



Document title	Revision of HELCOM Recommendation 24/3
Code	7-1
Category	DEC
Agenda Item	7 - Reduction of ammonia emissions from agriculture - Update of the HELCOM Recommendation 24/3
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Submitted by	Secretariat
Reference	

Background

According to the EMEP assessment of emissions of nitrogen in the region and its deposition on the Baltic Sea water area, proportion of nitrogen emissions from agriculture has increased, and the Agri group acknowledged in AGRI 5-2017 that some countries are at risk to exceed national ammonia emission ceilings of the NEC directive. The group agreed that the terminology and definitions used in the HELCOM Recommendation 24/3 “Measures aimed at the reduction of emissions and discharges from agriculture”, adopted in 2003, are unclear and do not correspond to the current state of knowledge and legal requirements. The Meeting agreed that the Recommendation 24/3 is outdated and requires revision.

The Agri group decided in AGRI 6-2018 Meeting that an overview of the ongoing activities to mitigate ammonia emissions in the countries will be made as a first step of the revision. AGRI 8-2019 Meeting took note of the overview of measures to mitigate ammonia emissions and in general supported the revision of the HELCOM Recommendation 24/3 based on the overview. The overview was circulated after AGRI 8-2019 for additional comments together with an invitation to the Contracting Parties to take a lead on the revision of the Recommendation. No country has offered to lead the revision.

HELCOM Heads of Delegation supported in HOD 57-2019 the revision of HELCOM Recommendation 24/3 on measures aimed at the reduction of emissions and discharges from agriculture.

AGRI 10-2020 agreed to postpone the discussion on the revision of the Recommendation to AGRI 11-2021 and requested the Secretariat to, based on the overview of the ongoing activities to mitigate ammonia emissions in the countries already compiled for AGRI 8-2019, make an initial document on possible measures to reduce ammonia emissions which can be considered for the update of the Recommendation.

This document includes information on potential measures to mitigate ammonia emissions. The overview of the ongoing activities to mitigate ammonia emissions in the countries is contained in attachment 1 and the currently valid HELCOM Recommendation 24/3 on measures aimed at the reduction of emissions and discharges from agriculture is included in attachment 2.

Action requested

The Meeting is invited to take note of the document on possible measures to reduce ammonia emissions and agree on a scope and timetable for the revision of the Recommendation 24/3.

The Contracting Parties are invited to consider taking a leadership of the revision.

Possible measures to reduce ammonia emissions

The overview of the ongoing activities to mitigate ammonia emissions in the countries (attachment 1) presents measures to reduce ammonia emissions. The table contained in this document focuses on the effectiveness of such measures in mitigating ammonia emissions to provide further background for the revision of HELCOM Recommendation 24/3. It should be noted that the list of measures is not exhaustive but provides examples of potential measures and their effectiveness.

Measure	Effectiveness in reducing ammonia emissions
<i>N management taking into account the whole N cycle</i>	
N fertilization plan and N balance	On mixed livestock farms, between 10% and 40% of the N surplus is related to NH ₃ emissions
<i>Livestock feeding strategies</i>	
Low-protein animal feeding	Combined NH ₃ emissions for all farm sources decrease roughly by 10% when mean protein content decreases by 10 grams (g) per kg (1%) in the diet.
<i>Animal housing techniques</i>	
Reducing manure surfaces such as soiled floors in pig housing	25%
Partly slatted floors in pig housing	15-25%
Keeping the litter dry in broiler housing	40-60%
Treatment of exhaust air by acid scrubbers or biotrickling filters	70-90%
Acidifying the manure	60%
Cooling the manure	45%
<i>Manure storage</i>	
Covering the manure storage: <ul style="list-style-type: none"> - Tight lid - Plastic cover - Floating cover 	>80% >60% >40% <i>Compared to uncovered slurry store without crust and uncovered solid manure heap</i>
Replacement of lagoons by tanks/silos	30-60%
<i>Fertilizer/manure application techniques</i>	
Low-emission manure spreading techniques: <ul style="list-style-type: none"> - trailing shoe - band application - injection/shallow injection - direct incorporation after broadcast spreading (solid manure or slurry) 	>30%* >30%* >60%* >30%*

