Future GHG emissions of the chicken meat chain

IIASA – External Collaborator,
30 July-14 August 2018

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LCA & Scientific Committee Leader, GreenProteinProject

Background

- Life Cycle Assessment (LCA) and Scientific Committee leader for the European Commission Horizon 2020 BBI GreenProtein project

- Professor of Industrial Management and PhD supervisor at Faculty of Business and Law, Union-Nikola Tesla University, Belgrade, Serbia
- Research Associate, London School of Economics, London, UK
- Post-doc research, Sorbonne University, Paris, France
- Research Scholar, Columbia University, Harriman Institute, New York, USA

Published papers (selection)

Journal of Cleaner Production 184 (2018) 440–450

Contents lists available at ScienceDirect

Journal of Cleaner Production

journal homepage: www.elsevier.com/locate/jclepro

Life cycle assessment of the chicken meat chain

Dubravka Skunca [a, *], Igor Tomasevic [b], Ivan Nastasijevic [c], Vladimir Tomovic [d], Ilija Djekic [e]

Meat Science 142 (2018) 5–13

Contents lists available at ScienceDirect

Meat Science

journal homepage: www.elsevier.com/locate/meatsci

Consumers' perceptions, attitudes and perceived quality of game meat in ten European countries

Igor Tomasevic[a,*], Sasa Novakovic[a], Bartosz Solowiej[b], Nevijo Zdolec[c], Dubravka Skunca[d], Miroslav Krocko[e], Sarka Nedomova[f], Rezear Kolaj[g], Georgi Aleksiev[h], Ilija Djekic[d]

Procedia Food Science

Volume 5, 2015, Pages 258-261

open access

Environmental Performance of the Poultry Meat Chain – LCA Approach ☆

Dubravka Skunca [a], Igor Tomasevic [b], Ilija Djekic [c]

emeraldinsight BRITISH FOOD JOURNAL / VOLUME 119, ISSUE 7

Consumer-perceived quality characteristics of chicken meat and chicken meat products in Southeast Europe

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Nevijo Zdolec, (Department of Hygiene, Technology and Food Safety, Faculty of Veterinary Medicine, University of Zagreb, Zagreb, Croatia)
Rezear Kolaj, (Department of Economy and Rural Development Policies, Faculty of Economics and Agribusiness, Agricultural University of Tirana, Tirana, Albania)
Georgi Aleksiev, (Faculty of Economics, Department of Management, Trakia University, Stara Zagora, Bulgaria)
Ilija Djekic, (Department of Food Safety and Quality Management, Faculty of Agriculture, University of Belgrade, Belgrade, Serbia)

emeraldinsight BRITISH FOOD JOURNAL / VOLUME 120, ISSUE 5

Transformation of quality aspects throughout the chicken meat supply chain

Author(s): Ilija Djekic, (Department of Food Safety and Quality Management, Faculty of Agriculture, University of Belgrade, Belgrade, Serbia)
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Environmental Performance of the Poultry Meat Chain – LCA Approach ☆

