

Tywi Farm Nutrient Partnership

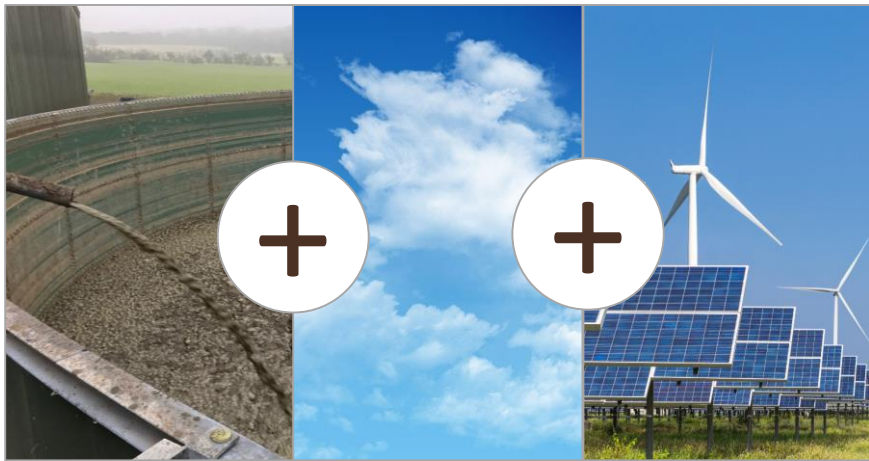
10th February 2022

N2

Applied

Dr Nick Humphries
Chief Agronomist

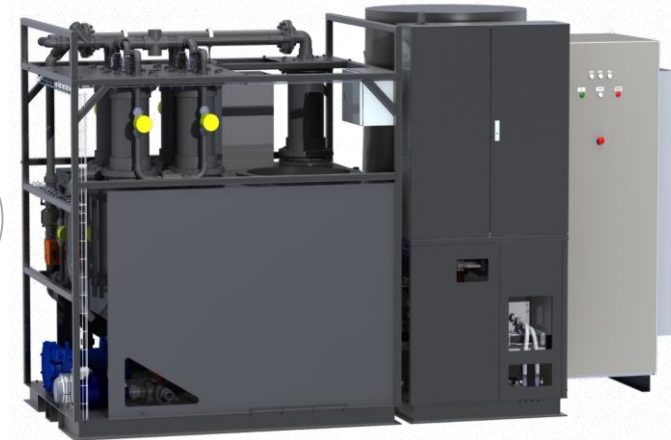
N2 Applied: Improving global food production