Measure	Effectiveness in reducing ammonia emissions
- acidification	15-80% <i>* Compared to broadcast spreading</i>
Replacing urea-based fertilisers by ammonium nitrate-based fertilisers	90%
Incorporation of urea-based fertilizers	50–80%
Use of urease inhibitors in solid urea fertilizer	70% for solid urea, 40% for liquid urea ammonium nitrate
<i>Other measures related to agricultural N</i>	
Grazing	Urine excreted by grazing animals often infiltrates into the soil before substantial NH ₃ emissions can occur. Therefore, NH ₃ emissions per animal are less for grazing animals than for those housed where the excreta is collected, stored and applied to land. Effectiveness in reducing ammonia emissions depends on the baseline.

Source for acidification in spreading: <http://balticslurry.eu/wp-content/uploads/2018/12/A-5.2-report.-Main-environmental-considerations-of-slurry-acidification.pdf>

Sources for the other measures: "[Guidance document on preventing and abating ammonia emissions from agricultural sources](#)" by Economic Commission for Europe, 2014.

Attachment 1

Overview of technical and policy measures to mitigate ammonia emissions

As agreed by the Agri group in AGRI 6-2018, the Secretariat circulated a questionnaire on measures to mitigate ammonia emissions. The listed measures were based on "[Guidance document on preventing and abating ammonia emissions from agricultural sources](#)" by Economic Commission for Europe, 2014. Some of the measures are included also in the HELCOM palette of agri-environmental measures and for those measures the questionnaire was pre-filled. The listed measures are included in Annex 1. of this document. It should be noted that the questionnaire did not include all possible measures, e.g. slurry acidification in storage and application could be a measure to mitigate ammonia emissions

The countries were invited to answer whether the measures were implemented, obligatory and subsidized. They were also asked to evaluate how widely the measures were implemented as well as how effective the measures were perceived to be to mitigate ammonia emissions. Answers to the questionnaire were received from Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden.

