Sustainable Phosphorus fertilizers

From nutrient streams to circular Fertilizers: advancing EU phosphorus autonomy while reducing pollution

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Sewage sludge use can be improved

Sewage sludge ash can be upcycled into a P fertilizer

- **Direct use in Agriculture:**
  - 34% in average at EU level
  - Important variability among countries (0 till >80%)
- **Incineration:**
  - **31% in average at EU level**
  - High variability
  - Changes happening in Member states

  → **SSA alone could account for up to 6% of P fertilizer demand in Europe, but SSA needs to be processed to provide an efficient P fertilizer**
- **Other uses with lost nutrients:**
  - 12% Landfill
  - 10% others

→ Solutions to recycle SSA into fertilizers exist

→ Production of safe, efficient and circular fertilizers should be favored over landfilling.

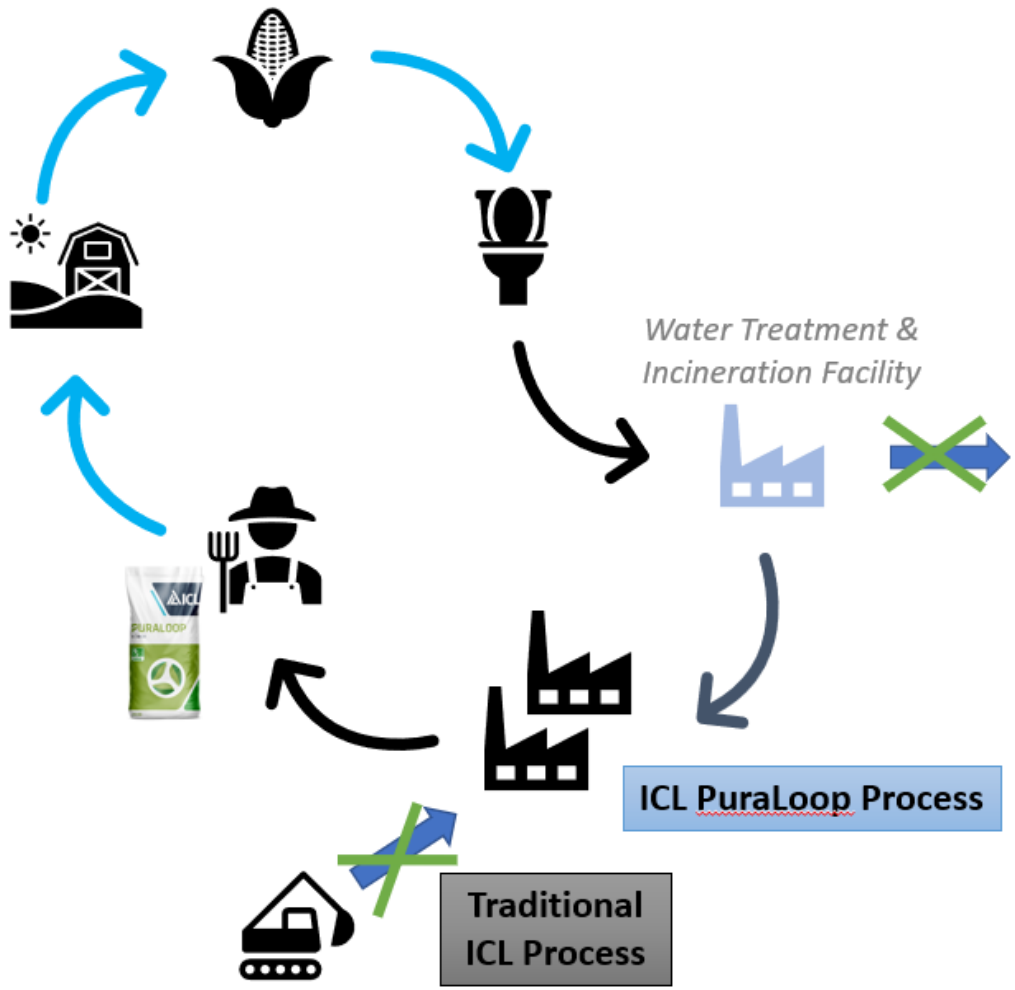
TH-AL-22-005-EN-N Beyond water quality.pdf

Valorizing the SSA waste stream

- P is concentrated in sewage sludge by water treatment facilities. ~90% of all P goes into the sludge.
- P is concentrated into the sewage sludge ash (SSA) after treatment by incineration facilities.
- Phosphate in SSA is poorly available for plants: a transformation process is necessary.

Puraloop phosphate from ICL

- Fully plant available
- Gradual release, improving efficiency.
- Granular fertilizer, easy to apply and transport
- Final product formulations can be tailored to farmers agronomic needs



