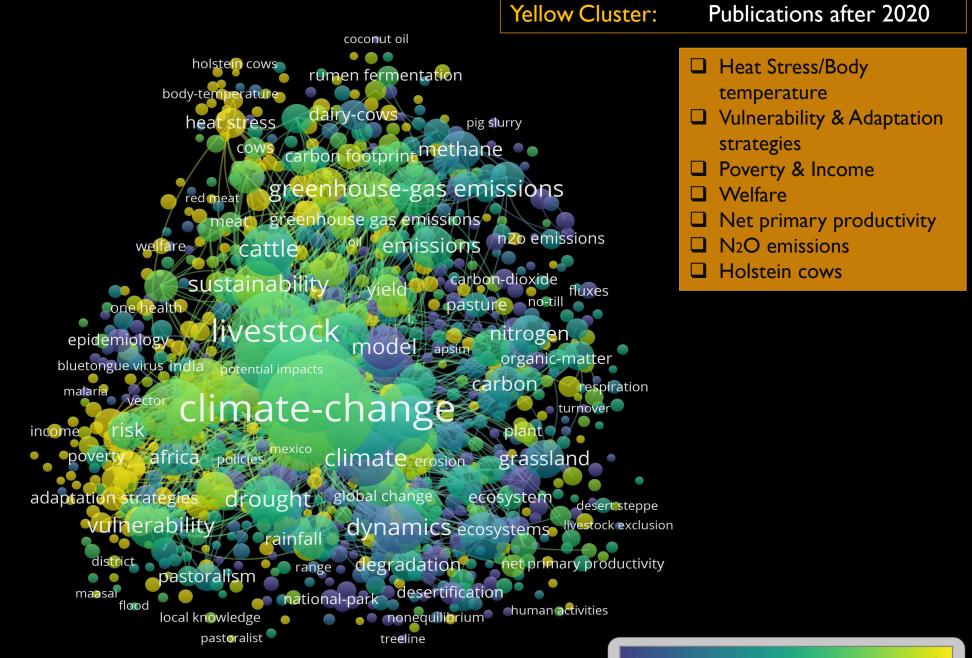
- Biodiversity / Plant diversity
- Dynamics
- NDVI: Normalized Difference Vegetation Index
- Grazing
- Alpine grassland
- → Animal feeding]



> At 2020 to 2024



- Starting at 2016 >400 per year
- > At 2015 to 2009 350< publications <100 per year
- ➤ Before 2000 <20 per year



2018

2019

2020



CONCLUSIONS

Core trends on research: New strategies for adaptation in climate transition &

Animals welfare (Heat stress)

Leading research: Animal capital relating to cattle

Mitigation of GHG emissions (N2O)

Limited research on

market and stakeholders: Institutional changes

(e.g. trade, conflict resolution, income stabilization programs ect)





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