

Manure spreading: Mitigation, co-benefits and net costs

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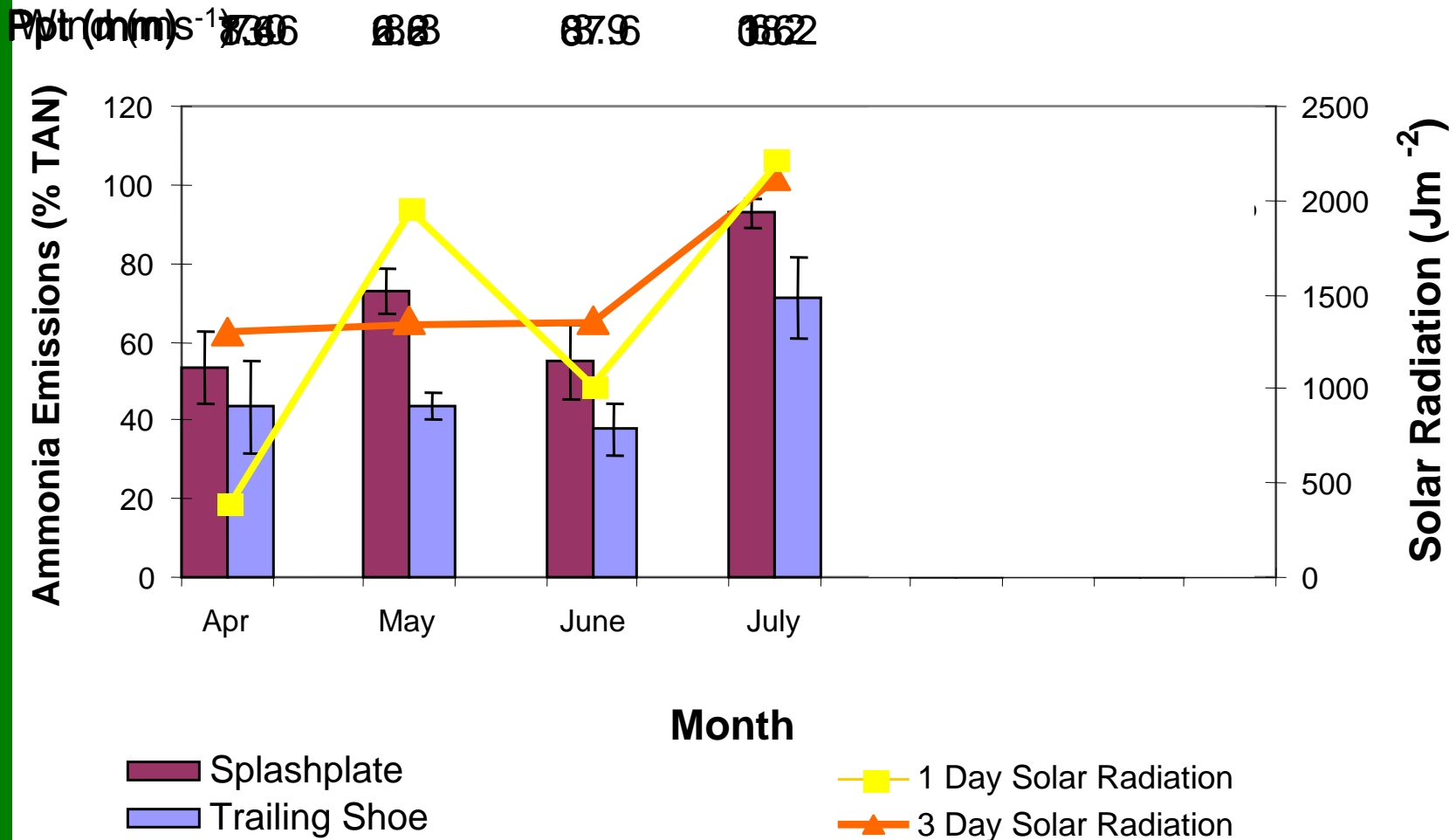
Sources of agricultural ammonia

Agriculture is responsible for 98% of Irelands ammonia emissions - Limit 116kT NH₃

Research : Land-spreading techniques, clover systems, housing



The effect of various climatic conditions on ammonia emissions



TS versus SP: Overall reduction = 28%

Net costs of trailing shoe: NFRV & Fertilizer value vs. adoption costs

- Fertilizer N price = €1.20 / kg N
 - Cost of trailing shoe adoption
 - Assumptions:
 - All slurry applied by contractor
 - Purchase cost differential = €25,000
 - Machine 400 hours per year, spreading 30m³/hr
 - Work-rate equivalent
 - N fertilizer value = only benefit
 - Spreading distribution → P & K FRV = 100% in both cases
 - Grass contamination flexibility & odour reduction not included
- €0.77 / m³ slurry
- More expensive in reality
 - farmer-owned equipment

