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Assessing the environmental footprint of digital agriculture : research perspectives

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Introduction

- **Digital tools for agriculture** are one of the levers to accelerate the **agroecological transition**. However, little is known about the impacts of their use on the environment and **how to assess them**.
- The **progressive adoption** of digital agriculture makes its environmental assessment necessary.
- **Three review** of the environmental impacts of digital agriculture have already been published, but the **methods** used to assess these impacts remain **poorly understood**.
- This study aims at establishing a **state-of-the-art** of the digital tools evaluated and evaluation methods used. The **methodological challenges** of assessing the environmental impacts of these tools will be highlighted.

Method : a systematic review

1 Query construction



2 Query execution



On Web of Science and Scopus databases

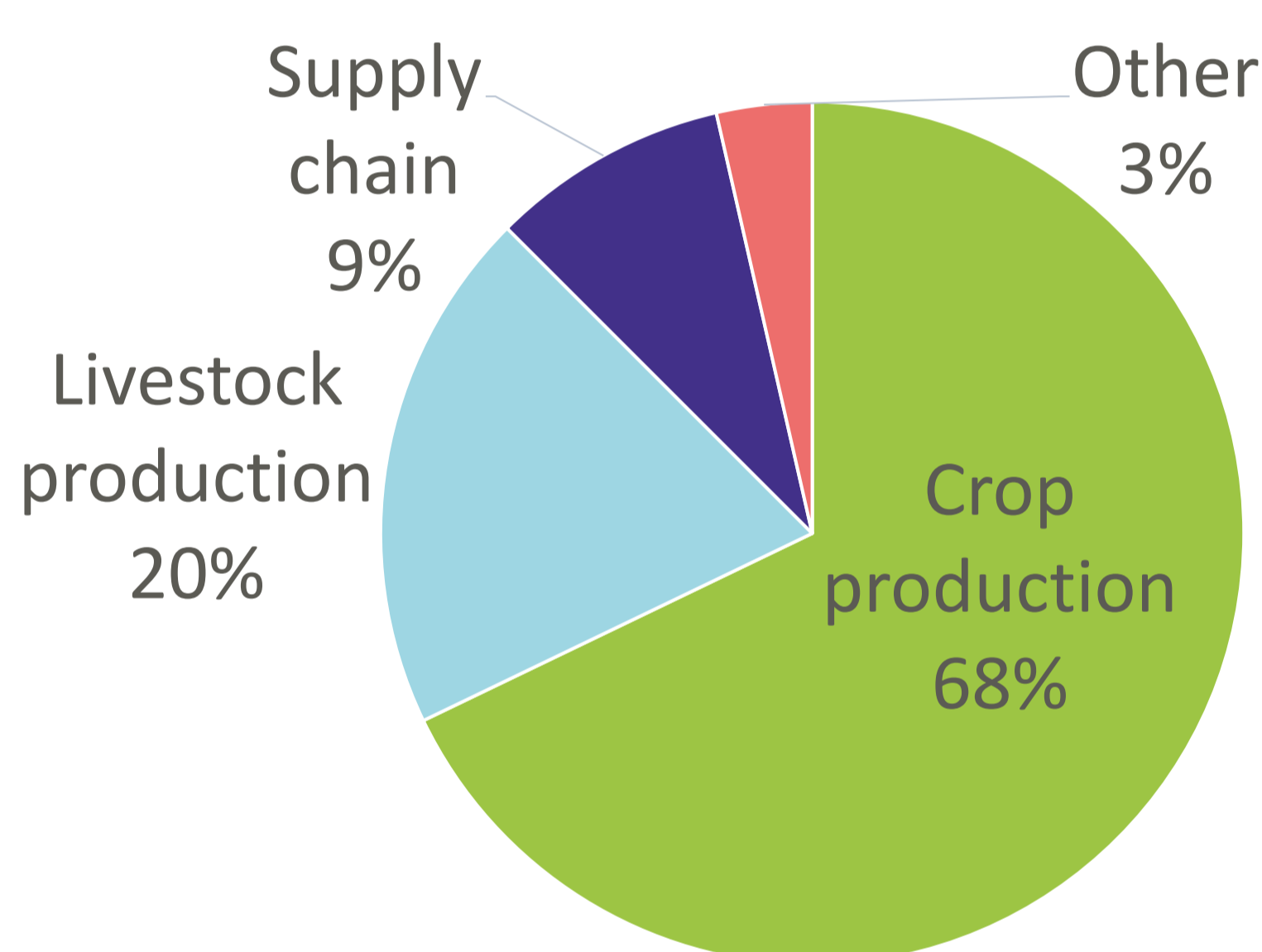
3 Query results sorting



PRISMA method applied with Rayyan software

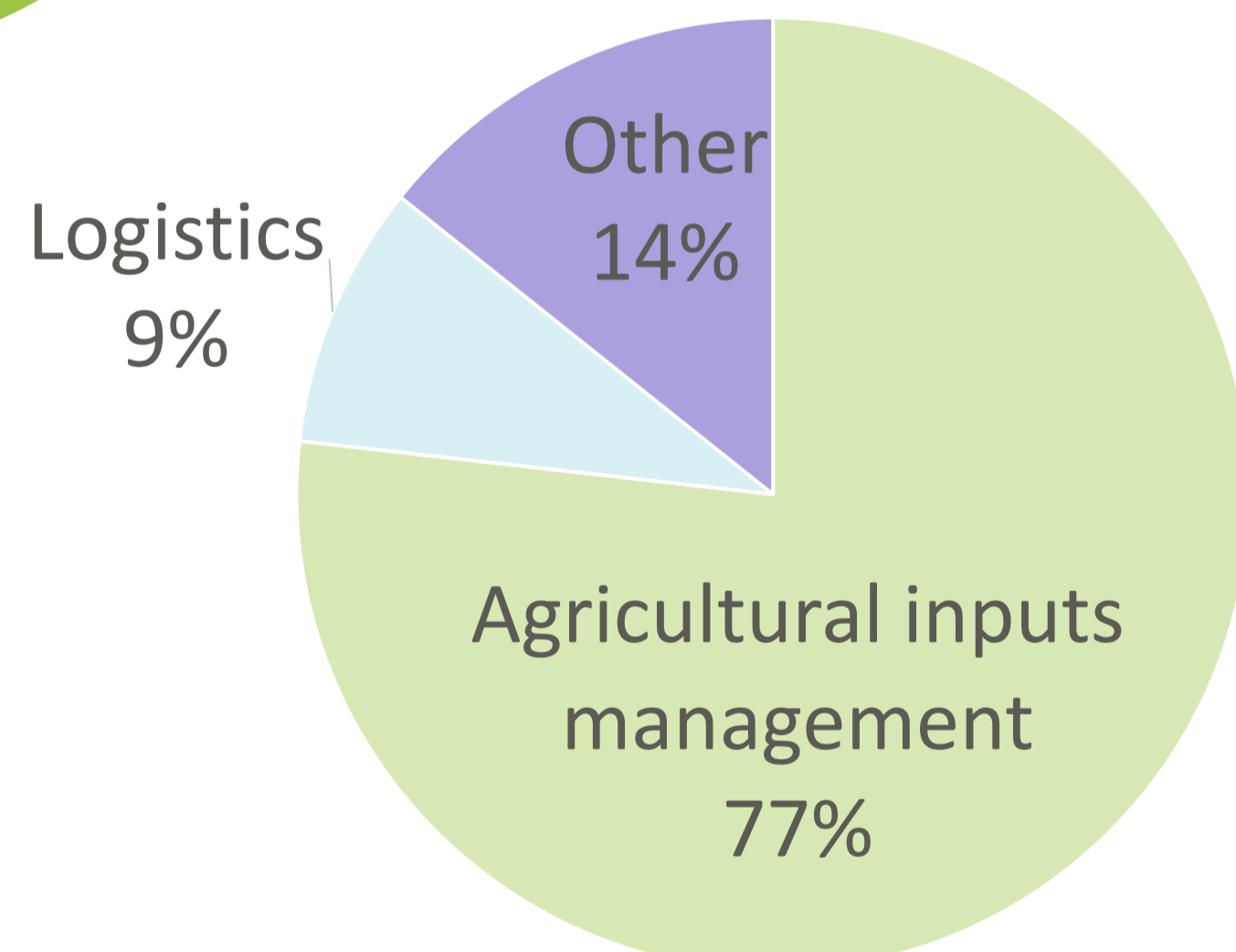
General statement

Out of the 56 papers reviewed...



... A majority deals with crop production while digital tools for livestock production and supply chain are poorly assessed.

... Most of them are used to manage agricultural inputs. Other functions were identified like time savings and animal welfare.

