Global Barriers and Facilitators to the Uptake of Biopesticides

A scoping study

CABI and FAO

Regional Consultation Meeting, February 2025

Collaborative work

Problem statement

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

Approach

- **CABI** and **FAO's** Pest and Pesticide Management Team joined hands to tackle the challenges underlying the limited use of biopesticides, by adopting an evidence-based **Juno** approach

Presentation outline

Project overview

Types of biopesticides

Biopesticide Production and Uptake Pipeline

Data extraction and screening

Preliminary results:

- Research distribution by stage and biopesticide type
- Variation of research by country and stage
- Commonly retrieved barriers and facilitators by stage

Initial take home messages

Next steps

Project overview

Primary research question:

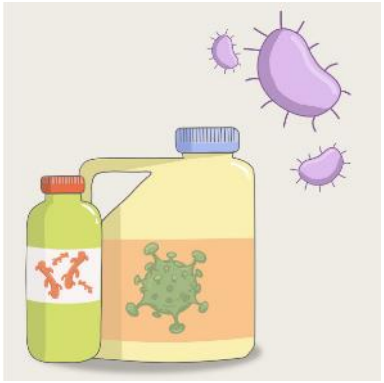
- What research exists on **barriers** and **facilitators** to biopesticide uptake?
- What are the **barriers** and **facilitators** to biopesticide uptake

Secondary questions:

- Where do these barriers and facilitators occur along the **stages** of the uptake pipeline?
- How do they vary by biopesticide **type** (e.g. microbial, macrobial) 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)

