

TFRN October 2010

Sub-group on costs of spreading

General considerations

There is background material, but costs may have changed, as well as techniques

→ values have to be reconsidered

How to do this?

How the national expertise can interact with GAINS modelling (IIASA)?

Moreover, GAINS approach must be clarified for experts; develop understanding between the two modellers communities.

Tentative agenda

- Measures to be covered: slurries / solid manure / mineral fert.
2. What factors to include in costs/benefits and what is basic data to gather/compare?
 3. Comparisons with GAINS; can we explain the differences?
 4. Can we set a framework for further data collection/comparisons?
 5. Applicability considerations
 6. Side-effects: synergies/conflicts with GHG emissions

Measures to be covered

Slurries (pigs, dairy, other cattle....):

- slot inject (grass, arable)
- deep inject (arable)
- trailing shoe (grass, arable)
- trailing hose (grass, arable)
- incorporation (arable) ? <4 h, 24h???

Solid manures (poultry, pigs, dairy, other cattle..)
incorporation

Few discussion on mineral fertilizers

→ **How to classify information in terms of “efficiency” at national level?** (*GAINS lumps measures in low/high efficiency “groups”*)

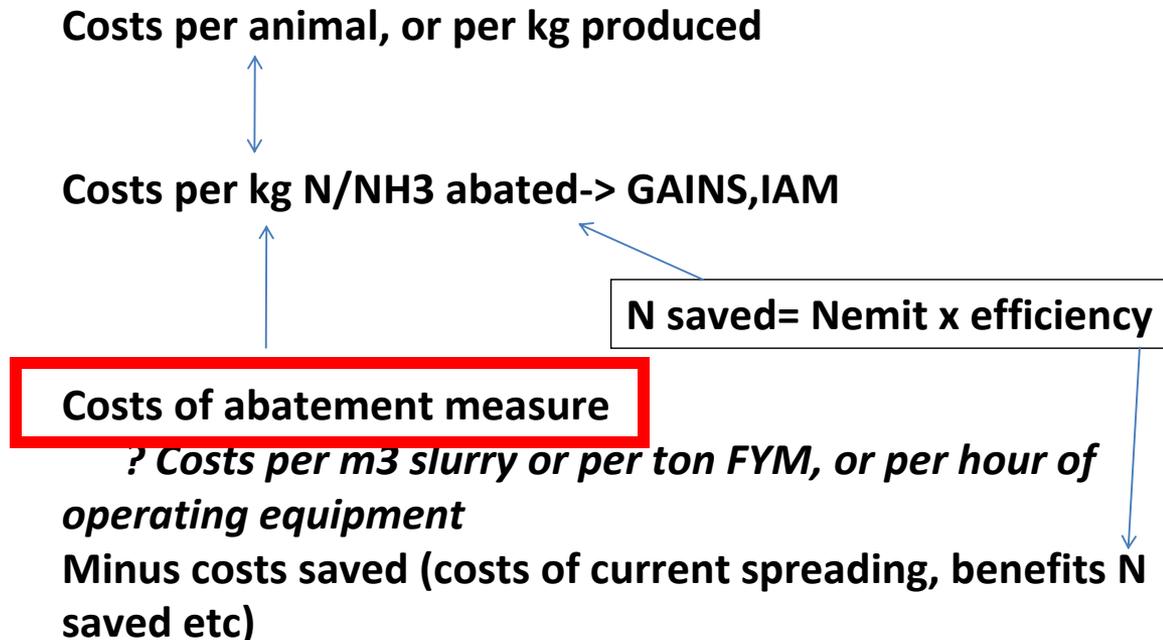
What do we need to estimate/compare ?

How national expert could collaborate for comparing measures and comparing with IIASA estimates?

Costs: different people have different interests

→ different references, different units

→ need to bring these things together



Costs of abatement measures

- discussion on the factors in costing specific techniques

- build a reference spreadsheet with default values and circulate it to the national experts → advice, adaptation

- range of variation between countries
- sensitivity *e.g.* to applied volumes, farm/contractor costs, uncertainty analysis

- need consistency when estimating cost for present and new techniques for calculation of additional costs

- explanation of the simplified approach in GAINS where curves has been matched to available data.

