Global Barriers and Facilitators to the Uptake of Biopesticides

Evidence synthesis

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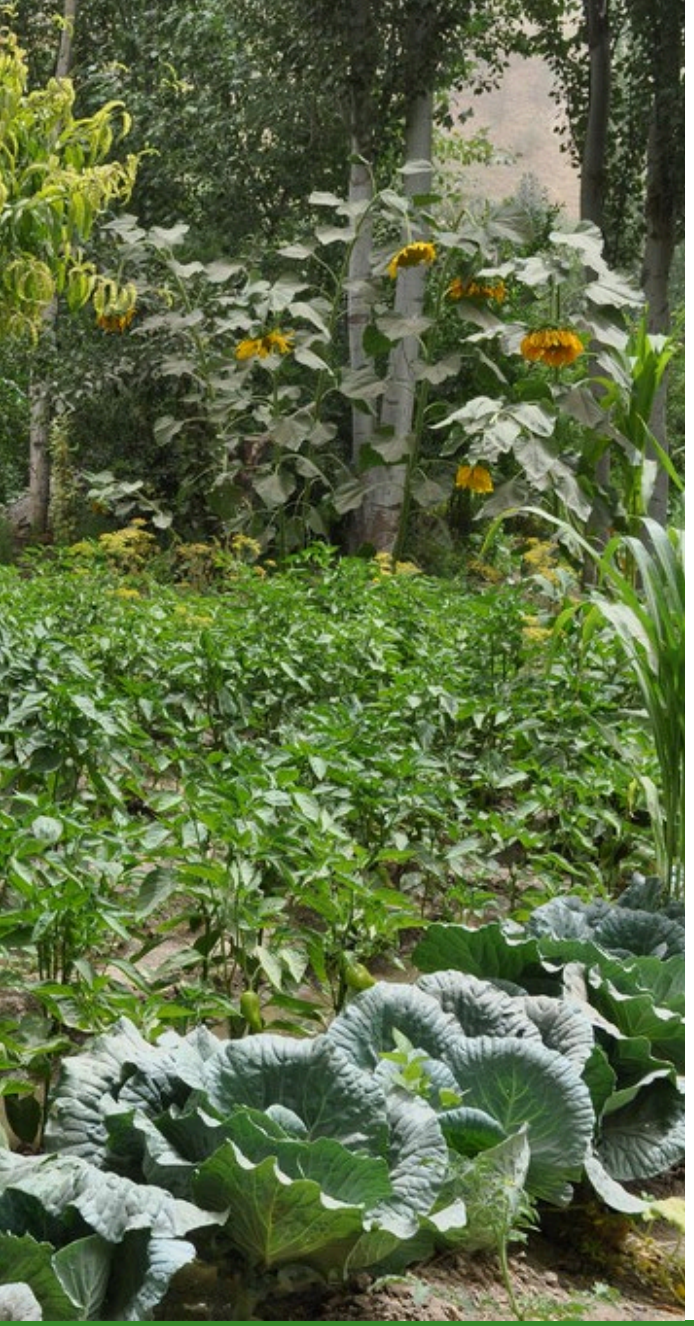
Collaborative work

Problem statement

- Despite growing global interest, biopesticide use remains limited compared to synthetic pesticides

Approach: Evidence Synthesis

- **CABI** and **FAO's** Pest and Pesticide Management Team joined hands to uncover the challenges underlying the limited use of biopesticides



Presentation outline

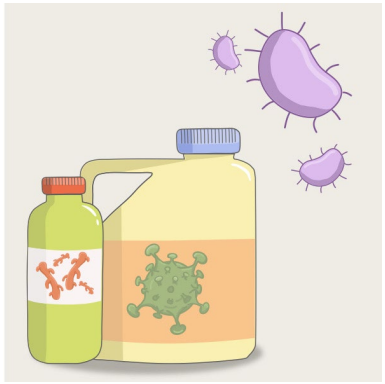
- Project overview
- Types of biopesticides
- Scope and the Biopesticide Production and Uptake Pipeline
- Data extraction and screening
- Preliminary results
- Take home messages
- Next steps

Project overview

- **Research questions:**
  - What research exists on **barriers** and **facilitators** to biopesticide uptake?
  - What are the **barriers** and **facilitators** to biopesticide uptake and where do they occur along the stages of the uptake pipeline?
  - How do they vary by biopesticide **type** (e.g. microbial, macrobial), literature type and **geography**?