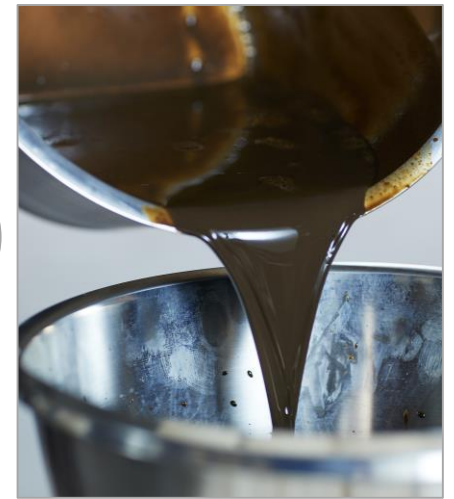
Slurry /
Digestate

Air

Electricity



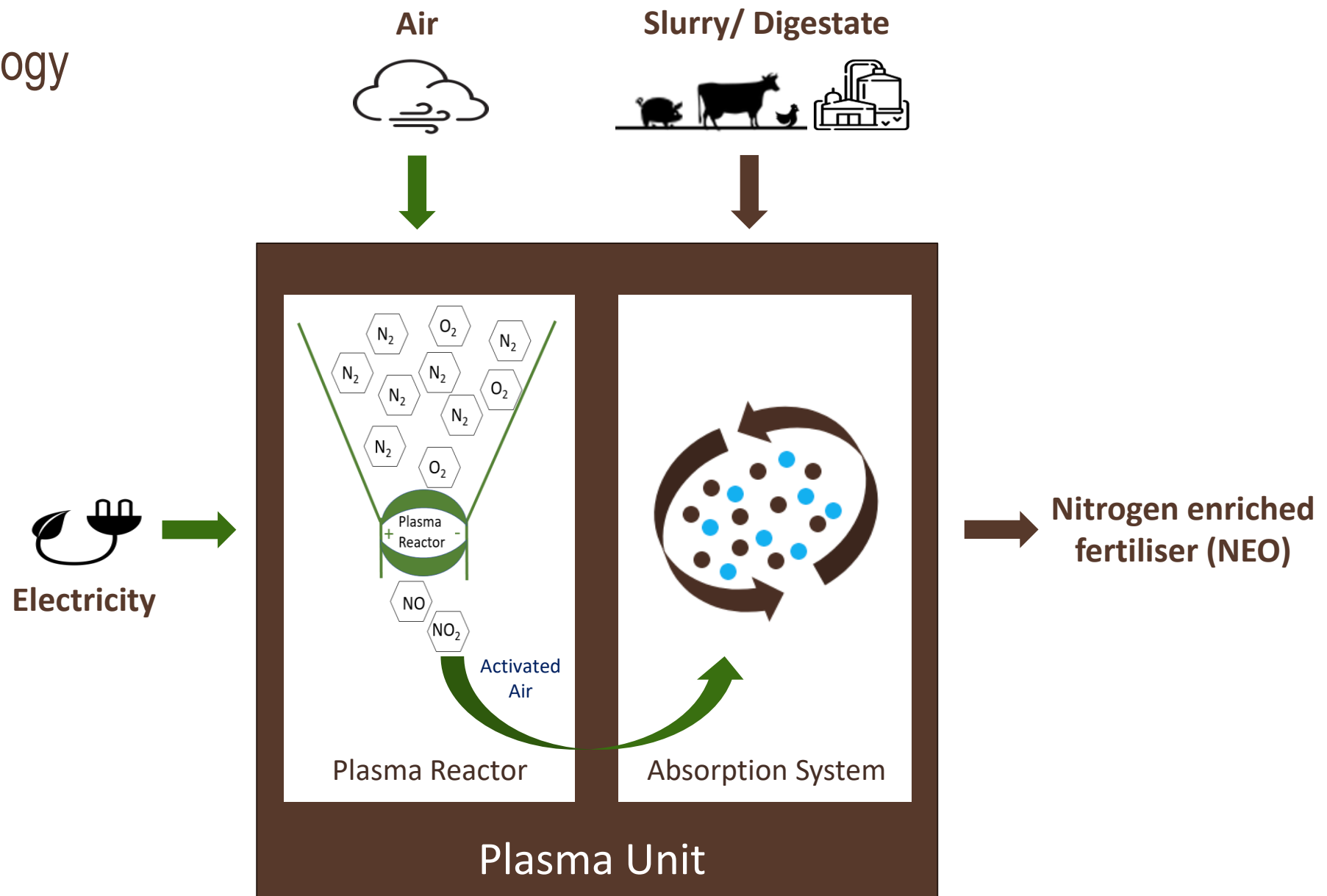
N2 Unit



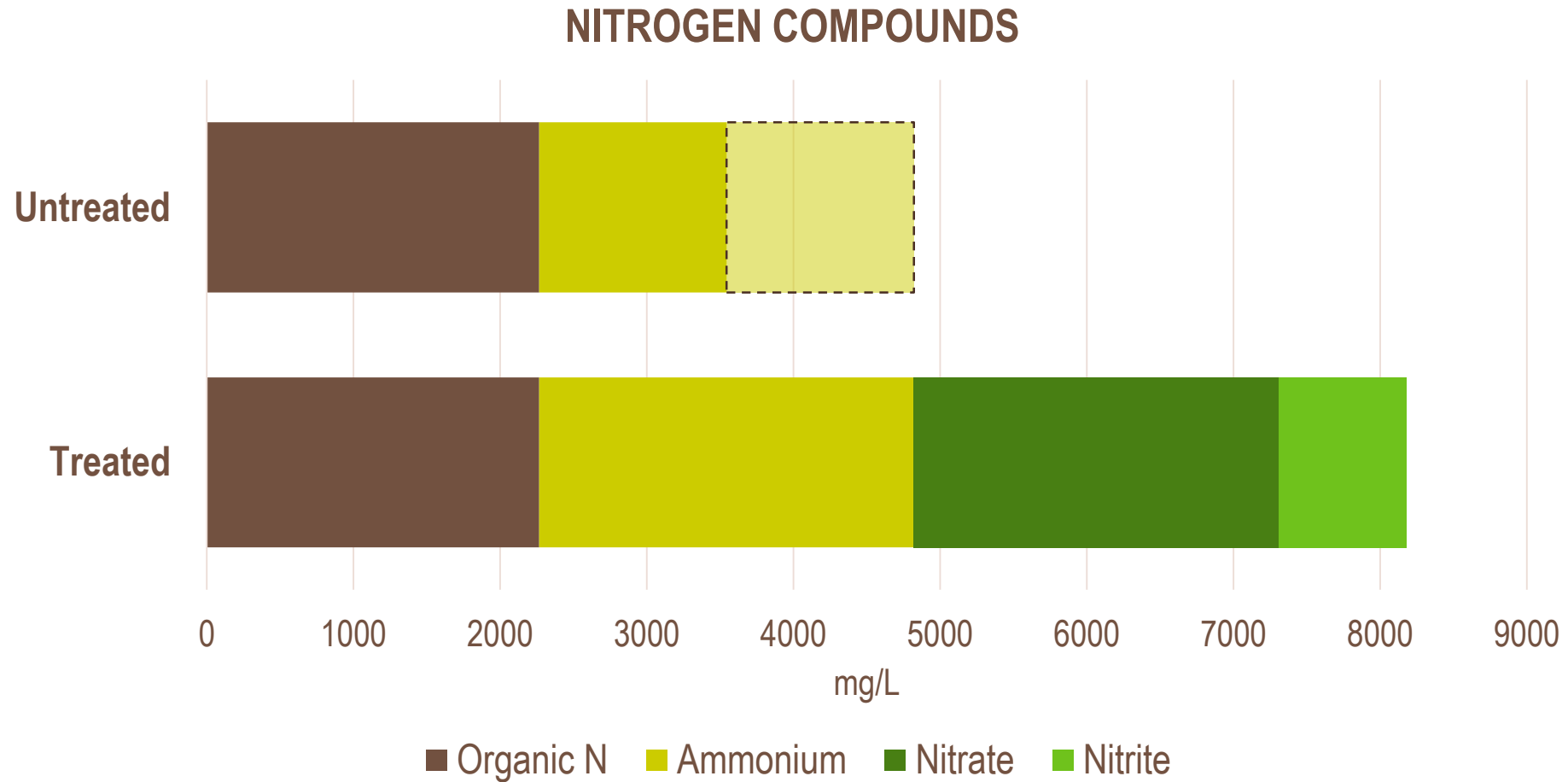
Nitrogen Enriched
Organic fertiliser

The N2 Plasma Technology

- 50kW plasma power
- Renewable energy or grid
- Separator required
- Separate storage



Nitrogen Enriched Organic Fertiliser



N2 Applied – Independent analysis from NRM Laboratories of organic substrates in the UK.

The N2 Solution

Emission reduction

- ✓ 90% ammonia reduction in field
- ✓ 95% ammonia reduction in storage