- the spreadsheet could be used to generate new data for reviewing and improving costs

Additional benefits

Costs avoided from conventional spreading (if not taken into account to give cost difference already)

N saved → fertiliser costs avoided: illustration of potential cost savings to be added to the spreadsheet; fraction of N saved can be complex (conversion organic/mineral)

If cost of abatement techniques come down → the savings could lead to negative overall costs

(Odour, Silage taint)

Uniformity of application and consistency

(Side effects GHGs

Side effects NO₃ leaching ? Upper estimates on these?)

Other considerations

- Costs to farmer or country (*e.g.* fuel tax)
- Contractor *vs* farm application; could depend on the farmer's time availability
- Equity issues
- Techniques should be improving and get cheaper
- Farm size: how it can be reflected in GAINS? (spreadsheet can help) now and in the future?
- Applicability data used by GAINS are very different according to countries
- National experts are interested to review applicability and efficiency data, because important for NECs

Other techniques and side-effects

- timing of application
- mineral fertilizer : alternative application techniques
- urease inhibitor / nitrification inhibitor
- integration with GHG
- TFRN needs to follow developments of alternative techniques and related costs

What is to be done? *(are there resources?)*

- Prepare the spreadsheet for national cost calculation of individual techniques
- Bring together data from different countries (by Christmas??) and others (*e.g.* COPA), to compare and feed in to IIASA development **[URGENT]**
- IIASA bring more information on the methodology and assumption + data use on the different countries (*e.g.* different abatement efficiencies).
- Follow new techniques development

3. Comparisons with GAINS etc ; can we explain?
(? UK costs lower than other countries)

? amount used/ amount spread

NB additional costs

? Further clarification of cost calculations in GAINS (e.g.table A9 in IIASA report) for deeper analysis

What needs to be done

3. Comparisons with GAINS etc ; can we explain?

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Unit costs of operation

**Tractor costs: capital-> annual interest (4%?) & depreciation
+ annual maintenance costs (fixed +dependent on total
hours used)**

above x hours used for spreading/total hours used

**+ labour costs/hr X hrs operated (including transport times
and allowing for slower operation when spreading)**

+ fuel costs (? include tax and NB CO2 emissions)

Equipment costs: capital-> annualised costs

+ maintenance costs allowing for hours used

? What else as well as total hours and hours used

**e.g. field size, difficulty of terrain, transport distance/time to
another farm etc; problems of small farms**

4. Can we set a framework for further data collection/ comparisons; e.g. a spread-sheet for cost calculations with key data

What is the same for all countries and what differs

(GAINS labour rates, fertiliser costs etc...)

Example

Cost per ton FYM = cost per hour / (ha per hour x ton per ha)

From Martin Ryan (2002)

poultry layers	15.5 t/ha	at 16 kgN/t
broilers	8.3 t/ha	at 30 kg N/t
pig manure	36 t/ha	at 7 kg N/t
cattle manure	41.5 t/ha	at 6 kg N/t

Similarly re slurry for cost/m³ and cost per hr

cattle slurry	83 m³/ha	at 3 kg N/m³
pig slurry	50 m³/ha	at 5 kg N/m³

But NB spreading time is only part of total time

? Which is more fundamental to compare cost/hr or cost/ton and cost/m³

5. Applicability considerations- farm size etc

**NB costs for farmer higher than contractor costs
(? *Suggestion regulate on equipment instead of farm size*)**

Equity issues re applicability e.g. stony ground etc

Profit margins

Enforcement problems and costs?

What do we need to estimate/compare

Costs per animal, or per kg produced



Costs per kg N/NH3 abated-> GAINS,IAM



$$\text{N saved} = \text{Nemit} \times \text{efficiency}$$



Costs of abatement measure

? Costs per m3 slurry or per ton FYM, or per hour of operating equipment

Minus costs saved (costs of current spreading, benefits N saved etc)



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