

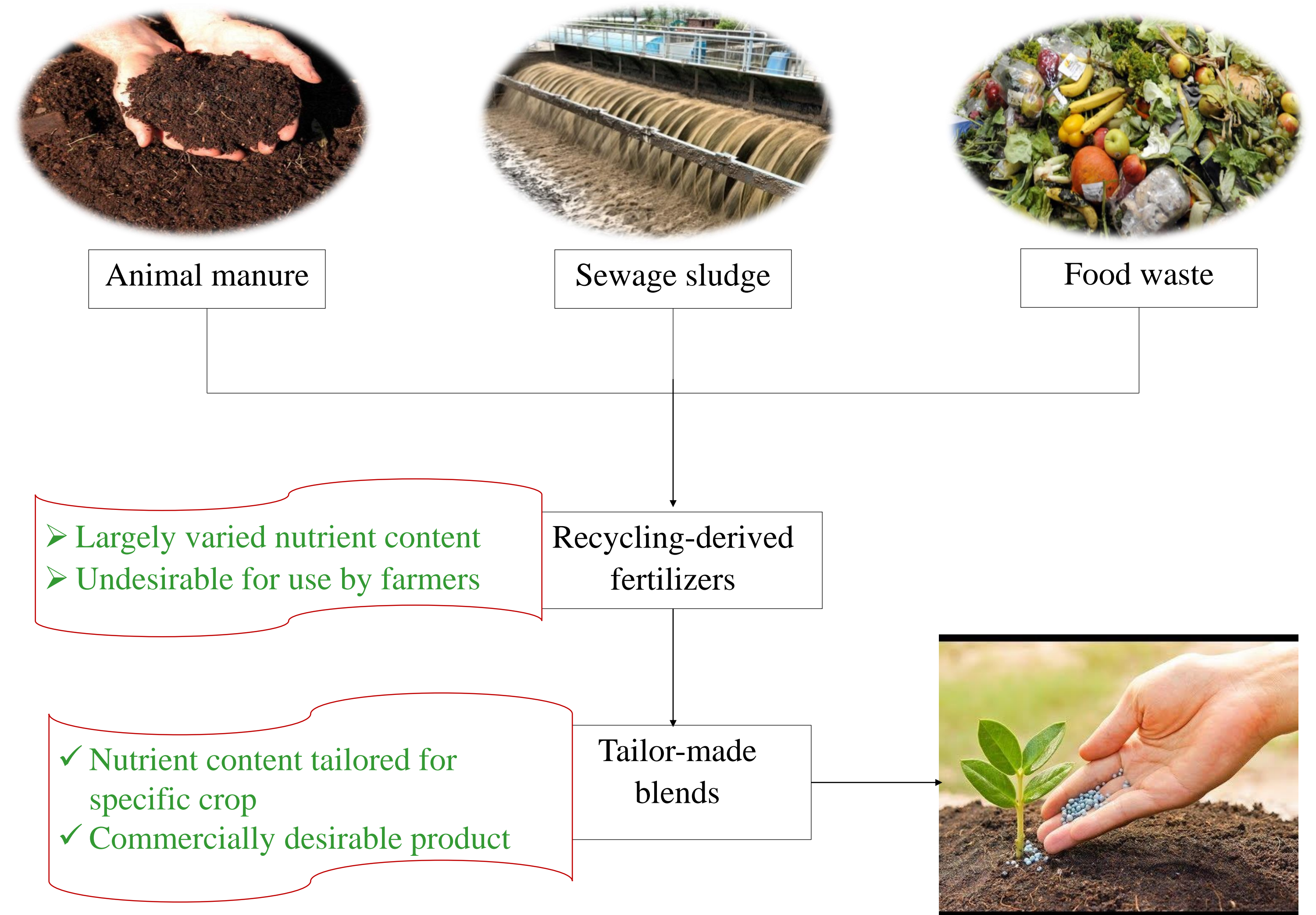
Assessment of tailor-made fertilizer blends produced from recycled nutrients