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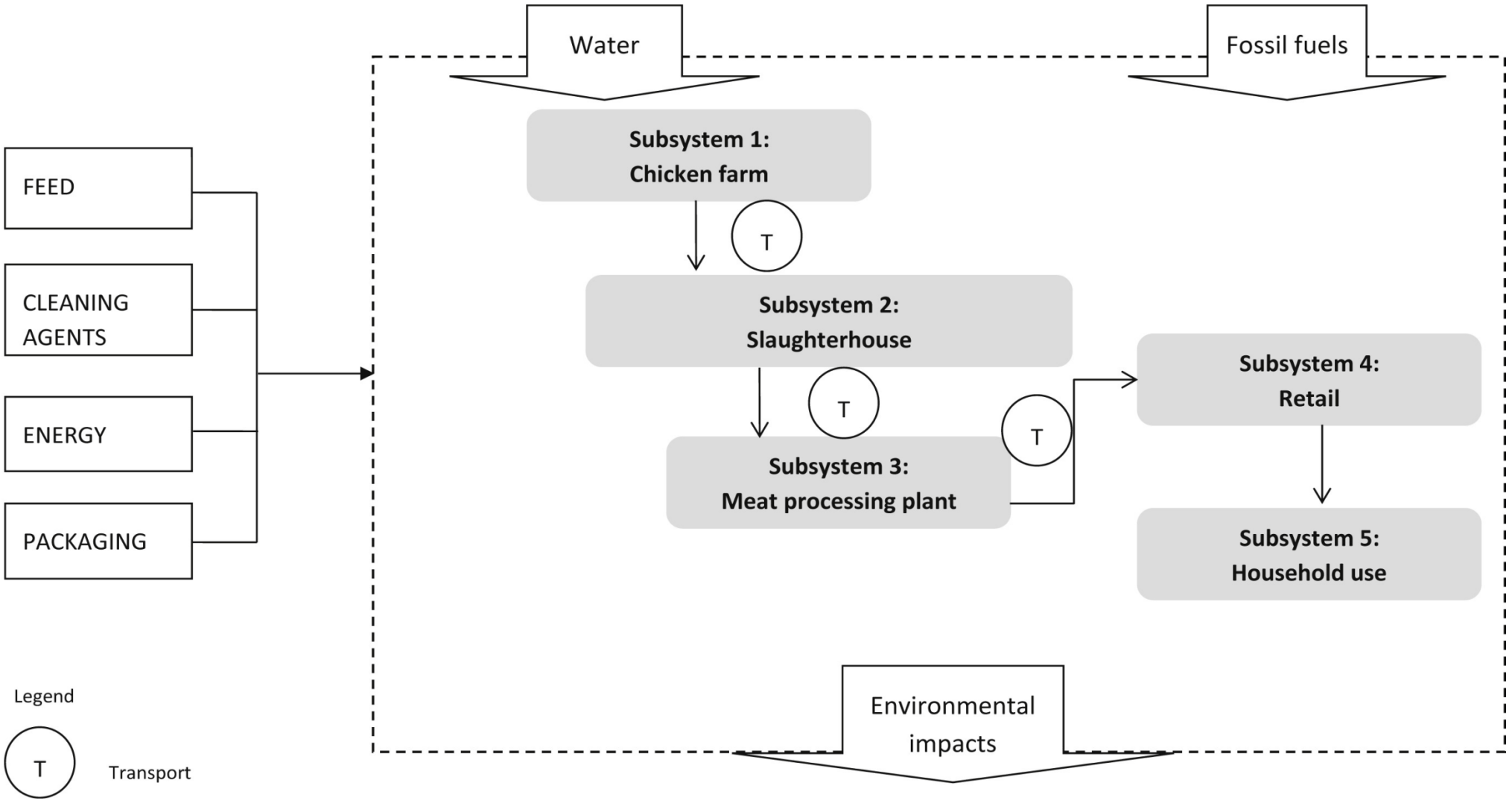
Generic model of system boundaries of the chicken meat production life cycle



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Life cycle assessment of the chicken meat chain

Dubravka Skunca [a, *], Igor Tomasevic [b], Ivan Nastasijevic [c], Vladimir Tomovic [d], Ilija Djekic [e]

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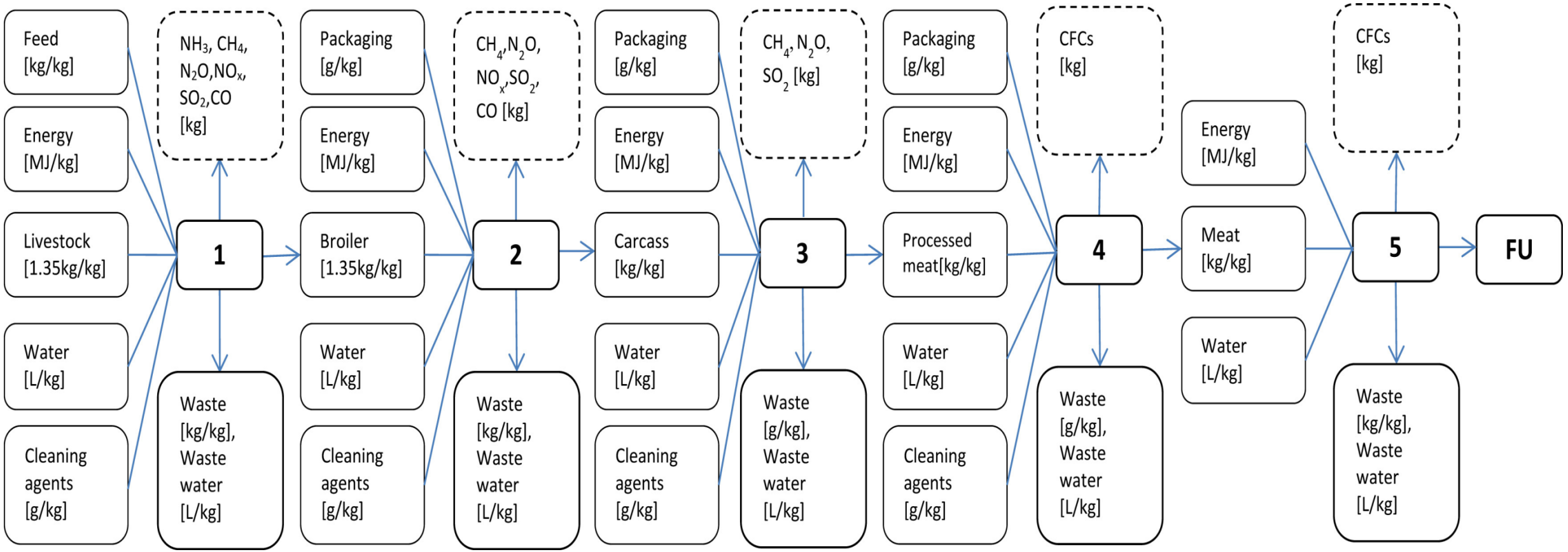
LCA of the chicken meat chain

