Ammonia emissions in Ireland

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www.agriculture.gov.ie

Agencies working on ammonia

- The Department of the Environment (the lead agency responsible for transboundary gases)
- The Environment Protection Agency (EPA)
- The Department of Agriculture, Food and the Marine
- Teagasc (Agriculture reseach & advisory body)
- Other state bodies provide data and technical knowledge on policy

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Irelands ammonia emissions

- Total ammonia emissions in 2010: 106.2 kt

- Agriculture accounts for virtually all (>98%) of Irish emissions

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Breakdown of Agricultural Ammonia emissions by Farming sector in 2010

Sector	% of Ag emissions
Cattle	74.0%
Pigs	7.5%
Sheep & goats	2.3%
Poultry	2.1%
Horses & mules	1.7%
Fertilizer application	12.3%

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Irelands Agricultural ammonia emissions by activity in 2010

Activity	% of Ag emissions
Animal Housing	32.0%
Manure storage	14.7%
Manure Landspreading	23.4%
Yard emission	5.9%
Manure deposited at pasture	11.7%
Fertiliser Nitrogen	12.3%

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Animal housing in Ireland

- Dairy cows are outdoors (day & night) approx 66% of the time with the remaining time spent indoors on cubicle housing.

- Beef animals are typically outdoors (day & night) >60% of the time with the remaining time spent indoors on slatted tanks or loose housing.

- Pig and poultry systems are mainly intensive but about one third of layers are free range

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Manure storage in Ireland

- The predominant manure system is slurry based, with the remainder based on farmyard manure.

- Cattle slurry is stored mainly under slatted tanks, with some in open tanks. Land application is spread throughout the year with a tendency towards spring spreading.

- Farmyard manure is stored either in designated areas or under the animals. Landspreading normally takes place in the autumn to reduce grass contamination.

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Manure spreading in Ireland

Slurry is spread using:

- Mainly low trajectory splashplate
- Some spread with TS and BS
  - Scheme to grant aid low emissions equipment (2007)
  - No survey so far to determine level of use
  - Likely to be a small %, as aid was restricted to farmers

Farmyard manure is spread by:

- The side discharge (rotary type) is the most common method, used by 57 percent of all farmers
- The rear discharge is the next most common method used on 27 percent of farms.

- Contractors spread all the slurry and farmyard manure on 36% and 30% of all farms respectively.

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Ammonia emissions from grazing in Ireland

Irish cattle spend the majority of their time outdoors grazing hence the ammonia emissions from grazing are significant.

	days housed	days grazing
Dairy cows	117	248
Suckler (beef) cows	141	224
Cattle 1-2 yrs	158	207

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Ammonia emissions from fertiliser in Ireland

- Urea accounts for 16% of all synthetic fertilisers
Mainly spread in Spring
  - long standing advice from Teagasc
  to avoid losses to atmosphere.

- The remainder of N fertiliser is
  - CAN (Calcium Ammonium Nitrate)
  - Or compounds based on CAN

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Irelands ammonia emission targets

- Ireland's national emission ceiling for NH3 under the NEC Directive is 116 kilotonnes (kt), to be achieved by 2010.

- Ammonia emissions in 2010 was calculated at 106.2 kt.

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Ammonia mitigation measures

- Slurry spreading (traditionally)
  - 35% in spring. (reduction of 22% compared to summer)
  - 44% in summer (high level of emissions)
  - 16% in autumn (reduction of 22% compared to summer)
  - 6% in winter (reduction of 22% compared to summer)
- Trend towards spring spreading (new pattern)
  - 52% in spring.
  - 36% in summer (high level of emissions)
  - 12% in autumn
  - 0% in winter
- Crusting in outside manure stores
  - a small proportion are covered
- Spring spreading of urea

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Future ammonia mitigation measures

- Increase proportion of slurry spread in spring
  - maximum ~60% considered possible
  - higher level difficult due to
    - field conditions
    - need to avoid grass contamination

- Increased use of trailing shoe or bandspreading
  - currently not cost effective
    - Teagasc estimate costs of >€2 per kg ammonia (Including N savings)

- Housing modifications
  - possibly for new housing only

- Urea restriction?
  - current emission factor is 13%
  - would probably require a very strong restriction

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Agricultural ammonia mitigation challenges

- In Ireland, most cost effective mitigation measures already in place. This is reflected in the current inventory.

- Emissions projected to increase due to increase milk output
  - current projection for 2020 ~ 116 Kt after mitigation

- Large proportion of total emissions from cattle housing
  - most cattle housed on slats or straw bedding
  - effective mitigation measures lacking
    - Grooved floors need to be tested for dairy cows

- No additional controls relative to farm practices in 2005 available for emissions from grazing.
  - but increased time grazing may offer some potential
  - require improved understanding of potential for beef cattle

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Ammonia research programme

- Some research in early 1980s
  - Low emissions spreading
  - Acidification of slurry
- Ammonia research programme since 2006
  - Focussed mainly on low application spreading
  - Expanded now to include
    - Measurements from storage and housing
    - Urease inhibitors
- Focus is to develop cost effective mitigation practices
  - Improve N recovery
  - Link with nitrous oxide
    - Urea use a mitigation strategy
    - Trade –off with ammonia?

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Thank you

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