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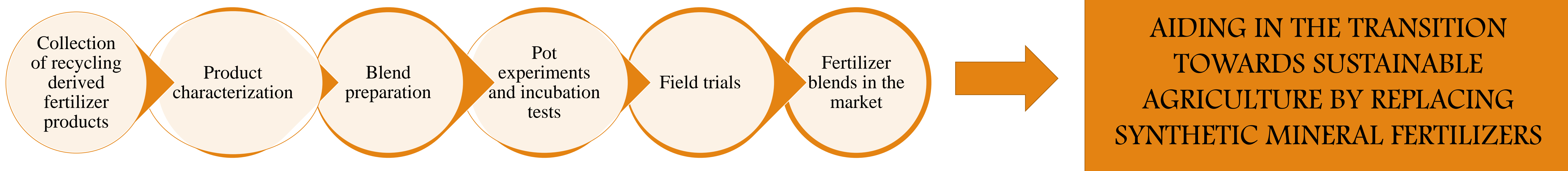
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PROBLEM AND OBJECTIVES:

- Excess of animal manure, sewage sludge and food waste causes nutrient surplus in some regions, whereas, other regions face a nutrient shortage sometimes, resulting in nutrient imbalance.
- Animal manure, sewage sludge and food waste are recycled to produce valuable derivatives that can serve as replacements of synthetic fertilizers.
- The nutrient concentration in recycled derivatives is variable, making them undesirable as fertilizers.
- Problem of nutrient imbalance can be mitigated by stimulating an exchange of nutrients from areas of surplus to areas of shortage.
- The issue of nutrient variability in recycled derivatives can be mitigated by developing tailor-made fertilizer blends from recycled fertilizers, with specific nutrient ratios desirable for the farmers in specific regions of North-West Europe.
- With this approach, *Interreg ReNu2Farm* aims to replace 2% mineral fertilizers in 5 years and 6% in 10 years by the recycling-derived fertilizer blends. To achieve this aim, an implementation of effective communication with the stakeholders (producers, farmers, policy makers etc.) will be crucial.