Implementation of measures

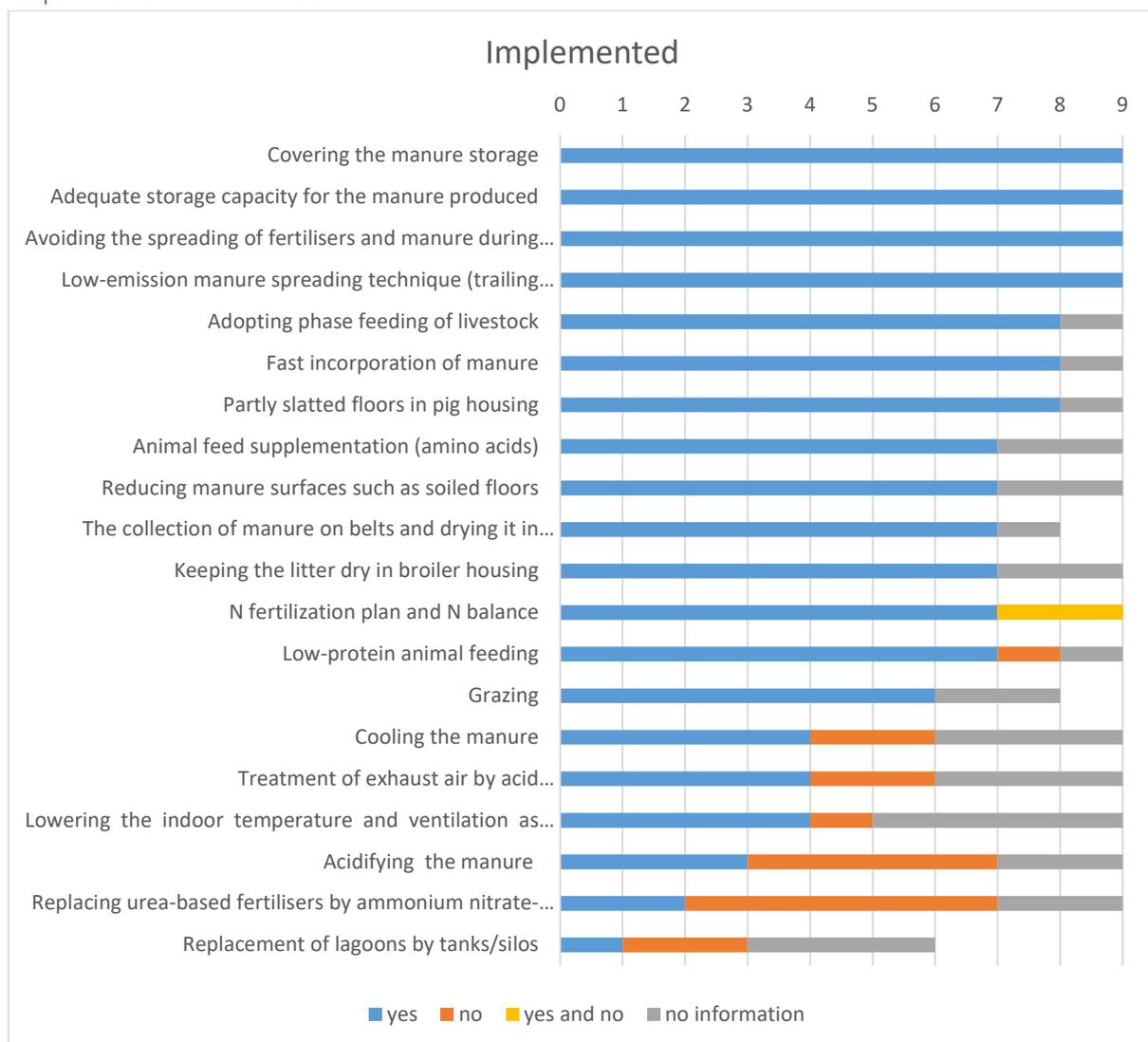


Figure 1. Implementation status of measures to mitigate ammonia emissions

According to the reporting, there is a variety of ammonia emission mitigation measures in use (Figure 1.). However, very little information was reported on how widely the measures are used. For some countries this information was missing almost completely.

The measures that are obligatory in all countries are adequate storage capacity for the manure produced and avoiding the spreading of fertilizers and manure during high-risk periods. N fertilization plan was obligatory in all countries but not N balance. Covering the manure storage at least for slurry storages and at least in parts of the country was obligatory in all but one country.

In general, many of the measures listed are not obligatory (Figure 2). There were however different interpretations for what is meant with “obligatory”. Some countries noted that many of the measures will be considered as best available technology (BAT) for installations covered by the EU Industrial Emissions Directive (IED) and will thus be obligatory for IED installations. These countries reported the BAT measures as obligatory.

