

Research questions

MCB, 2026/2027

Why the Research Question Matters

- Defines the scope and direction of your thesis
- Determines the methodology and data needed
- Guides literature review and hypothesis development
- A well-formulated question is **clear, focused, and researchable**

Key Characteristics of a Good Research Question - FINER Criteria

- **F**easible (adequate resources, time, expertise)
- **I**nteresting (to you and the field)
- **N**ovel (contributes new knowledge)
- **E**thical
- **R**elevant (to energy & environment challenges)

From Broad Topic to Focused Question

Example Topic: Agrivoltaics (combining agriculture with solar PV)

- Broad: *Agrivoltaics and biodiversity*
- Narrower: *Effects of agrivoltaic systems on pollinator abundance*
- Focused Question: *How does the shade regime under elevated solar panels in agrivoltaic systems influence native bee species richness compared to conventional open farmland?*

Research questions and objectives (1)

Rule of thumb:

Question = What do I want to know?

Objectives = What will I do to find out?

- **Research Question:** Defines the specific knowledge gap or problem the study aims to answer.
- **Objectives:** Describe the actions and analyses that will be undertaken to answer the RQ.
- A strong thesis has **one clear RQ** supported by **several aligned objectives**.

Research questions and objectives (2)

Rule of thumb:

Question = What do I want to know?

Objectives = What will I do to find out?

Research Question

- *How does the shade regime under elevated solar panels in agrivoltaic systems influence native bee species richness compared to conventional open farmland?*

Objectives

- *Measure native bee species richness in agrivoltaic and conventional farmland sites.*
- *Quantify and compare shade conditions across sites.*
- *Analyse the relationship between shade regime and bee species richness.*

Types of Research Questions

- **Descriptive:** *What is the current adoption rate of agrivoltaics in Southern Europe?*
- **Comparative:** *Do agrivoltaic sites support higher invertebrate diversity than traditional solar farms?*
- **Relationship-based:** *How does panel height correlate with ground vegetation cover?*
- **Causal:** *Does reduced soil temperature under panels increase earthworm biomass?*

Common Pitfalls to Avoid

- Too broad: *"How does agrivoltaics affect the environment?"*
- Too narrow: *"What is the soil pH under panel #7 at site X?"*
- Unanswerable: *"Will agrivoltaics solve world hunger?"*
- Biased wording: *"Why are agrivoltaics better for biodiversity?"*

Resources for Further Guidance

- **Books:**

- [*The Craft of Research*](#) (Booth, Colomb, Williams)

- **Websites:**

- University of Minnesota's "[*How to Write a Research Question*](#)"

- **Videos:**

- Scribbr. (2020, January 2). "[*How to develop a STRONG research question*](#)"

- **Field-specific:**

Example:

- Review papers on agrivoltaics (e.g., in *Applied Energy*)
- EU-funded projects like *Symbiosyst* for agrivoltaics case studies

Final Tips & Next Steps

- Discuss your question with your supervisor **early** and **often**
- Test it against the FINER criteria
- Be prepared to refine it as you review literature
- A strong question will make your research process smoother and your thesis more impactful