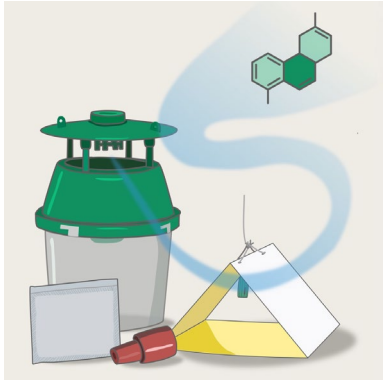
Types of biopesticides

Biopesticides in this study are defined as: A pesticide containing active substances made from living or dead microorganisms such as bacteria, algae, protozoa, viruses and fungi, pheromones and other semiochemicals, and plants or parts of plants, designed to repel, destroy or control any pest or regulate the growth of plants (Codex Alimentarius, 2022)



Microbials and their extracts

Macrobials (augmentative biocontrol)



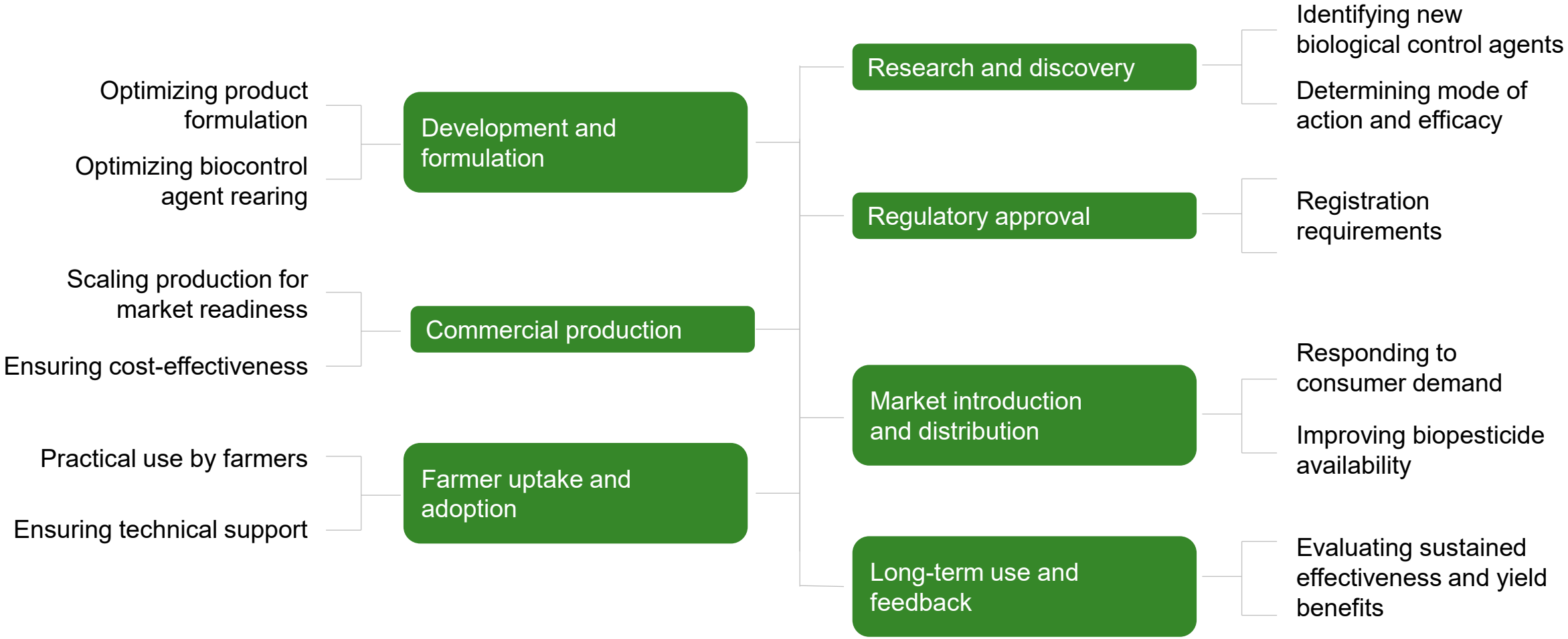
Semiochemicals

Botanicals and other natural substances

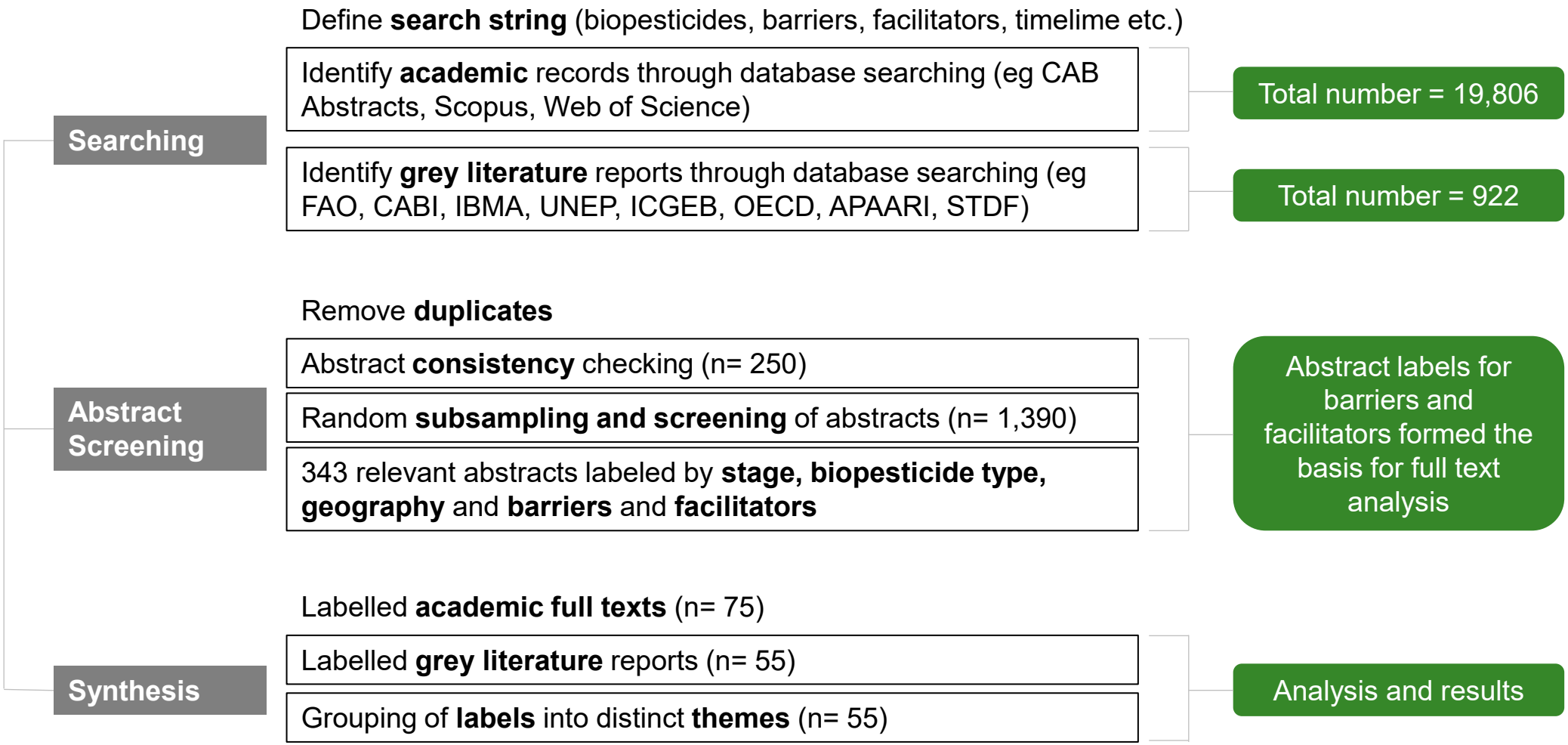
Scope of the study

- **Geographical scope:** Global
- **Timeframe:** 2016 – present; in line with the publication of the FAO guidelines for the registration of