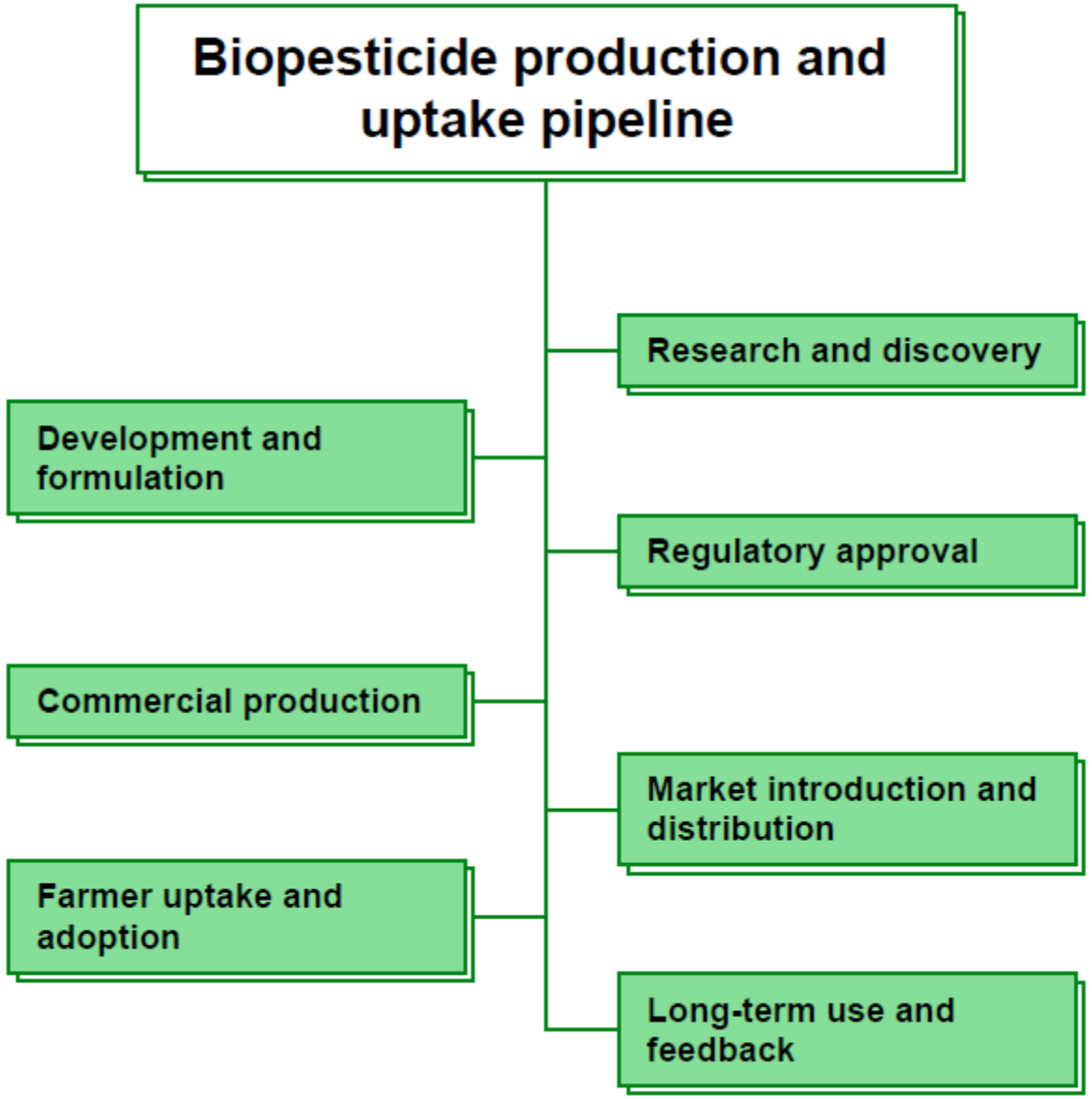


Microbials and their extracts

Macrobials (augmentative biocontrol)

Semiochemicals

Botanicals and other natural substances



Scope of the study

Geographical scope: Global

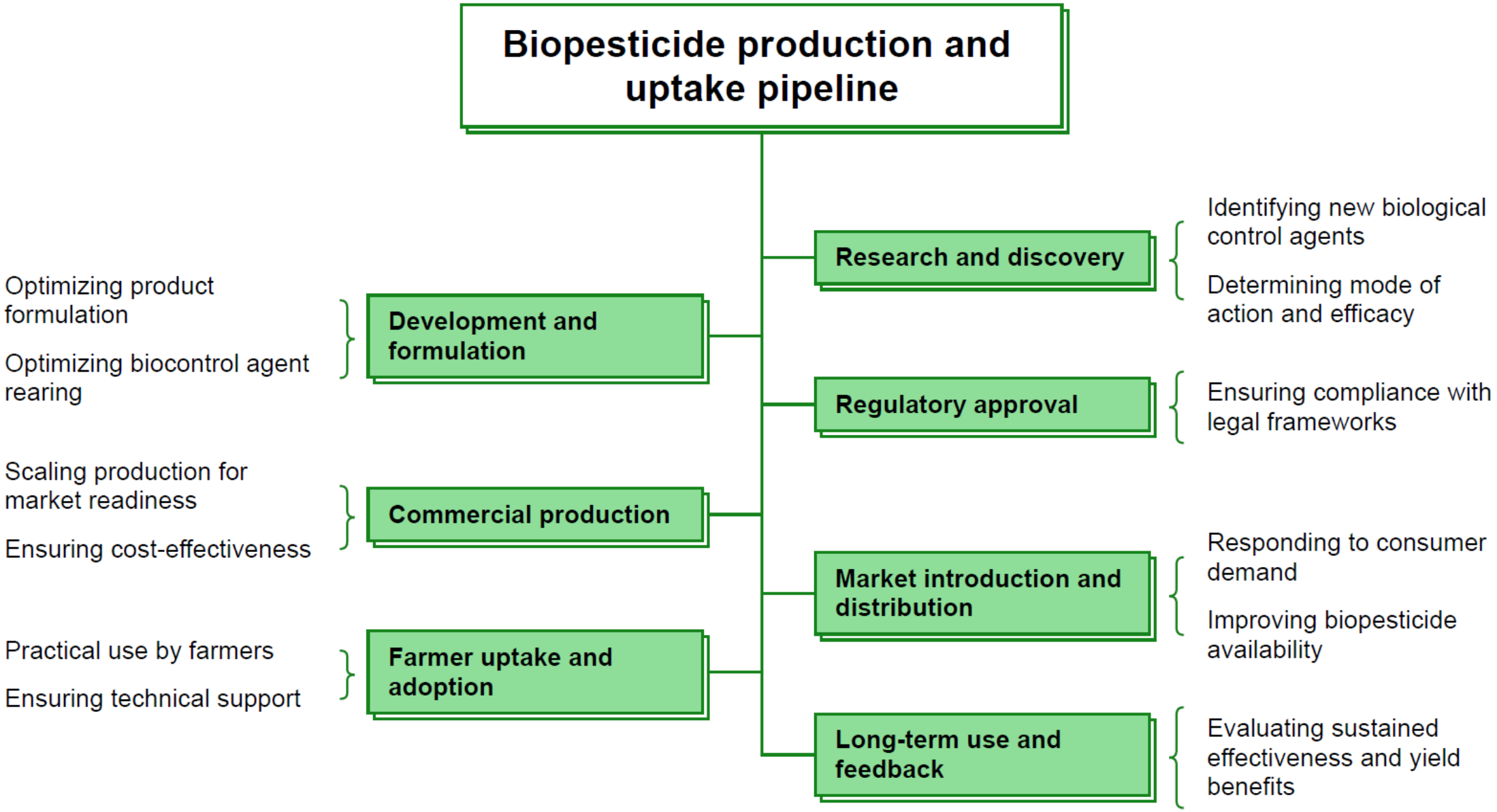
Timeframe: 2016 – present; in line with the publication of the FAO guidelines for the registration of microbial, botanical and semiochemical pest control agents (FAO and WHO 2017)

