



TRansition paths to sUustainable legume-based systems in Europe

Impact of legume and non-legume crops on soil-N availability and greenhouse gas emissions during winter cultivation period

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Aim of this Case Study

- to identify wider environmental effects such as carbon sequestration and greenhouse gas emissions when legumes are used in rotation schemes.
- to improve Nitrogen (N) supply via alternative renewable organic sources in non-legume crops grown organically

The experiment:

In organic agriculture the availability of N to plants depends on mineralization rates of soil organic matter, which are hardly predictable under field conditions.

In order to assess and improve N supply via alternative renewable organic sources in non-legume field crops grown organically, a field experiment was carried out at the experimental facilities of the laboratory of Vegetable Production of AUA.

Timeline:



Measurements:

Plant biomass characteristics
 N levels (total-N, NO₃-N, NH₄-N)
 Mineral nutrients
 Biological Nitrogen Fixation

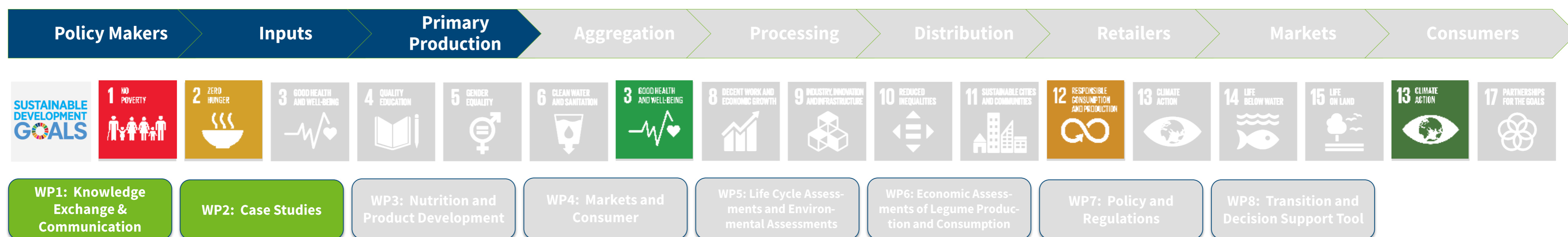
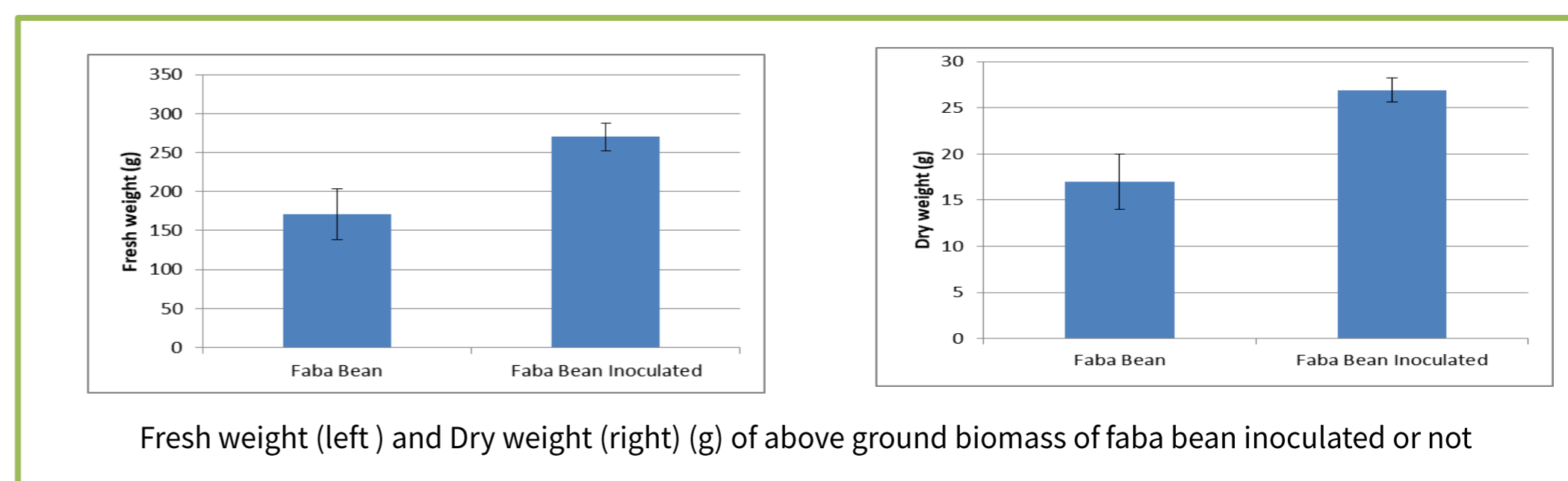
} in plant tissues and soil

Rotation scheme:

- Broccoli (organic) → Common Bean (organic)
- Broccoli (organic) → Common Bean inoculated (organic)
- Fallow → Common Bean (organic)
- Fallow → Common Bean inoculated (organic)
- Faba Bean → Common Bean (organic)
- Faba Bean inoculated (organic) → Common Bean inoculated (organic)
- Broccoli (conventional) → Common Bean (conventional)
- Broccoli (conventional) → Common Bean inoculated (conventional)

Treatments:

- Broccoli organic
- Broccoli conventional
- Faba bean organic inoculated with *Rhizobium leguminosarum* bv. *viciae*
- Faba bean organic non inoculated
- Non-cultivated plot (control)



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