microbial, botanical and semiochemical pest control agents (FAO and WHO 2017)
- **Population:** Biopesticides
- **Intervention:** the 7 stages of biopesticide production and uptake pipeline
- **Phenomenon:** Contextual barriers and facilitators across stages
- **Literature type:** Academic and grey literature

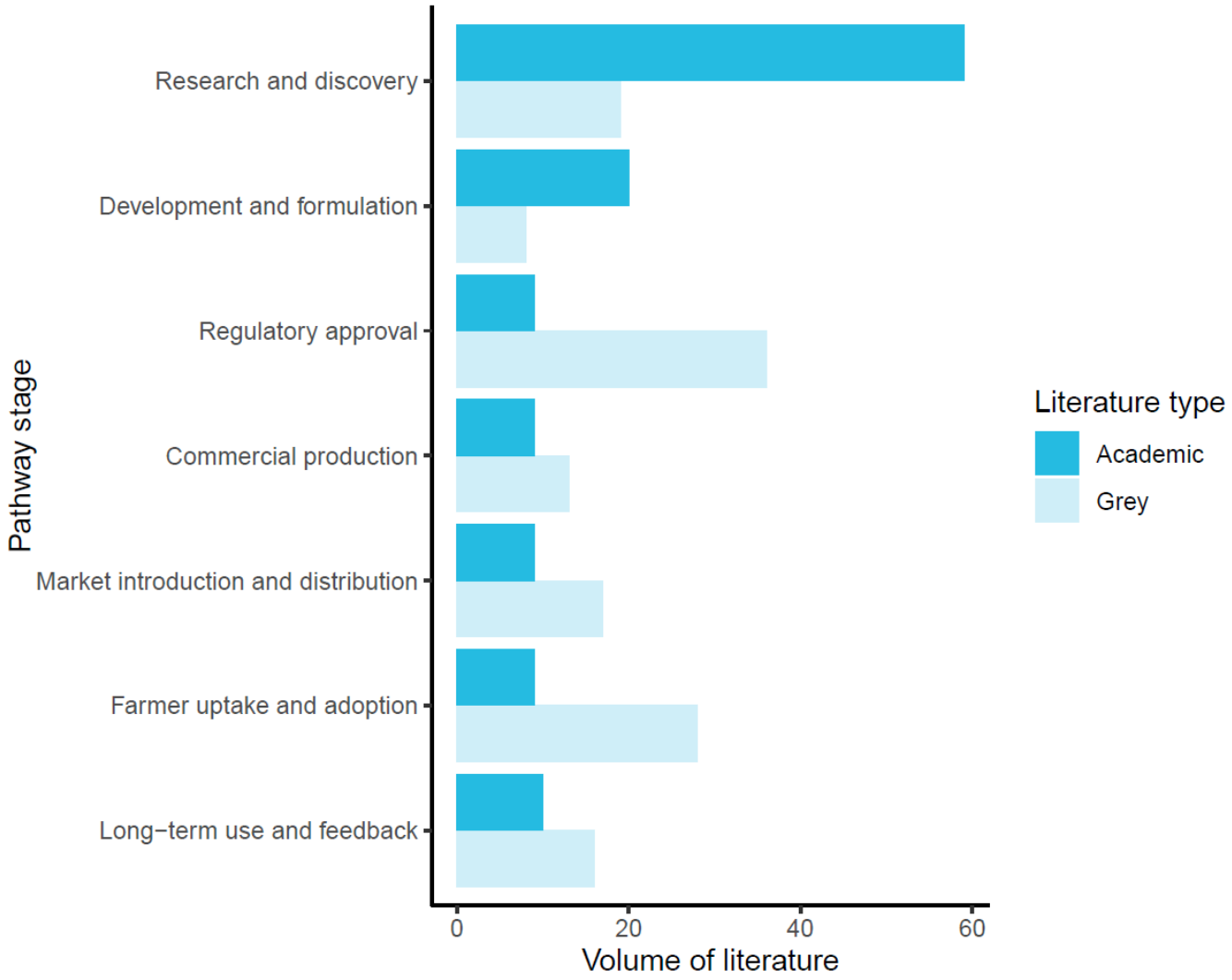
Biopesticide production and uptake pipeline