Population: Biopesticides

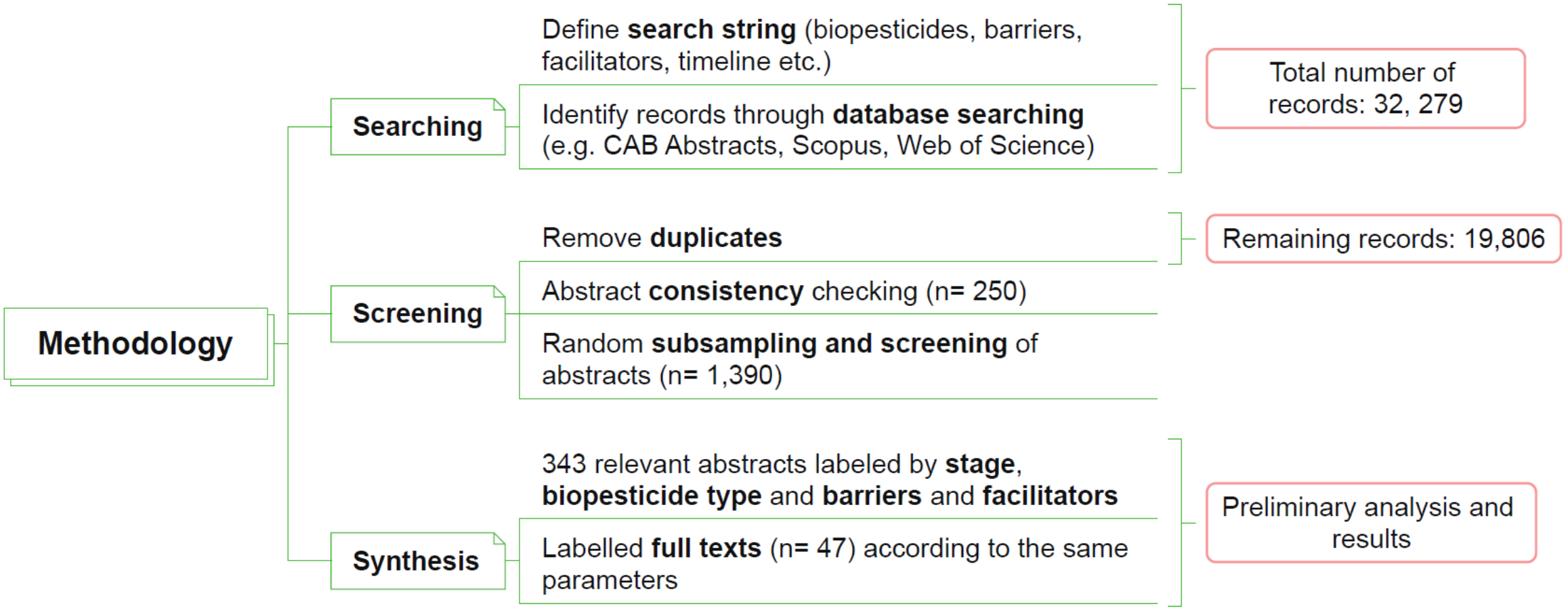
Intervention: the 7 stages of biopesticide production and uptake pipeline