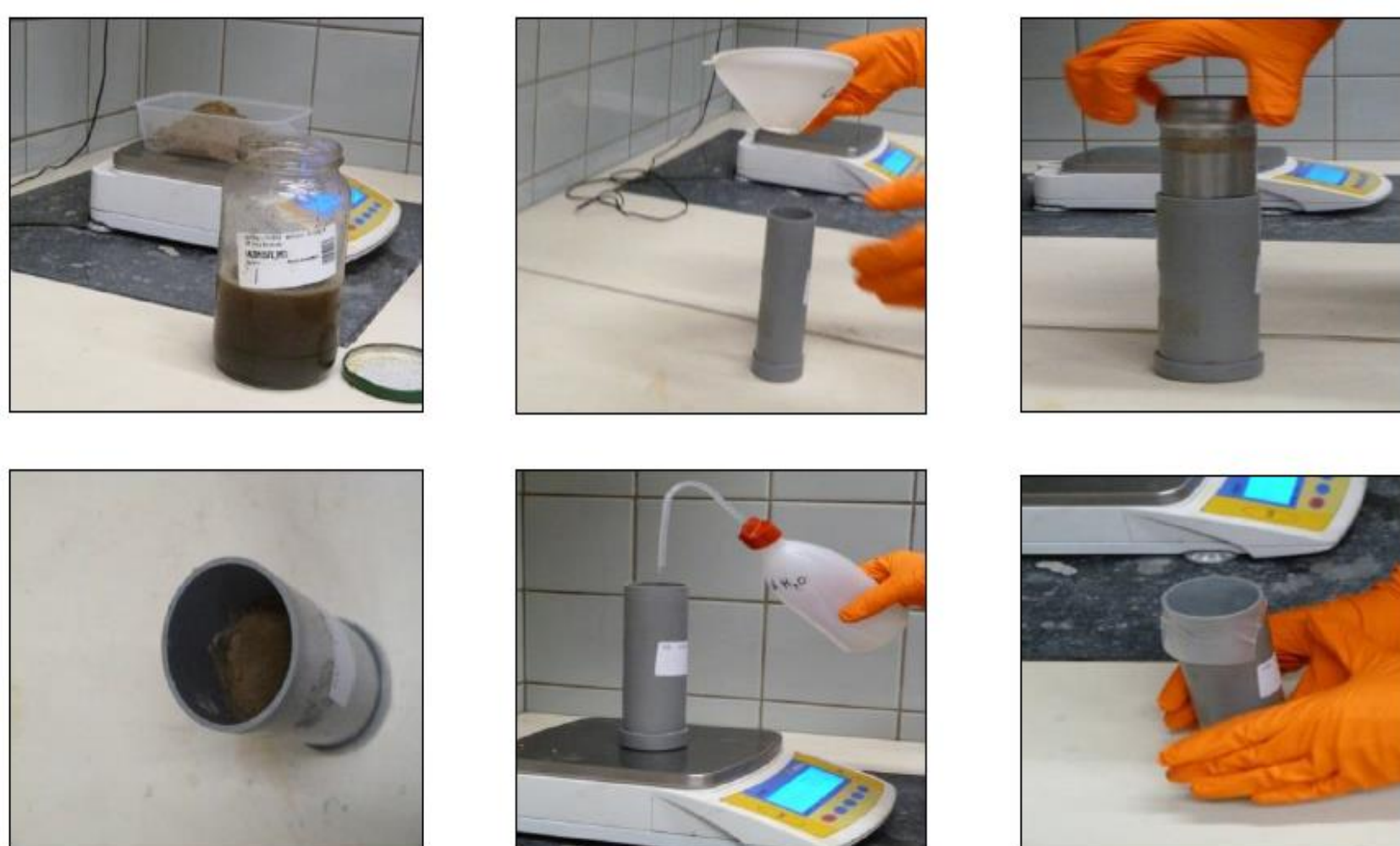


STAGES OF RESEARCH:



LAB-SCALE EXPERIMENTS:

- Physico-chemical characterization of 20 recycling-derived fertilizers including ashes, struvite, compost, digestate derivatives, ammonium sulphate, ammonium nitrate, pig urine and mineral concentrate
- Preparation of tailor-made blends suitable for specific crop requirements
- Incubation experiments to assess N mineralization and N release potential
- Pot experiments to examine the effectiveness of recycling derived fertilizers and blends in comparison to synthetic mineral fertilizers