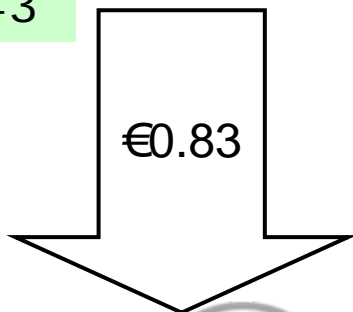
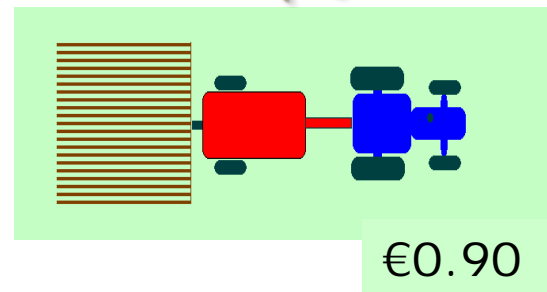
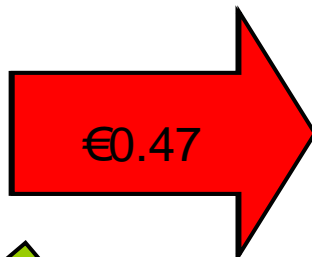
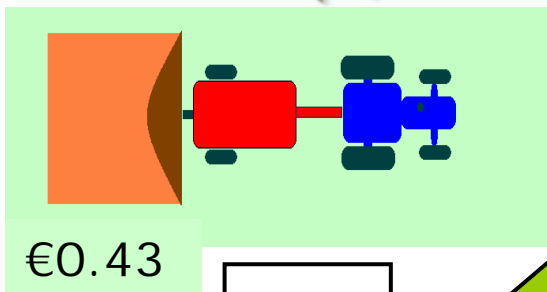
SP → TS

= €0.77 /m³

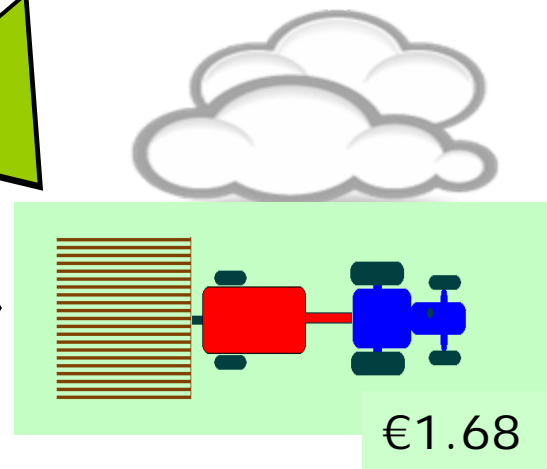
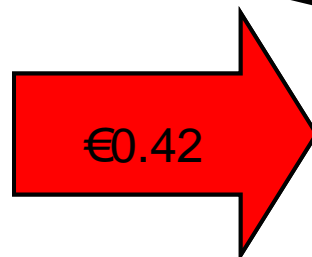
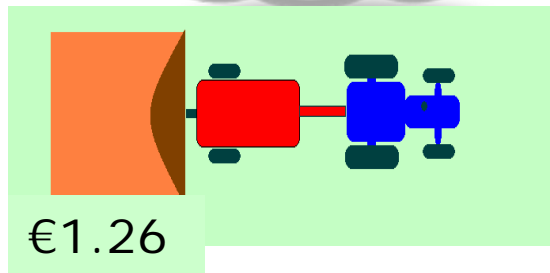
Splashplate

Trailing Shoe

June



April



Irish conclusions

- Consistently lower emissions associated with trailing shoe (average reduction = 28.9%)
- At early spreading dates there was no significant difference between emissions from Splashplate and Trailing shoe

- Ammonia emission reductions appear to transfer to increased FRV
- Economic benefit of FRV increase is marginal
- Spring application is more effective at no extra cost
- Specific to Ireland
- Policy proposal → encourage spring (weather dependant) application
 - TS proliferation will occur naturally
 - Odours
 - Grassland management & flexibility

Comparison of ammonia emissions from conventional slatted sheds to out-wintering pads - ferm tubes and ADMS