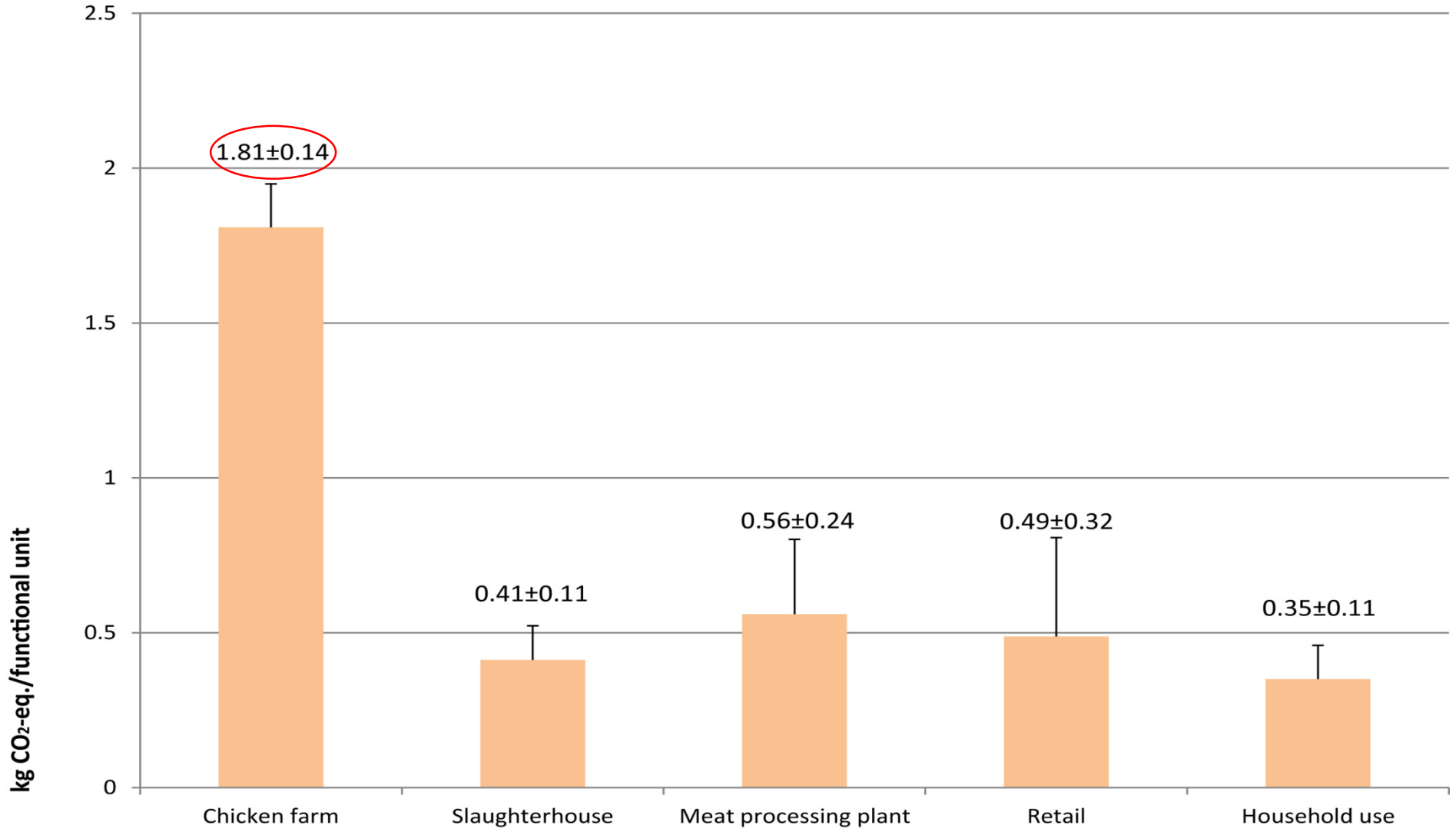
- First LCA of entire chicken meat chain that included household as the last link.
- The objective of this paper was to assess the environmental performance of the chicken meat chain, including 119 different farms, slaughterhouses, meat processors and retailers, as well as 500 households.
- A total of 619 life cycle assessment calculations have been completed to identify and quantify the environmental impacts from a cradle-to-grave perspective covering five subsystems: ‘chicken farm’, ‘slaughterhouse’, ‘meat processing plant’, ‘retail’ and ‘household use’.
- Structured surveys in selected entities have been conducted in order to collect life cycle inventory input data.
- GWP, AP, EP, OLD, CED