Phenomenon: Contextual barriers and facilitators across stages

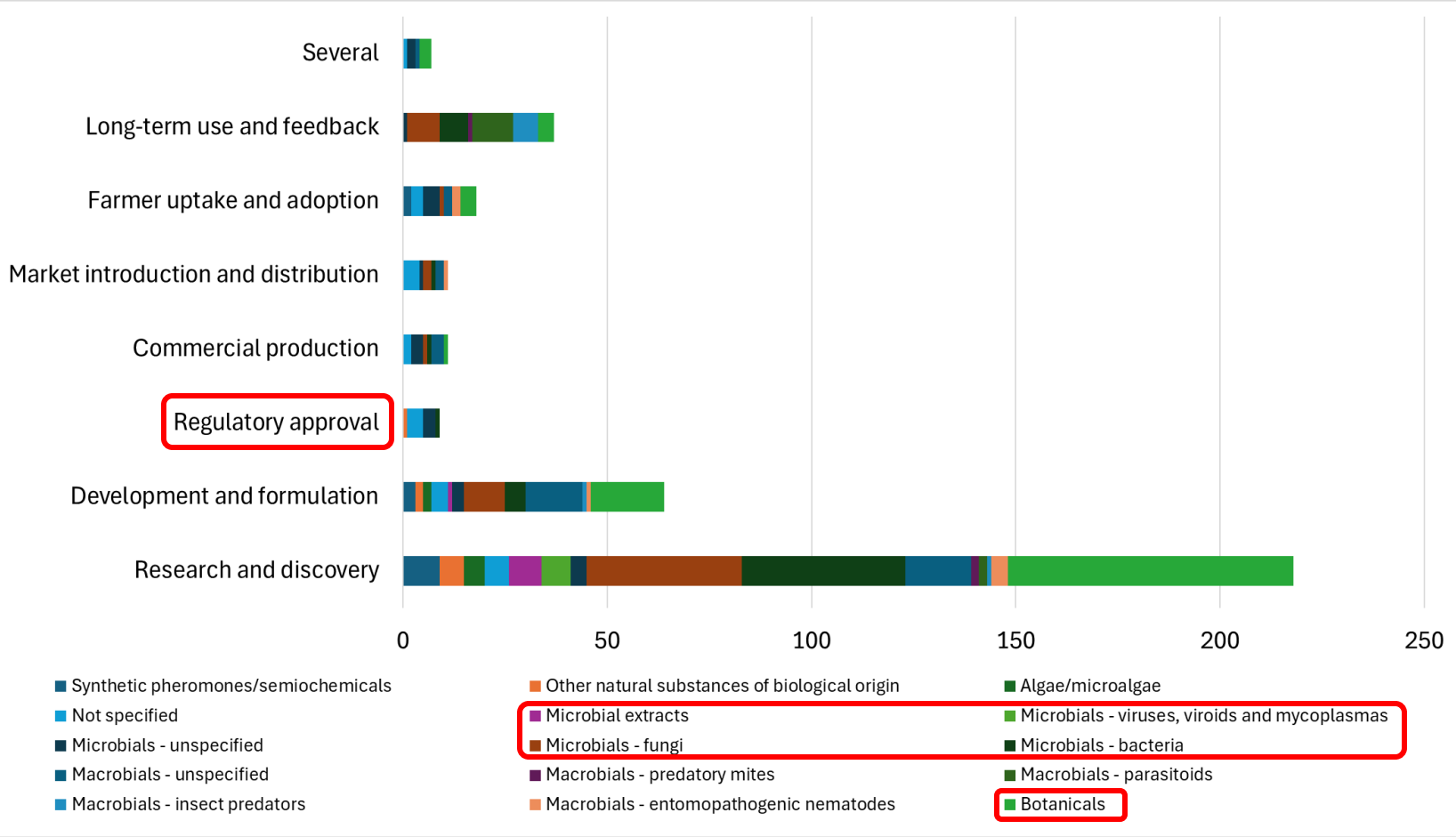
Biopesticide production and uptake pipeline