- ✓ 99% methane reduction in storage
- ✓ Reduces odour

Green N fertiliser

- ✓ Low/no carbon cost
- ✓ High Nitrogen Use Efficiency
- ✓ Increased application versatility

Supports sustainable farming

- ✓ Increase crop yield
- ✓ Improve soil health
- ✓ Sustain livestock production



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IMPROVING GLOBAL FOOD PRODUCTION

N2 Applied enables farmers to produce
... using



n2applied.com

N2

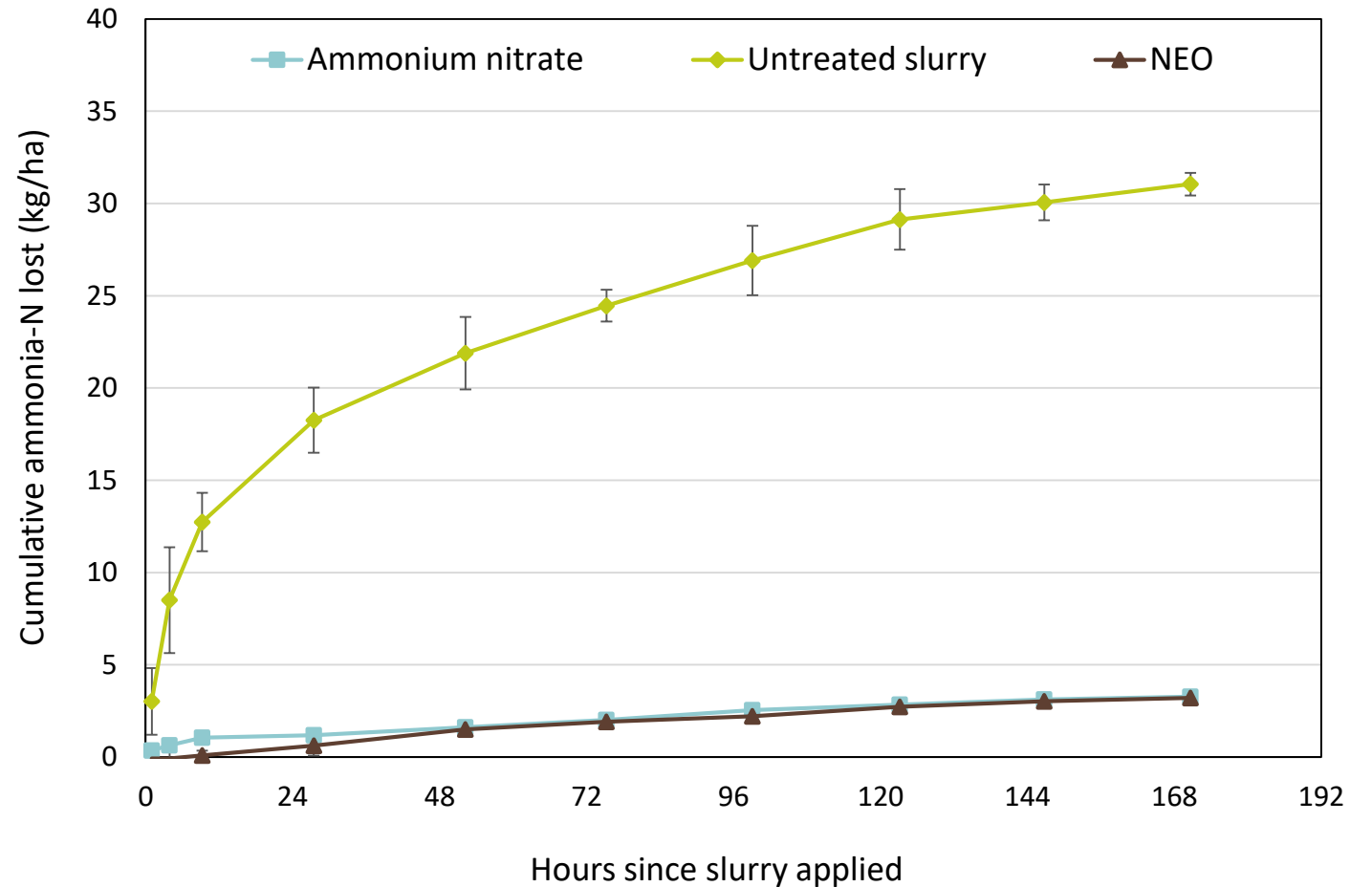
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ADAS ammonia loss results 2021