Material flow analysis for the entire chicken meat chain

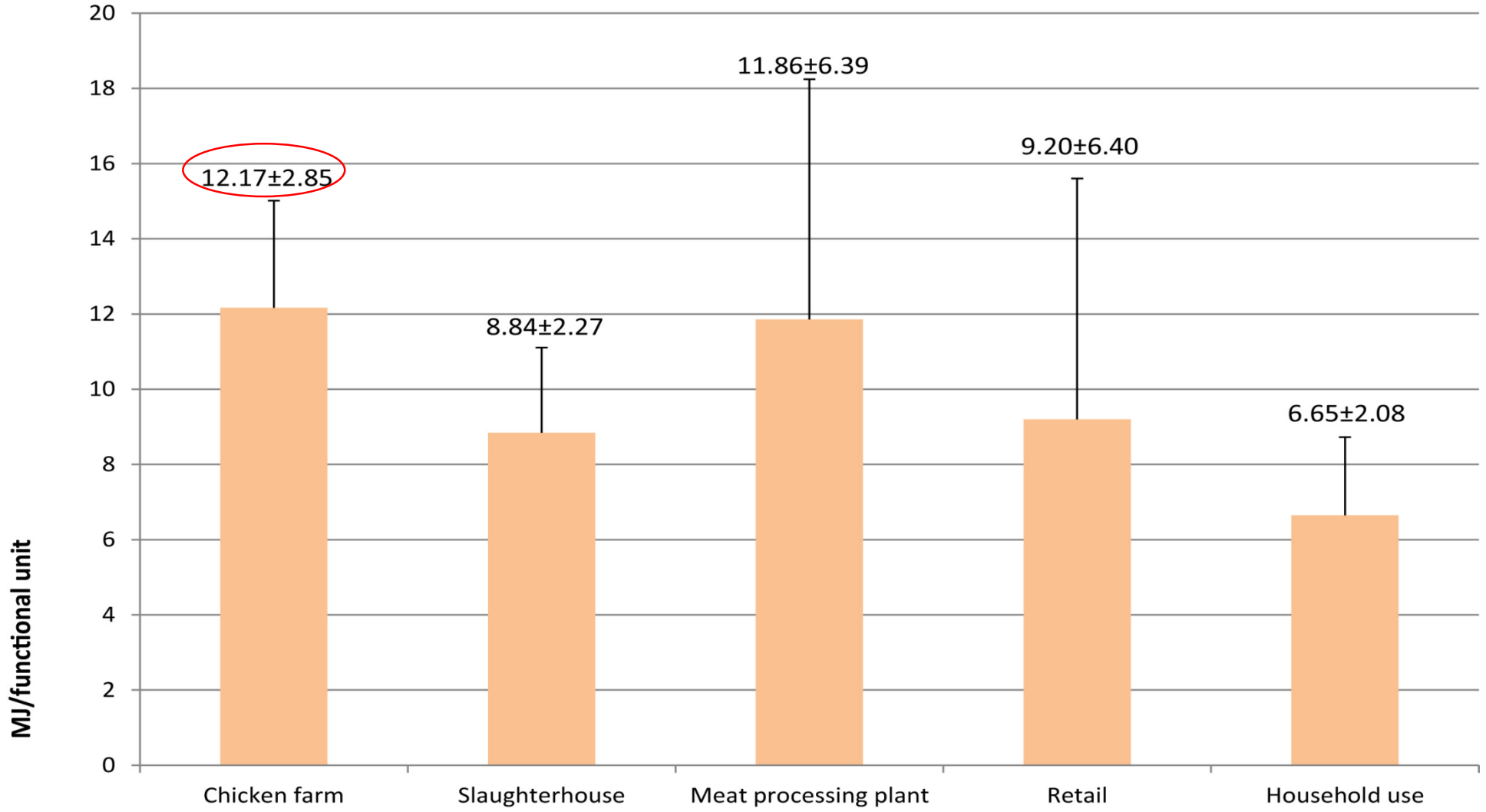
Legend: 1 – Chicken farm; 2 – Slaughterhouse; 3 – Meat processing plant; 4 – Retail; 5 – Household use; FU – Functional unit