Data extraction and screening



Research distribution by stage and biopesticide type



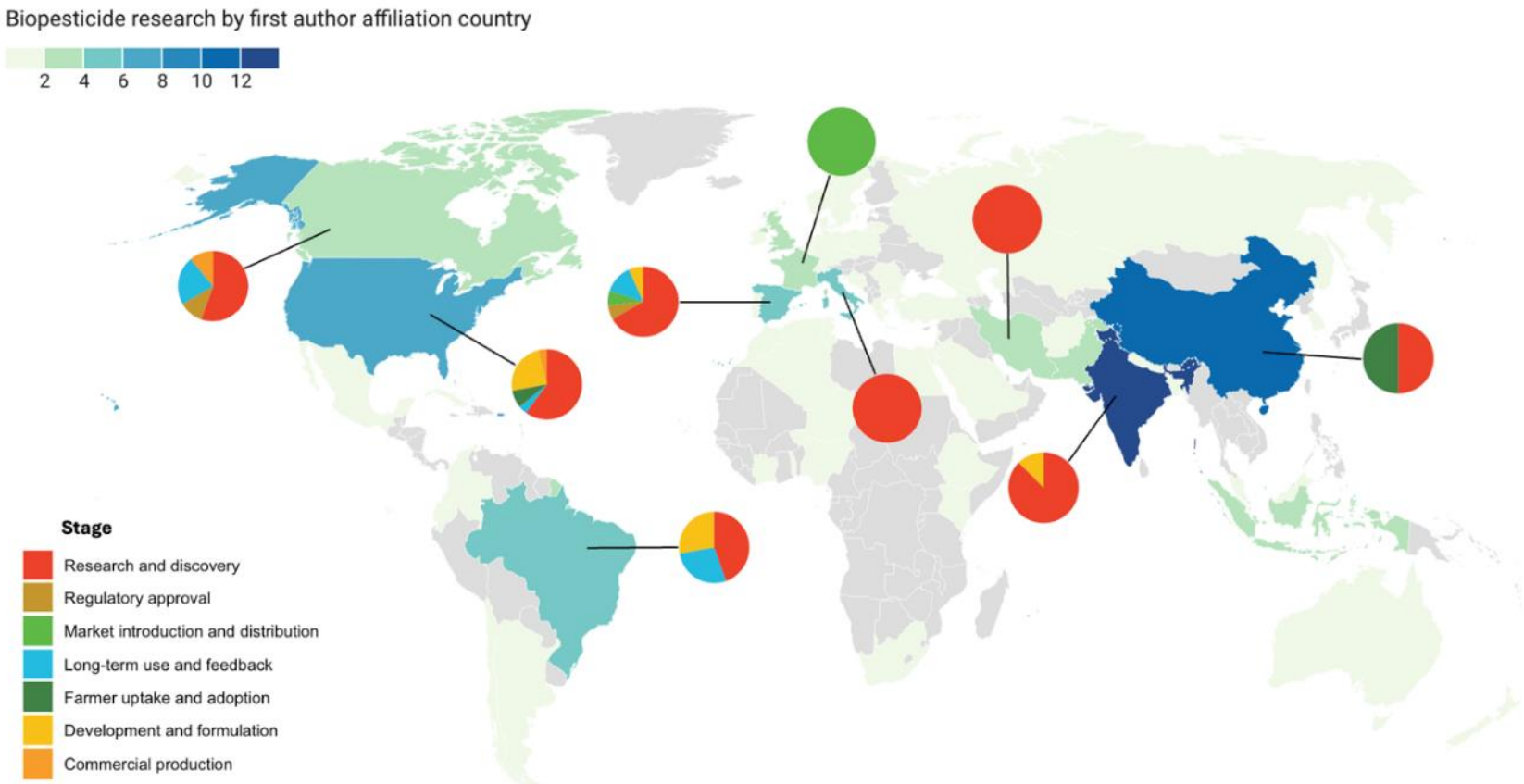
Most scientific research falls in the **early stages of development**