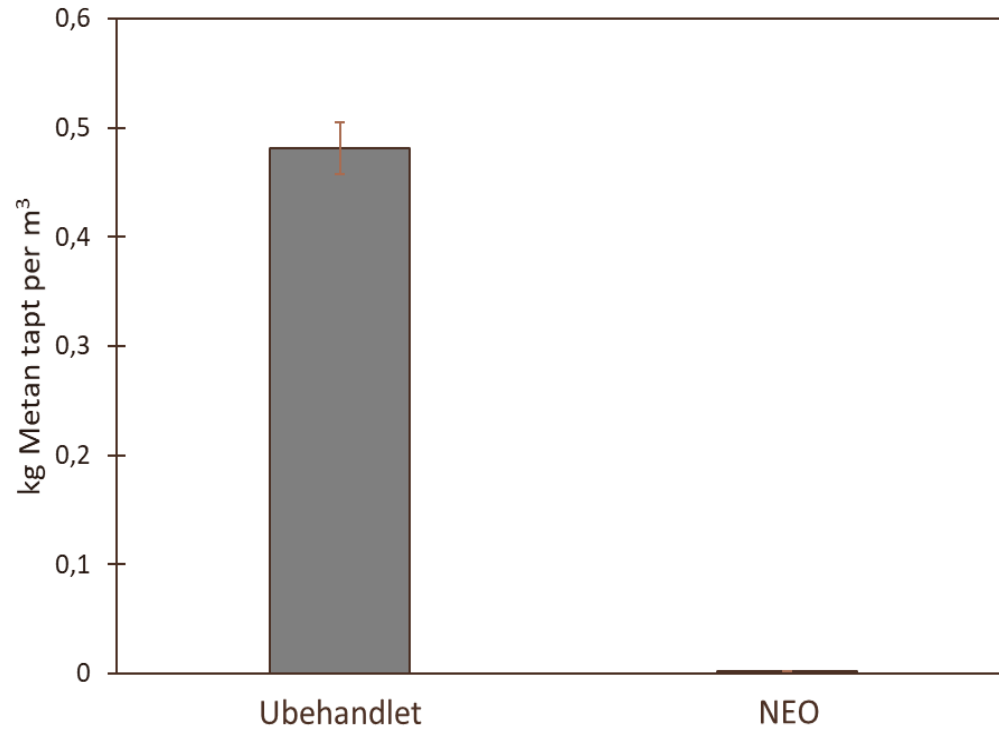
Comment:

- Band spread NEO and untreated dairy slurry applied at matched rates to winter wheat.
- NEO performed as well as Ammonium Nitrate, meaning NEO ammonia loss was effectively zero.