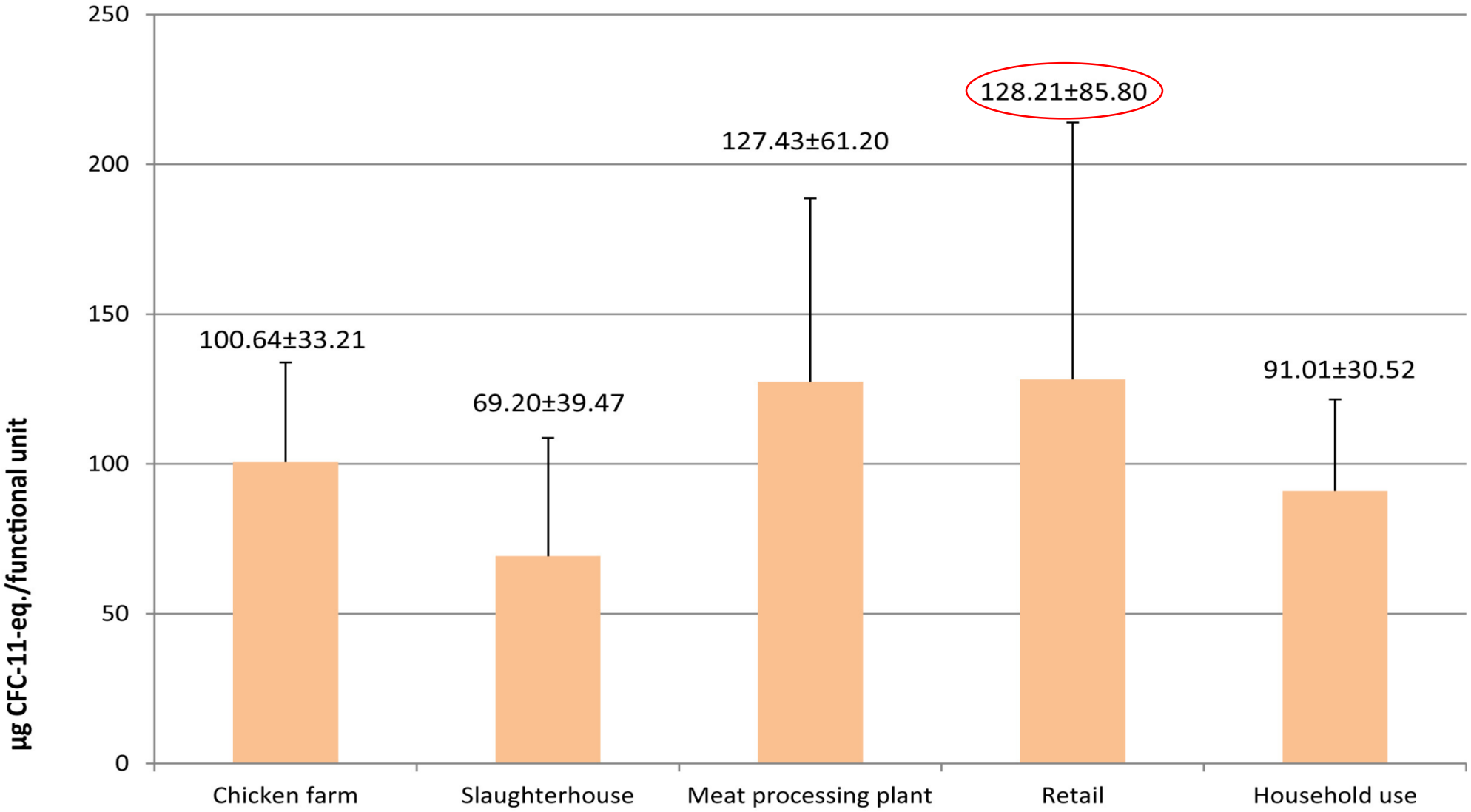
Average values and standard deviation range of the Global Warming Potential (GWP) per functional unit (FU) for each of the subsystems