Regulatory bottleneck potentially delaying the move to later stages of development

Botanicals are highly used globally, especially in smallholder systems

Microbials also dominate thanks to their versatility, effectiveness and targeted action

Variation of research by country and stage



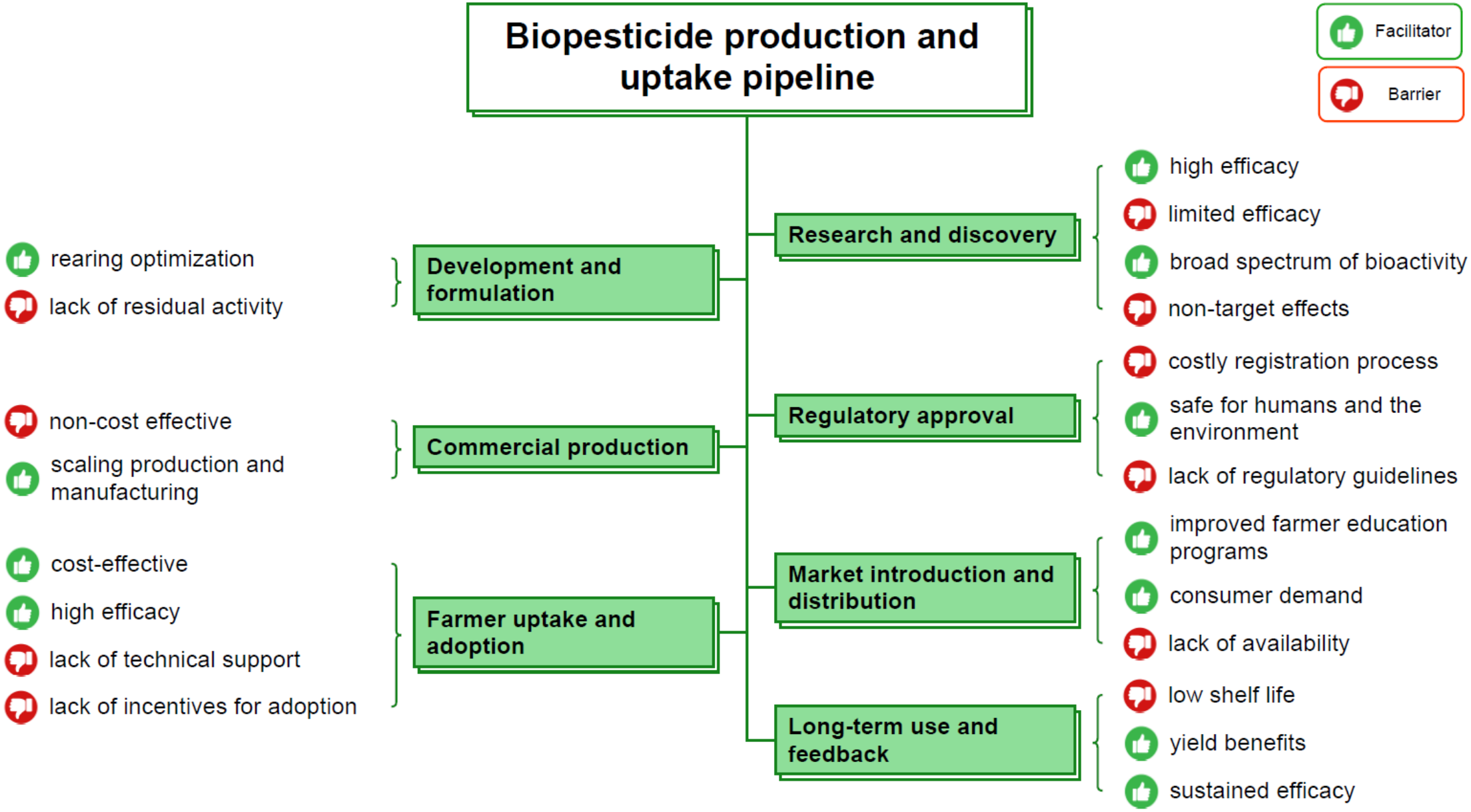
Top 9 countries showcased based on proportion of published literature