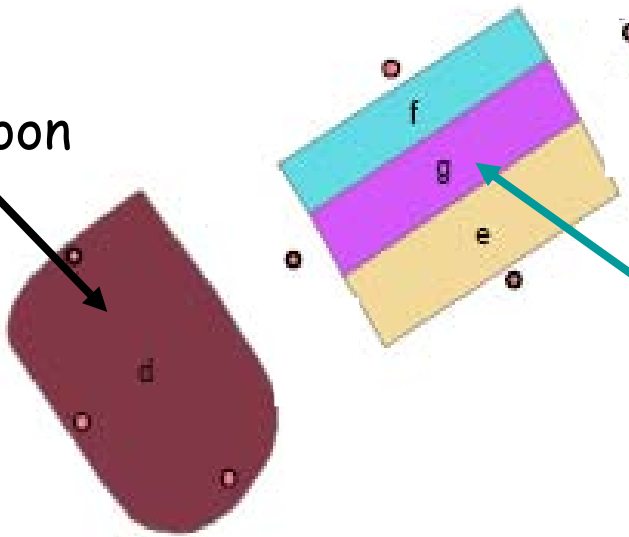


Ferm tube

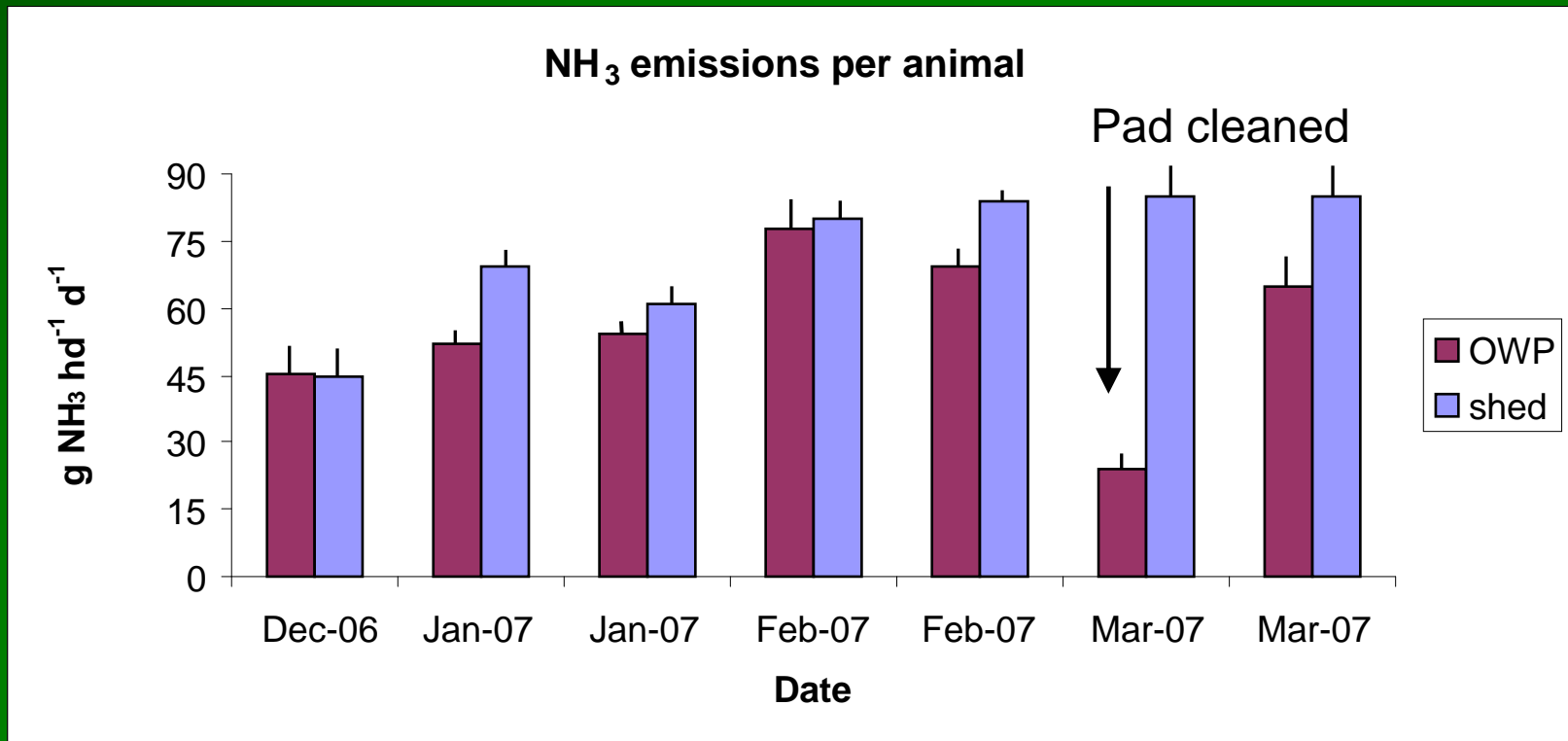


Teagasc Grange Co. Meath

Lagoon



Ammonia emissions from cattle in a slatted shed vs. cattle on an OWP



Average ammonia emission per animal per day
over the winter