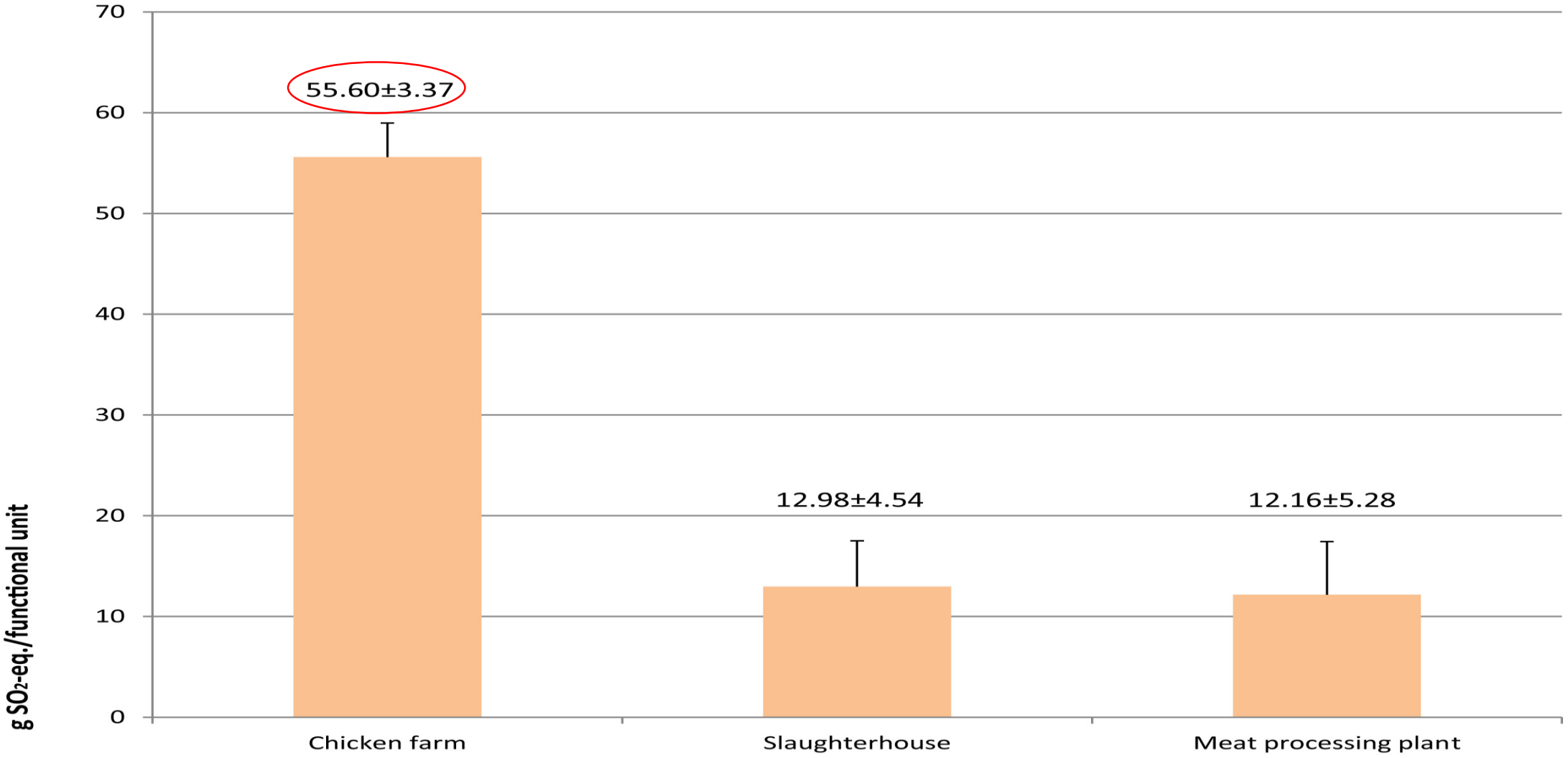
Average values and standard deviation range of the Cumulative Energy Demand (CED) per functional unit (FU) for each of the subsystems