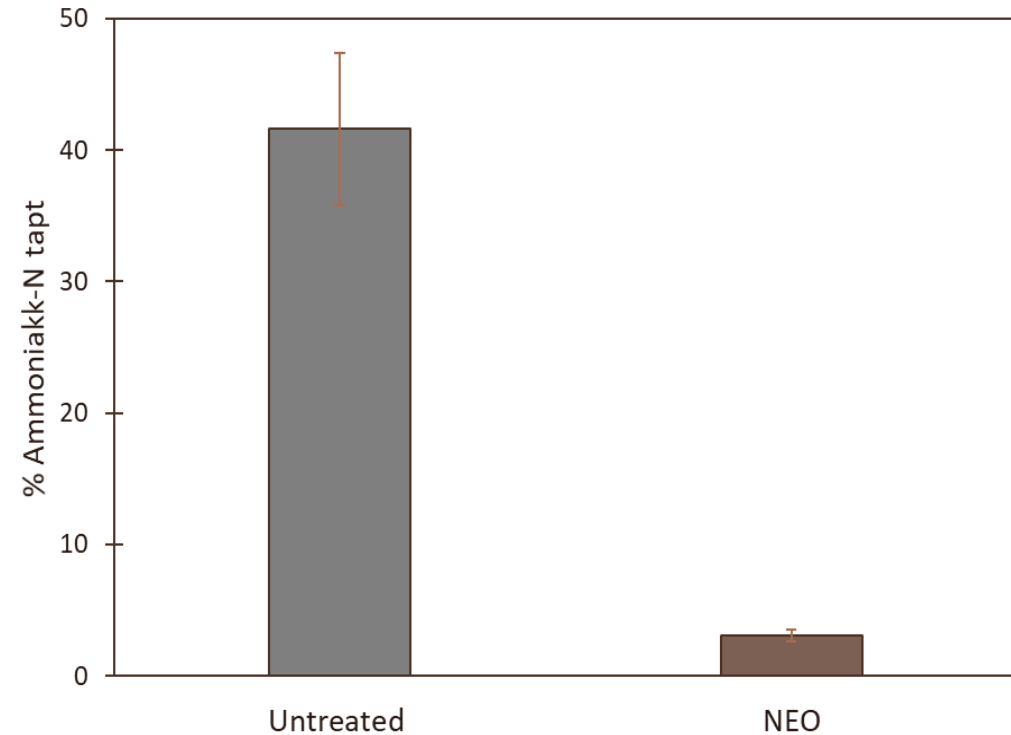


Reducing emissions of methane and ammonia

RISE storage trials 2020

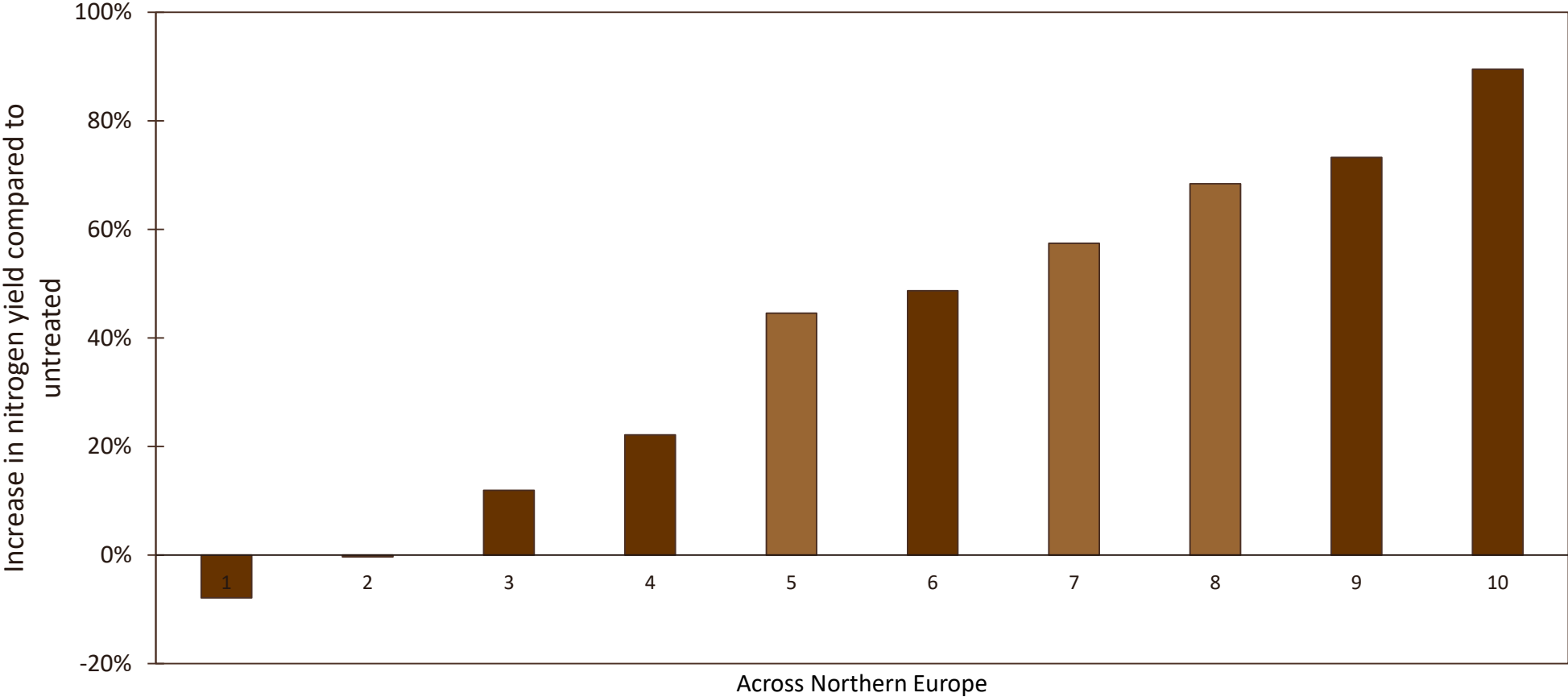


Methane emissions



Ammonia emissions

Yield Effects – 2020 Trial Summary



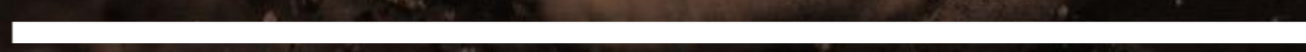
- Application rates matched by volume.
- Application rates matched on total N content.