Closing the Loop

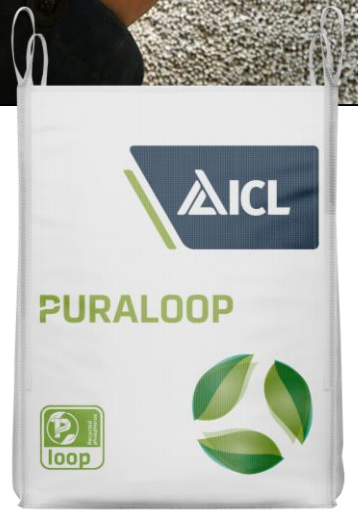
A glimpse of ICL's Process

SSA Unloading

Acidulation Process

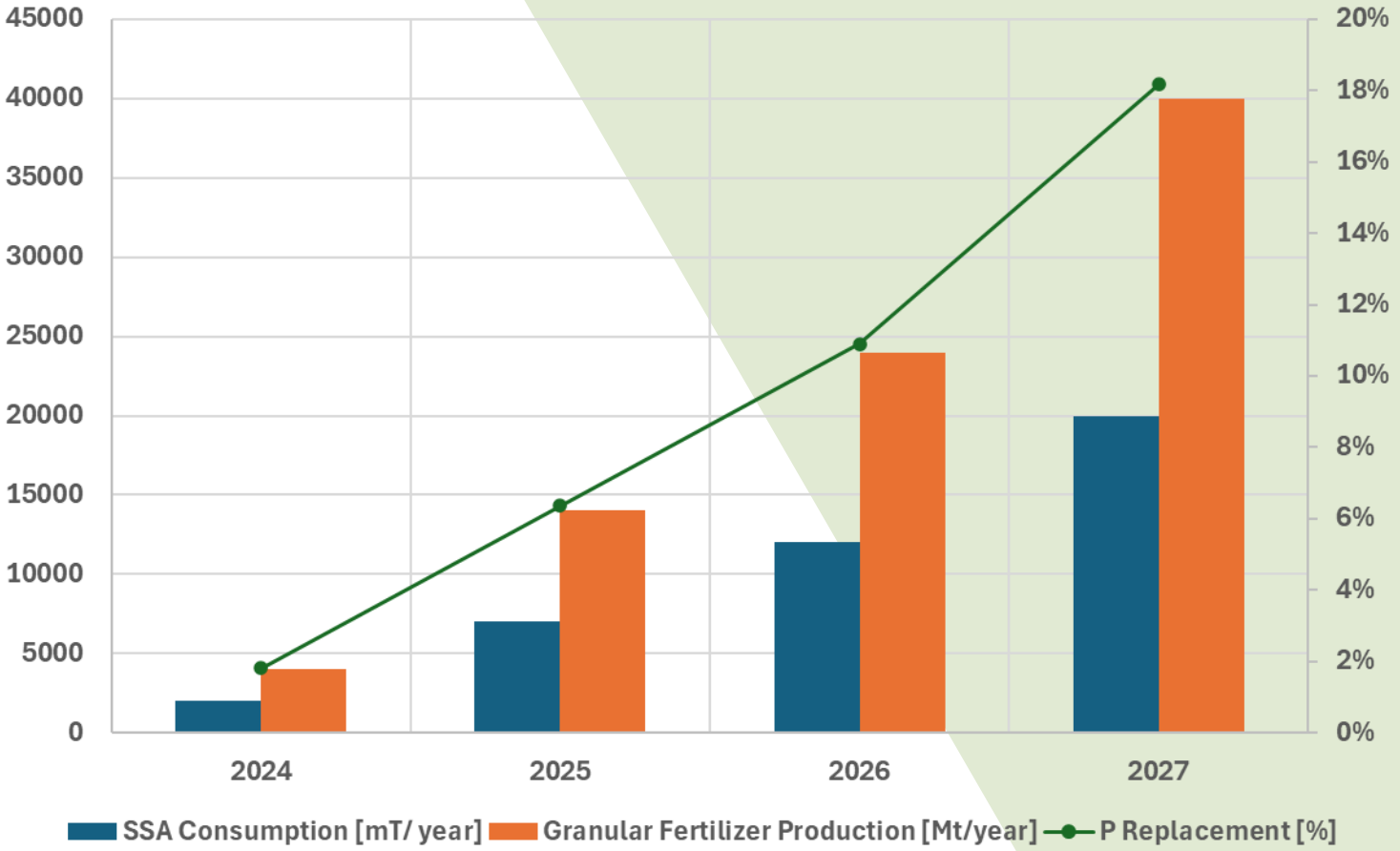
Granulation & Drying Process

Final Product



Scaling up

Easy in paper, complex in reality…



- The scale-up of a process involving waste streams is a long and complex journey.
- Not all SSA are the same! Relevant spatial and temporal variations.
- Necessary to develop as many processes as waste streams you want to valorize
- Waste regulations across EU are not harmonized
- Adoption of new recycled fertilizers at scale need to be supported

PURALOOP

Chemical Analysis

Sample	P_2O_5 WS	P_2O_5 NAC	P_2O_5 Tot	K_2O	MgO	CaO	SO_3	Free acid	Cl	pH	H_2O
				%					%		%
PURALOOP 38	20.0	37.7	38	1.2	2.0	10.5	5.8	2.4	0.6	3.3	6.8

PURALOOP heavy metals content are **below EU limit**, making it a completely safe product

PURALOOP

Agronomic experience

How to use:

- For direct application in fields, for all crops.
- Suitable for bulk-blending with other fertilizers (similar limitations to TSP)
- For optimal results, incorporate your phosphate granular fertilizer into the soil

Trial results:

- Several **fully replicated pot trials** done in Germany, Italy and Israel, on different crops and soil types have shown that **Puraloop has a similar performance to TSP**.
- Fields trials covering **longer growth cycles** showed that fields treated with **Puraloop performed better than TSP.**

Thank you

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