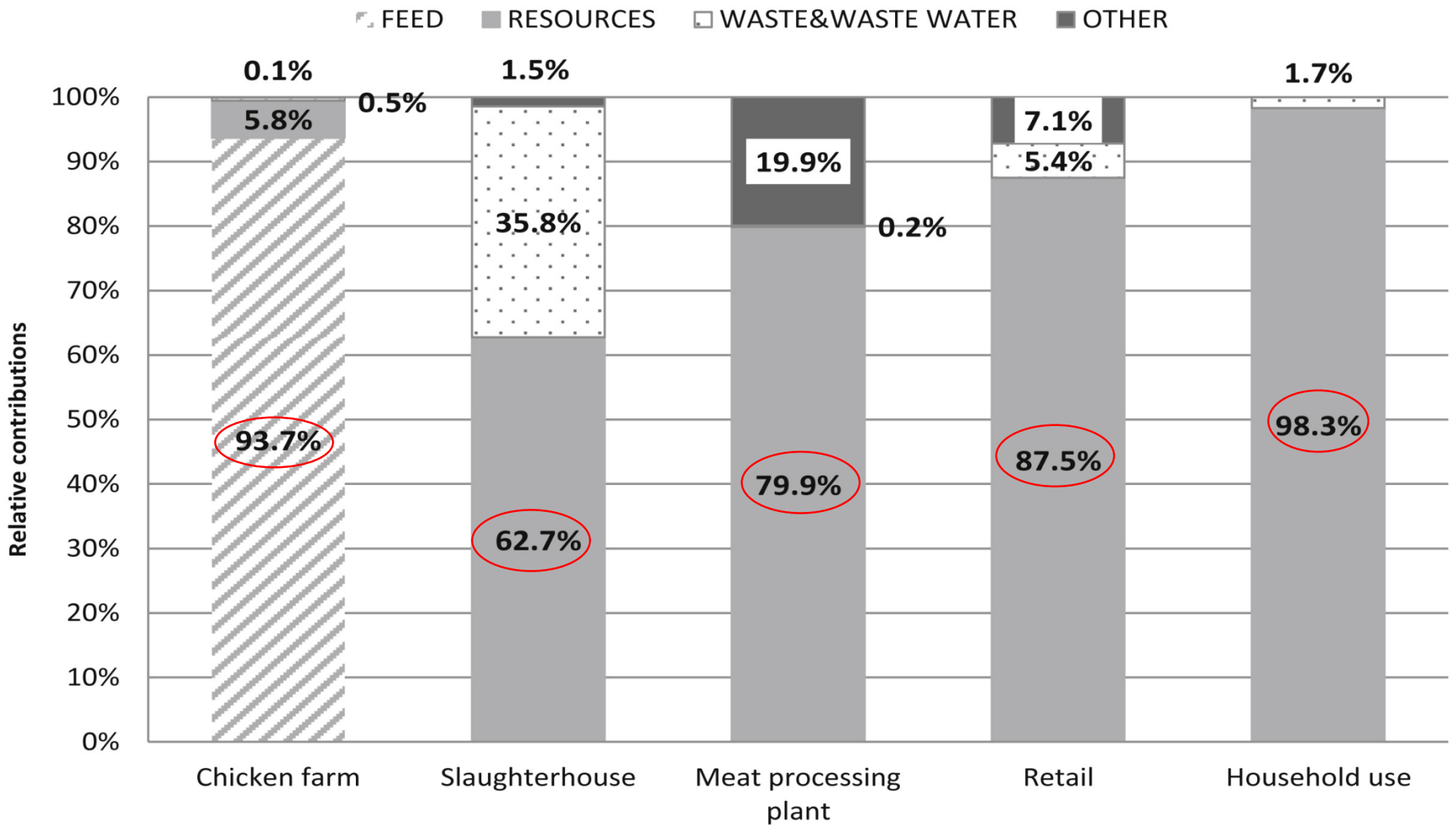
Average values and standard deviation range of the Ozone Layer Depletion (OLD) per functional unit (FU) for each of the subsystems