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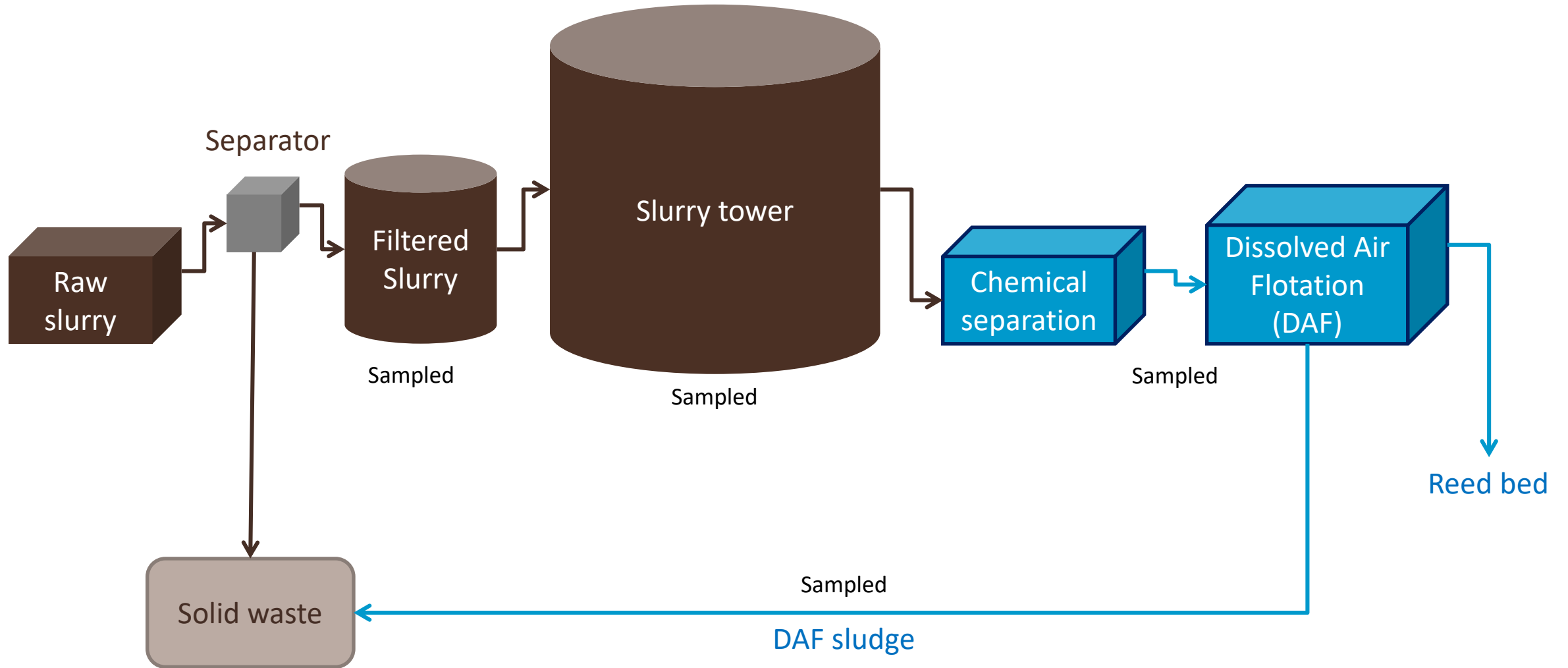
Project progress