Data extraction and screening

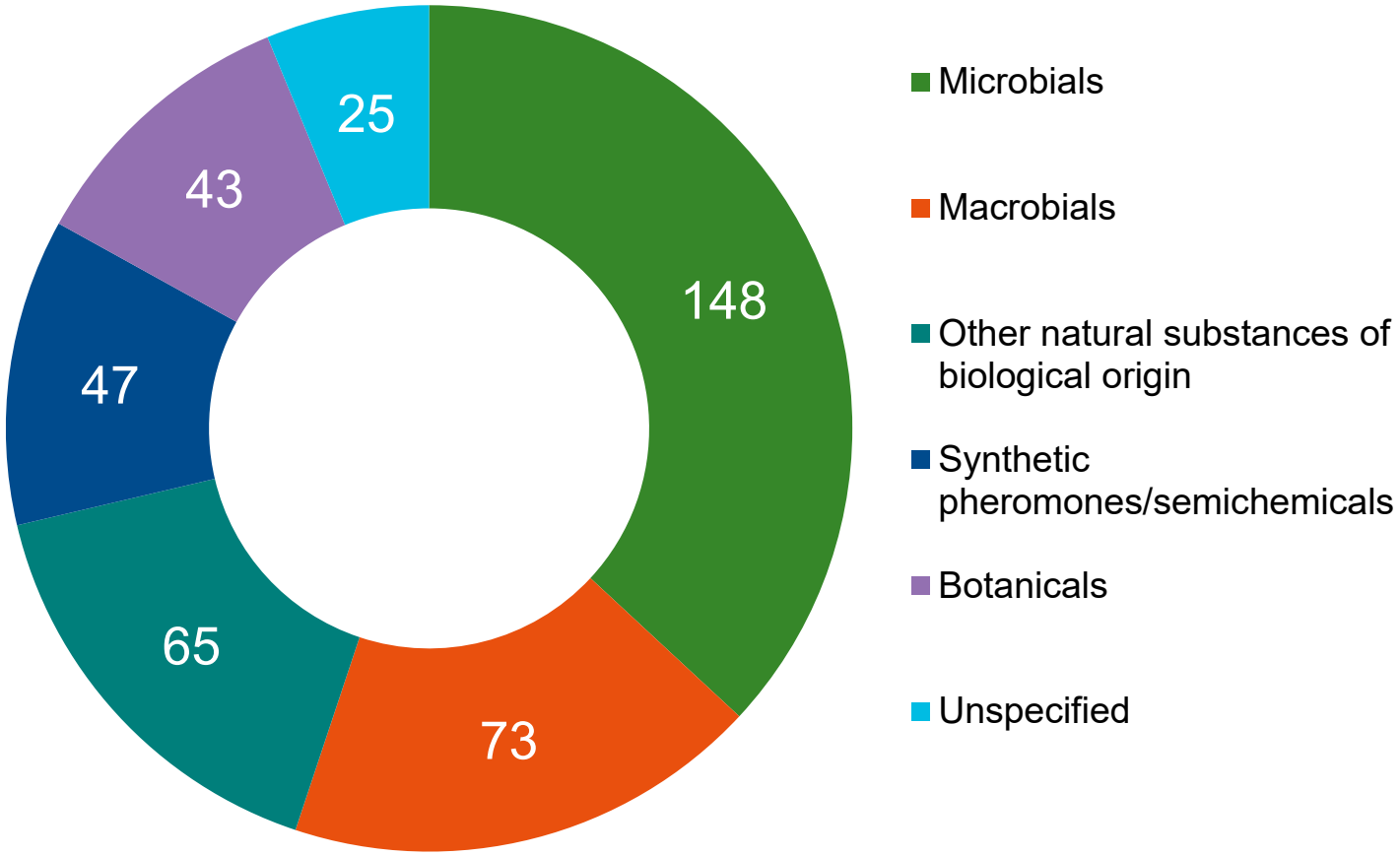


Research distribution by stage and literature type



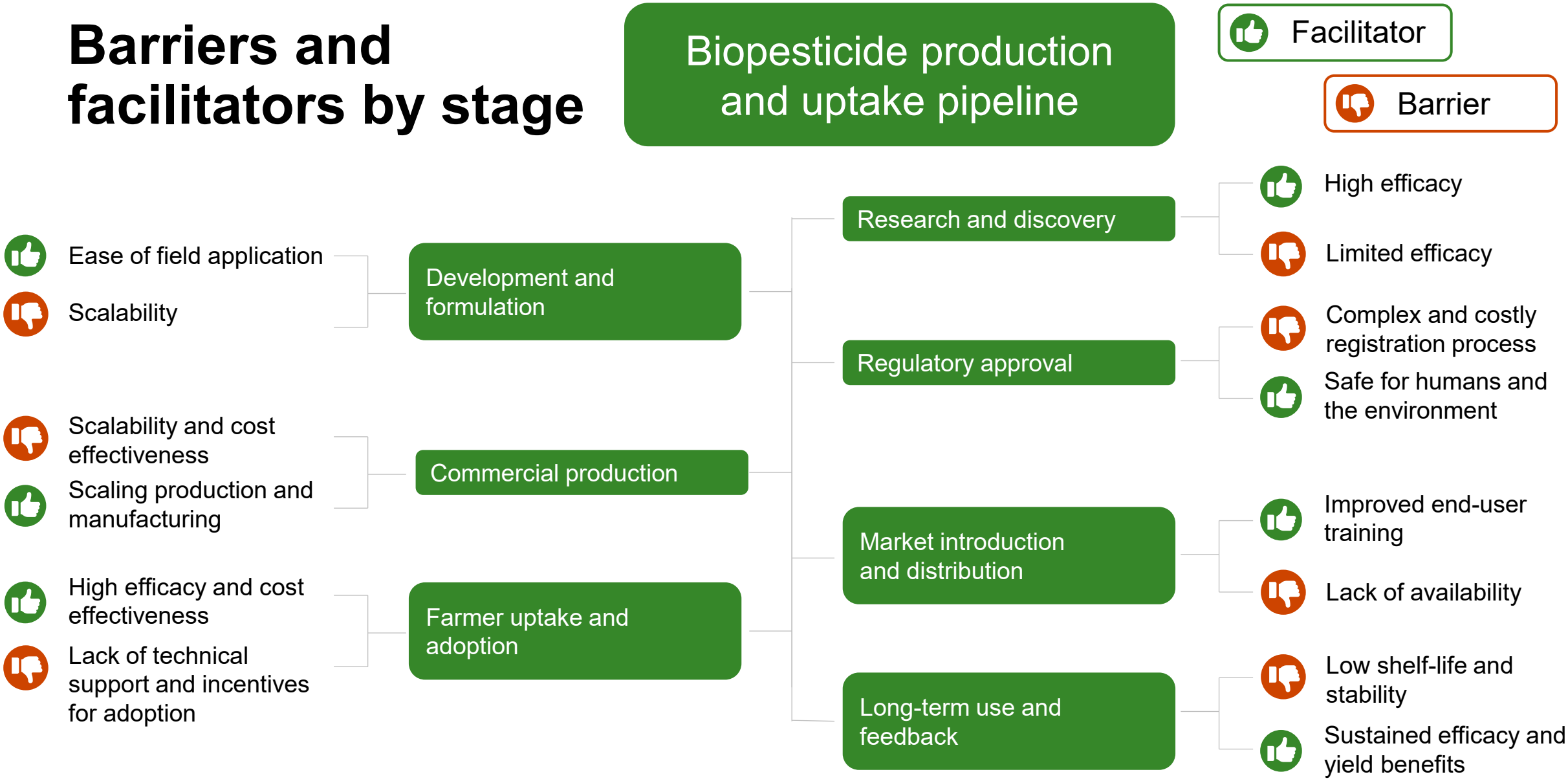
- Vast majority of **academic literature** focuses on the early stages of development
- **Grey literature** gives more attention to regulatory approval and farmer uptake
- The transitional **commercial production** and **market introduction** stages have limited literature, likely due to private sector domination
- Overall research **skewed** to the early stages, highlighting a need for more systematic and interdisciplinary work, addressing regulatory, commercial and long-term dimensions of biopesticide uptake