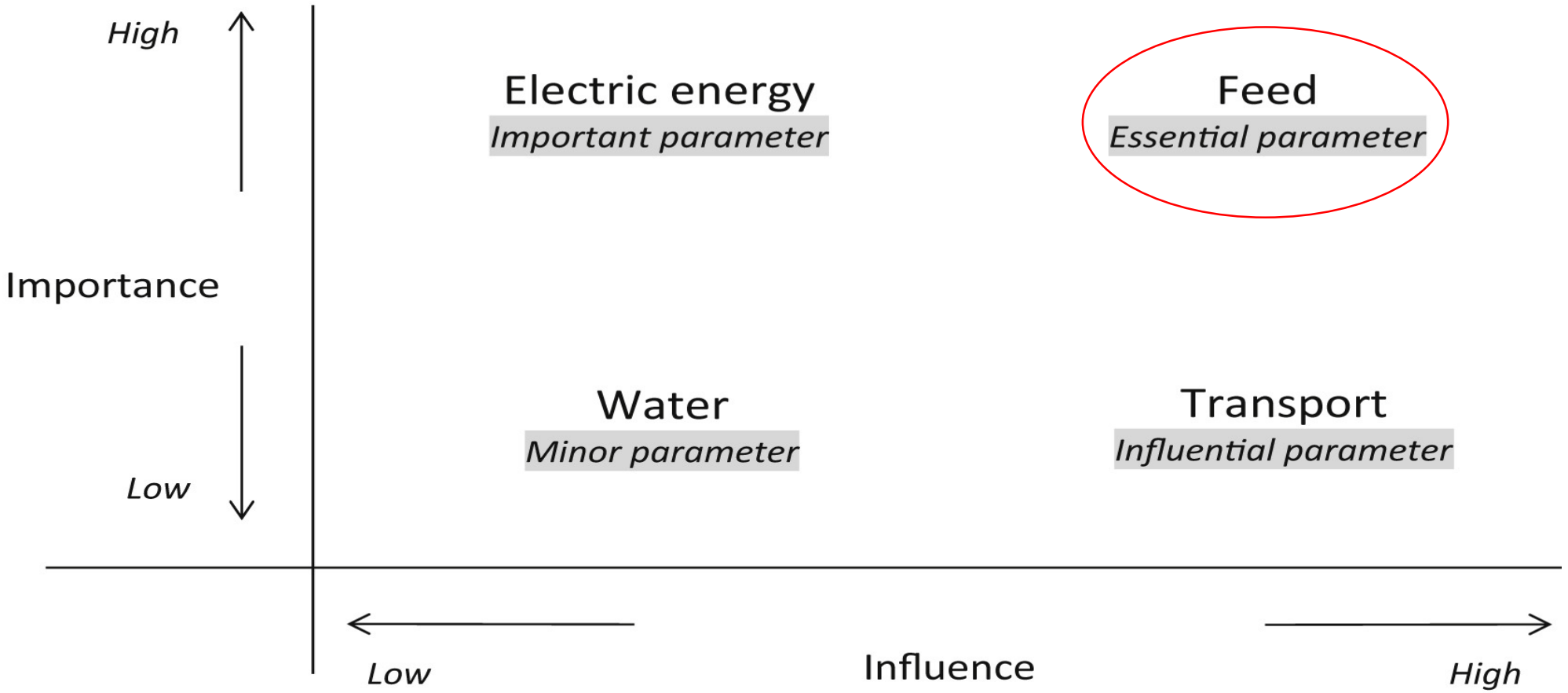
Average values and standard deviation range of the Acidification Potential (AP) per functional unit (FU) for subsystems 1-3



Relative contributions (in %) to Global Warming Potential (GWP) from processes involved in the subsystems 1-5



Influence and importance of parameters related to sensitivity analysis - the most influential and important parameter is in the top right corner



Conclusion

- The main contributor to the environmental profile of a chicken farm is feed production.
- The activities performed at the farm express the highest environmental impacts manifested as GWP, CED, AP and EP.
- Contributions of the meat processing plant are essentially due to energy use and packaging materials, while impact of slaughterhouse, retail and household is directly connected to energy requirement.
- Improvement actions - grain legumes usage as a protein source in feed, treating of chicken litter in a biogas digester, usage of energy efficient systems through the entire chain, while at the same time stimulating consumers towards more sustainable consumption in terms of waste recycling.
- Implementation of the same methodology in other countries could offer a better insight into environmental practices within the global poultry production.

IIASA - Future GHG emissions of the chicken meat chain

- The objective of the research is to estimate greenhouse gas (GHG) emissions related to the chicken meat chain, covering five subsystems: ‘chicken farm’, ‘slaughterhouse’, ‘meat processing plant’, ‘retail’ and ‘household use’.
- Research will propose mitigation options for optimization of future GHG emissions of the chicken meat chain.
- Country of interest – China
- What would happen if the broiler production would be replaced by free range and organic chicken production?
- How would GHG emissions change?
- What preferences in the chicken meat diet does households (consumers) have?

Thank you for your attention.

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