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Gelli Aur Farm setup

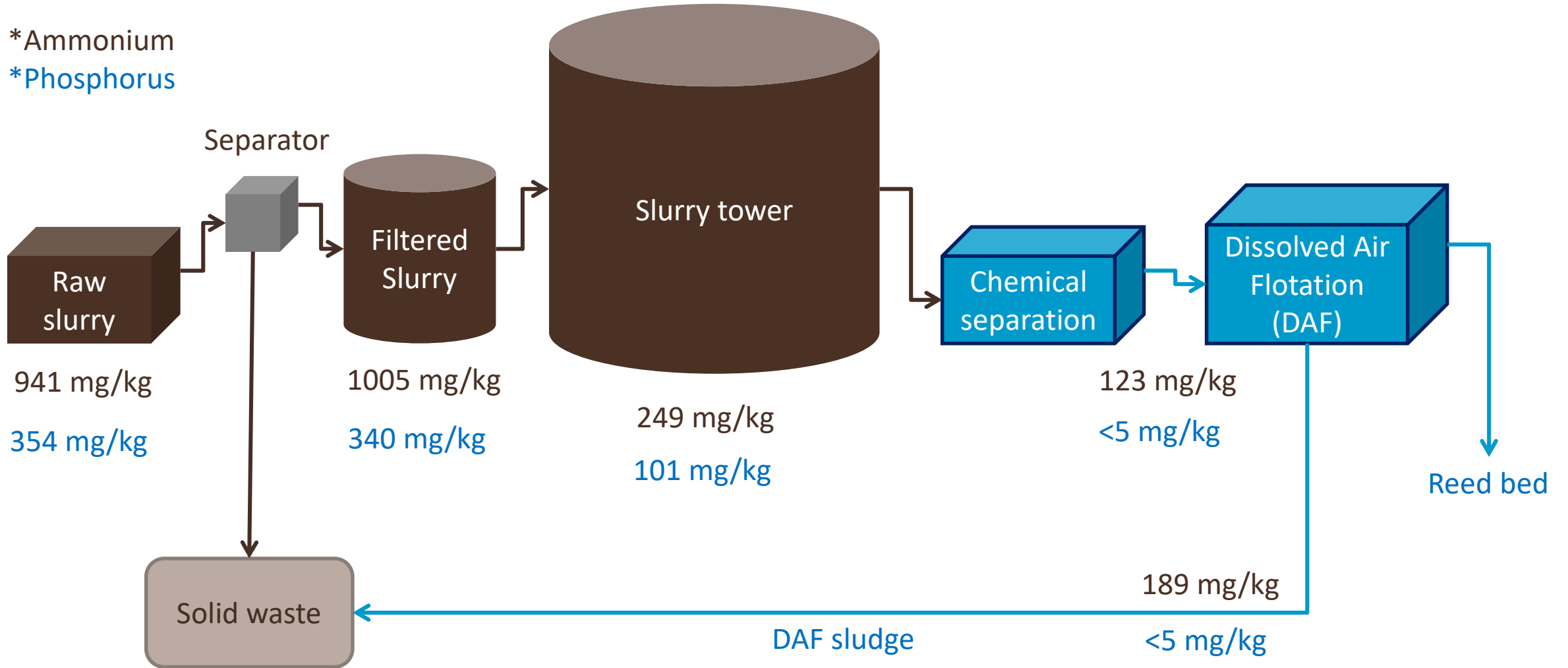


Chemical Analysis

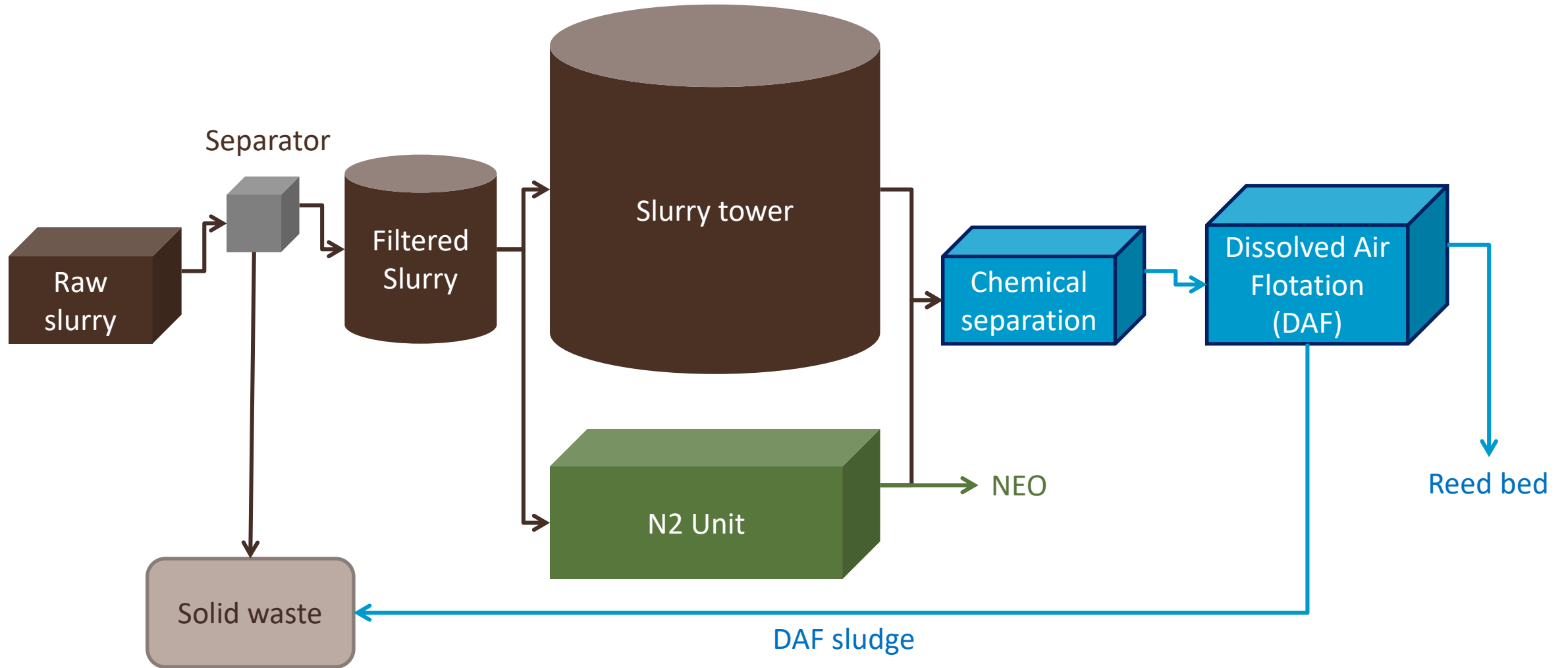
Laboratory Reference		SLUR111978	SLUR111979	SLUR111980	SLUR111982	SLUR111981
Sample Reference		CSG RAW	CSG SEP	CSG TOWER	CSG PRE DAF	CSG DAF SLUDGE
Determinand	Unit	LIQUID WASTE	LIQUID WASTE	LIQUID WASTE	LIQUID WASTE	LIQUID WASTE
Oven Dry Solids	%	5.63	4.21	1.07	0.380	0.370
Total Kjeldahl Nitrogen	% w/w	0.20	0.19	0.04	0.02	0.02
Nitrate Nitrogen	mg/kg	<10	<10	<10	<10	<10
Ammonium Nitrogen	mg/kg	941	1005	249	186	123
Total Phosphorus (P)	mg/kg	354	340	101	<5	<5
Total Potassium (K)	mg/kg	2760	2744	702	629	423
Total Magnesium (Mg)	mg/kg	440	423	103	83.4	61.5
Total Copper (Cu)	mg/kg	1.96	1.85	0.62	<0.2	<0.2
Total Zinc (Zn)	mg/kg	14.4	9.70	3.08	<0.5	<0.5
Total Sulphur (S)	mg/kg	304	278	65.4	20.8	19.6
Total Calcium (Ca)	mg/kg	973	859	312	225	178
Nitrite Nitrogen	mg/kg	<1	<1	<1	<1	<1
Total Sodium (Na)	mg/kg	279	271	105	99.8	266
pH 1:6 [Fresh]		7.52	7.57	7.18	7.34	7.04