Variation of research (grey + academic) by biopesticide type



- **Microbial (148)** biopesticides are the most researched, possibly due to their commercial relevance, diversity, and regulatory precedence
- Moderate attention to **macrobials (73)** and **semiochemicals (47),** possibly due to macrobial use being largely restricted to greenhouse systems and semiochemicals to specific crop-pest combinations
- Studies on **botanicals** may be published in regional journals and in local language, reducing their visibility in global systematic reviews

Barriers and facilitators by stage



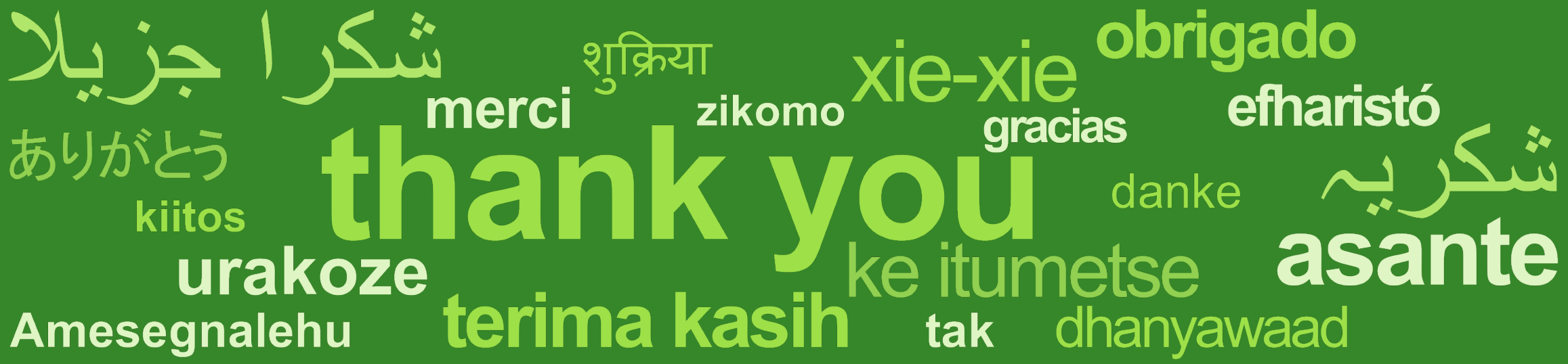
Initial take home messages

- Large discrepancies by **literature type:**
  - **Academic literature** more geared towards research and discovery
  - **Grey literature** focuses on regulatory compliance and farmer uptake
  - Overall literature is skewed to the **early stages** of development, highlighting the need for more interdisciplinary work
- **Global trends** dominate the literature, suggesting largely common biopesticide barriers and facilitators across geographies
- Strong focus on **microbial** biopesticides across the literature suggests an advanced commercial relevance
- Efficacy, safety, scalability, end-user training and policies and institutions are some of the most common **limiting factors** to biopesticide production and uptake

Next steps and outputs

CABI-FAO next steps and Outputs:

- Conclude screening and data analysis
- Scientific paper
- Evidence-based **policy brief** published by FAO to provide recommendations that help countries:
    1. Overcome the identified barriers and
    2. Implement facilitators to biopesticide production and uptake



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