Research in **India**, **Iran, China** and **Italy** focused on the early stages of development

Scientific output from **USA**, **Canada**, **Spain** and **Brazil** shows broader coverage across multiple stages

National variations will change after all **19,806** records analyzed

Biopesticide production and uptake pipeline



Initial take home messages

Large discrepancies in published literature by **stage** and **type** of biopesticide:

- **Scientific literature** is more geared towards **research and discovery,** with focus on **Botanicals** and **Microbials**

Regulatory bottlenecks may hinder progress to later stages of development

National variations exist in terms of **research focus**, indicating varying maturity levels of the biopesticide production and uptake pipeline

Efficacy, safety, cost-effectiveness, yield benefits, and farmer education programs are some of the **limiting factors** to biopesticide production and uptake

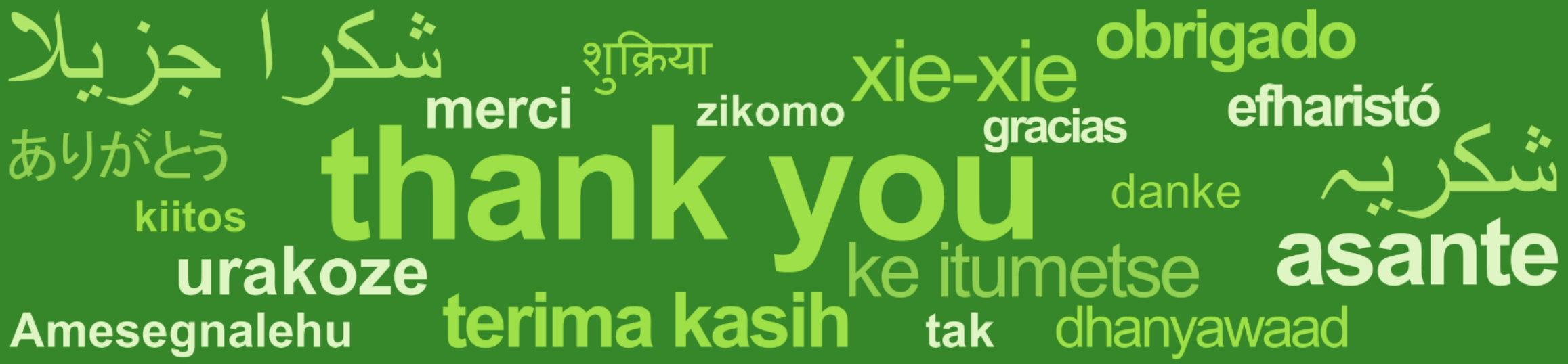
Next steps

Screening and labeling of all retrieved records (**19,806**) using **CABI's Large Language Model** (AI), to reach information saturation and provide a robust outcome

Full-text analysis of the relevant **grey literature** (e.g. FAO, OECD, CABI, World Bank) to complement the data gaps that exist in the fundamental literature

CABI-FAO Outputs:

- Scientific paper
- Evidence-based **policy brief** published by FAO to provide recommendations that help countries overcome the identified barriers and implement facilitators to biopesticide production and uptake



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