Nutrient content flow diagram

*Ammonium
*Phosphorus



Gelli Aur Farm planned implementation



Outcomes and questions

- 4700 m³ separated slurry treatment volume for one mk4.5 plasma unit.
- Ammonium and nitrate preserved through to DAF sludge and solids?
- Ammonia loss prevented in treatment process? Valuable fertiliser N maintained.
- Alternative process ideas:
 - Treat NEO as side stream and divert rest to reed bed.
 - If nitrate preserved after DAF, irrigate this as liquid fertiliser (Netafim).

Next steps

- Plan implementation of plasma unit on site.
- Explore possibility of importing slurry for grass plot trials 2022.
- Engage with partners to determine treatment optimisation within current Gelli Aur setup (chemical interactions, practical setup, trials).



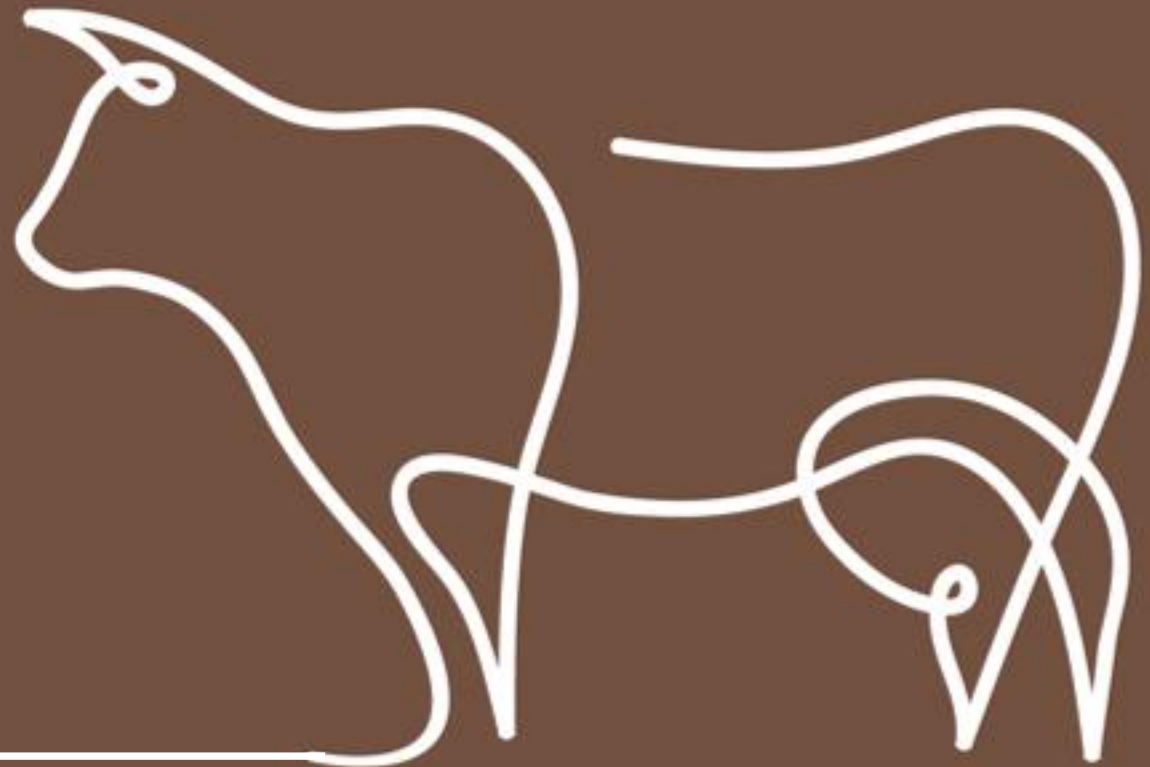
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Thank you for your attention