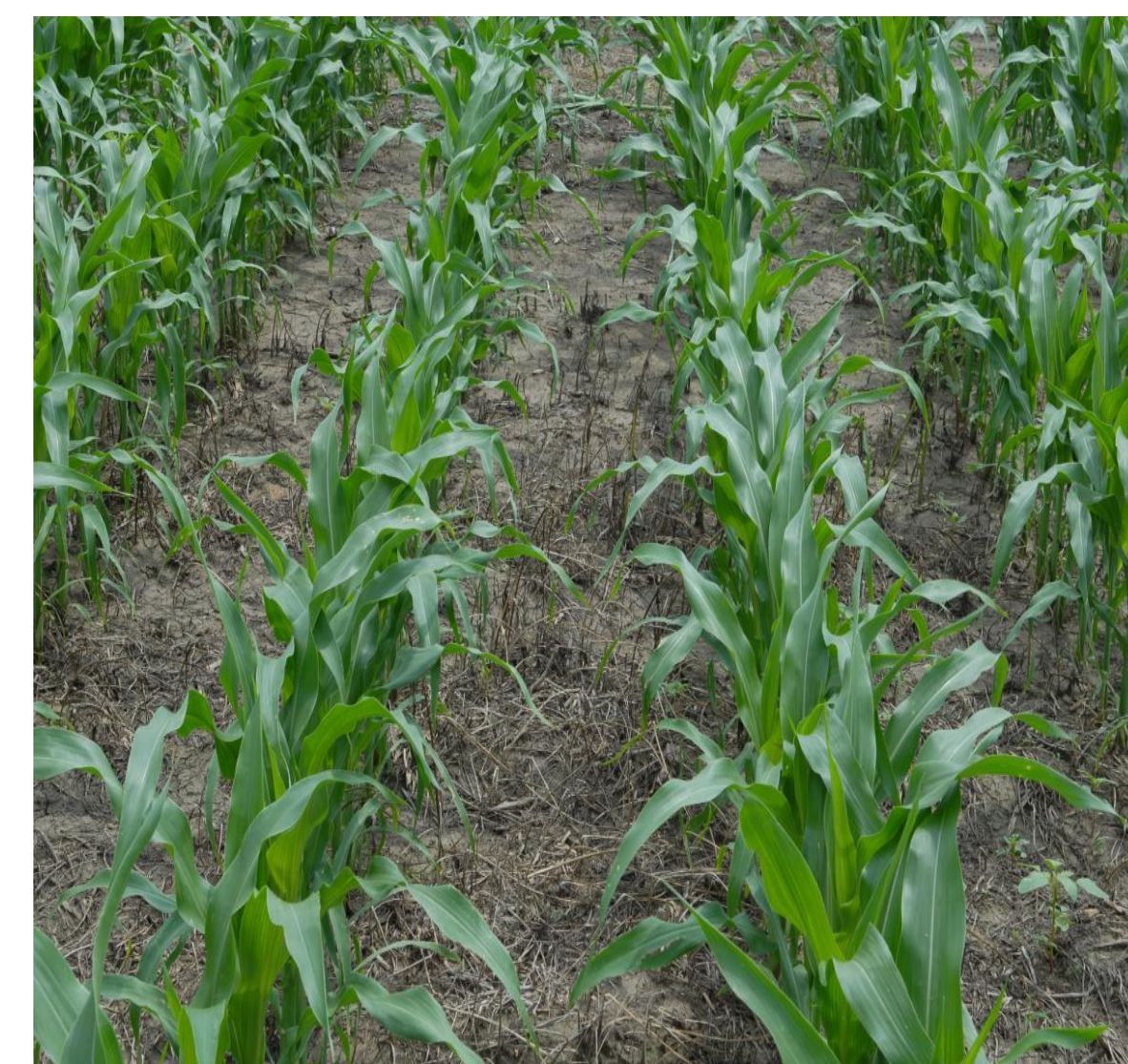
Experimental set-up of N incubation experiment for determination of N mineralization and N release



Pot experiments to test the recycling-derived fertilizers and tailor-made blends

FIELD-SCALE EXPERIMENTS:

- Field trials in Flanders to be carried out in collaboration with Inagro.
- Rotation of trials as follows:
 - First trial in March/April 2019 with maize
 - Second trial in 2020 with spinach + corn/cover crop
- Seven treatments to be tested with 4 replicates per treatment. The treatments of interest are:
 - Blank (no fertilization)
 - Control 1 (Synthetic P and K fertilizer)
 - Control 2 (Synthetic NPK fertilizer)
 - Animal manure
 - Ammonium nitrate
 - Ammonium sulphate
 - Pig Urine
- 3 dosages for all treatments except blank and control 1. The dosages are:
 - N – fertilizer advice - 60 %
 - N – fertilizer advice - 30 %
 - N-fertilizer advice



Field trials with maize (top) and spinach (bottom)

TESTED PRODUCTS FOR FIELD TRIALS:



Ammonium nitrate from stripping of liquid fraction of digestate



Ammonium sulphate from scrubbing of air from pig stables



Pig urine

NPK VALUES OF TESTED PRODUCTS:

Fertilizer	N (g/Kg)	P (g/Kg)	K (g/Kg)
Ammonium nitrate	60-80	-	~0,01
Ammonium sulphate	~25	~0,05	~0,14
Pig urine	~6	~0,03	~3,52

FUTURE PERSPECTIVES:

- To determine nutrient loss through atmospheric emission of NH_3 , N_2O and CO_2 from the application of the recycling-derived fertilizers and tailor-made blends