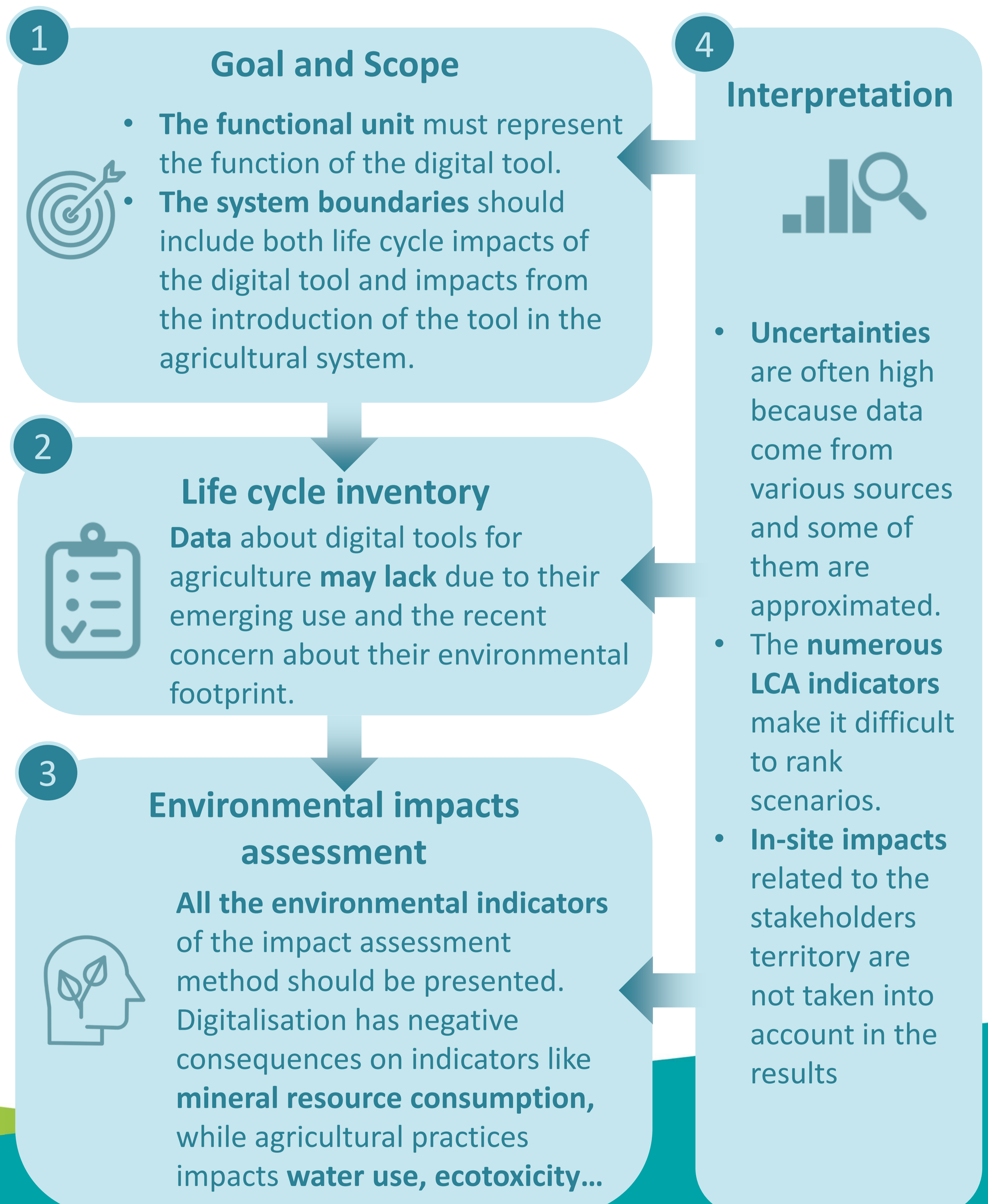


50%
Of Life Cycle Assessment (LCA)

LCA is the environmental assessment method used by half of the papers. It is a standardised method to quantify the environmental impacts of a tool or a product. It is a multicriteria and life-cycle based analysis.

LCA methodological challenges

By LCA steps, from the 28 LCA studies



Take-home message

To date, the studies assessing the environmental impacts of digital tools for agriculture focused on **input management in crop production**. Further research must be carried out to have a **better insight into the environmental footprint** of digital agriculture in all its forms. Furthermore, **guidelines** must be provided in order to **consider the specificities** of digital agriculture in environmental assessment, such as **consistent system boundaries** and **helpful indicators for stakeholders**.