Integrating mathematical optimization to enhance sustainability in a crop and dairy production agent-based model for Luxembourg

Supporting Information 2: PRISMA flowchart

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1. Review methodology

The review was conducted using the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) systematic review method [1,2], which includes “search strategy”, “screening criteria,” and “extraction and synthesis of data” stages. Figure 1 depicts how literature were selected and screened in order to reach the final subset of (63) papers that were identified and listed in the supplementary information (SI) file 2.

Relevant peer-reviewed literature was first identified using key word searchers with the Scopus search engine. Scopus was selected as it is reliable and largely used by researchers. The Scopus search was complemented by a search on the Sciencedirect database. A combination of logical operators “AND” or “OR” for search keywords were applied (see Fig. 1). Relevant articles were identified by applying three complementary search strategies:

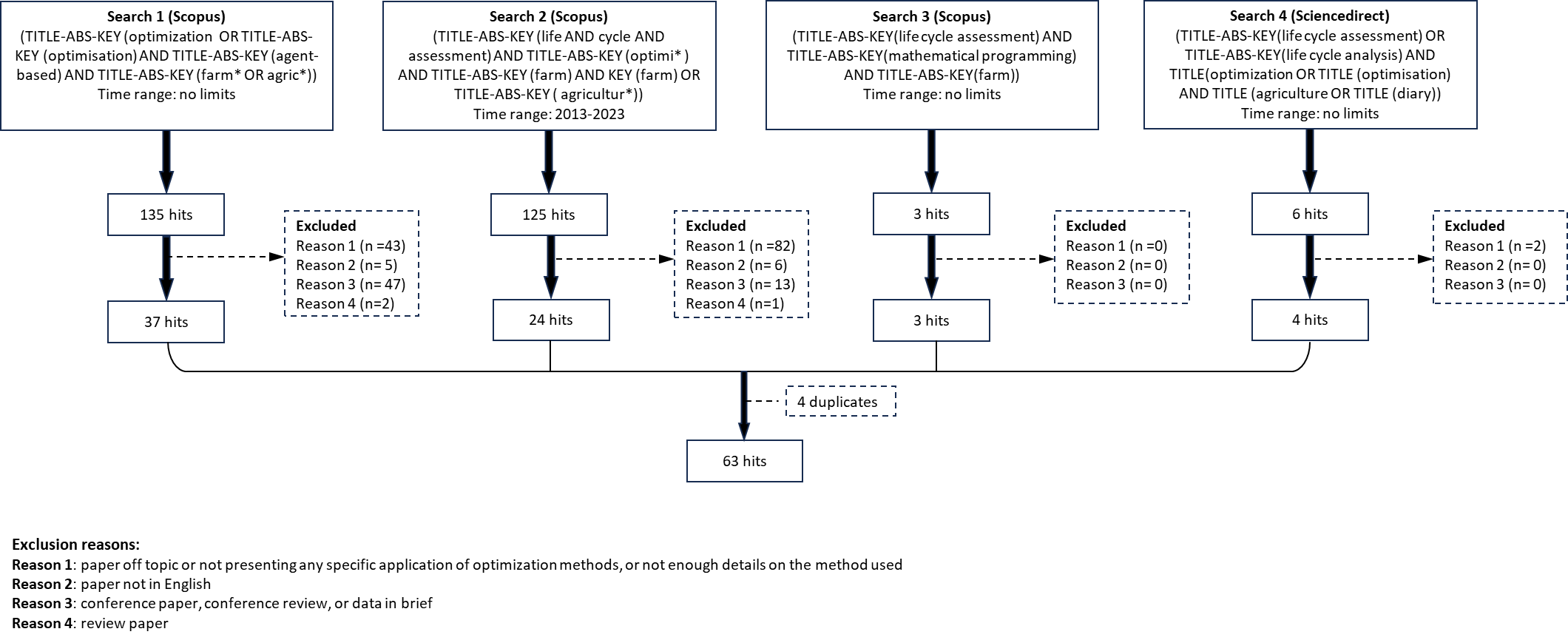
- Search 1 located in Scopus articles that use "optimization" or optimisation" in their title, abstract or among their keywords;

- Search 2 identified in Scopus articles that had "life cycle assessment" and the wild card "optimi\*" in the title, abstract, or among their keywords, "farm" among their keywords, and the wild card "agricultur\*" in their title, abstract or among their keywords. In this case, in order to reach a reasonable number of hits (not too many to be screened) the temporal span was limited to the range 2013-2023;

- Search 3 identified in Scopus papers that had "life cycle assessment", "mathematical programming" and "farm" in their title, abstract or as a keyword;

- Additional literature was identified with a final search (Search 4), which fetched in Sciencedirect the papers that had "life cycle assessment" or "life cycle analysis" and "optimization" (or "optimisation") and "agriculture" or "diary" in their title.

Only journal papers (no conference papers or other types of documents) in English were considered. Moreover, only research papers which presented a clear application to case studies were retained. Review papers were not considered. Therefore, the exclusions criteria listed in Fig. 1 were applied. Finally, snowballing search was not applied.



**Figure 1.** Selection of the literature based on the PRISMA systematic review method.

References

1. Moher, D.; Liberati, A.; Tetzlaff, J.; Altman, D.G.; Antes, G.; Atkins, D.; Barbour, V.; Barrowman, N.; Berlin, J.A.; Clark, J.; et al. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine* **2009**, *6*, e1000097, doi:10.1371/JOURNAL.PMED.1000097.

2. Page, M.J.; McKenzie, J.E.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E.; et al. The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. *Systematic Reviews* **2021**, *10*, 89, doi:10.1186/s13643-021-01626-4.