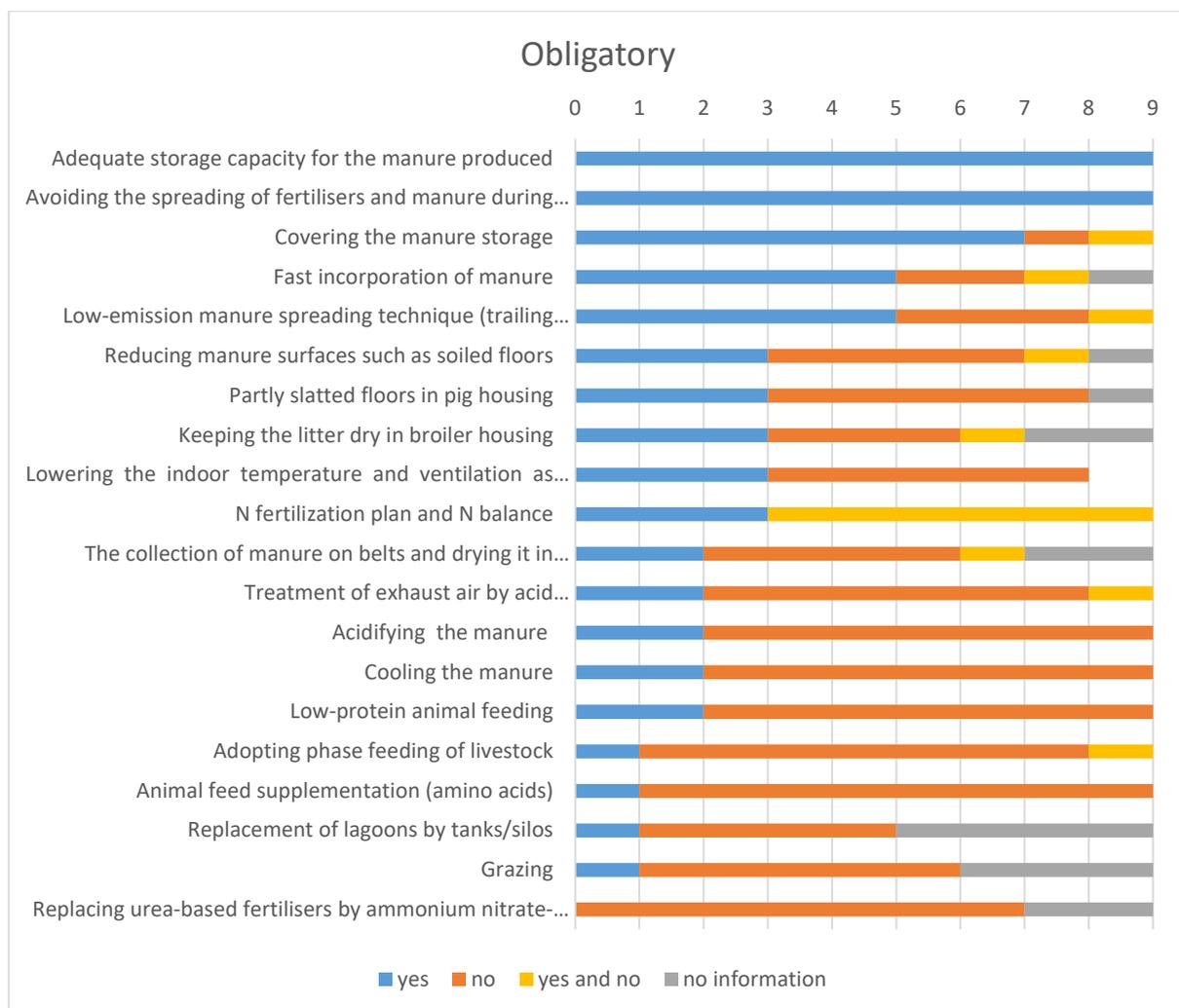


Figure 2. Obligatory measures



Figure 3. Subsidised measures

Building adequate manure storage capacity is subsidized in seven out of the nine countries. Also, covering the manure storage and low-emission spreading techniques are subsidized in many countries.

Effect of measures

The countries were asked to rate the measures with the scale of “very effective – recognizable effect – low effect – not relevant” according to how effective they were considered for their country (Figure 4.). Many of the measures listed are not targeted only to reducing ammonia emissions and there was a very large variation on evaluating the effectiveness of measures to mitigate ammonia emissions in the countries. The use of low-emissions manure spreading techniques received most mentions as a very effective measure. One factor to explain the large variation in evaluation of the effectiveness of measures could be the fact that some countries evaluated the measures based on their effect on farm scale while others considered if the measure is effective on a country scale taking into account how widely it is actually used.

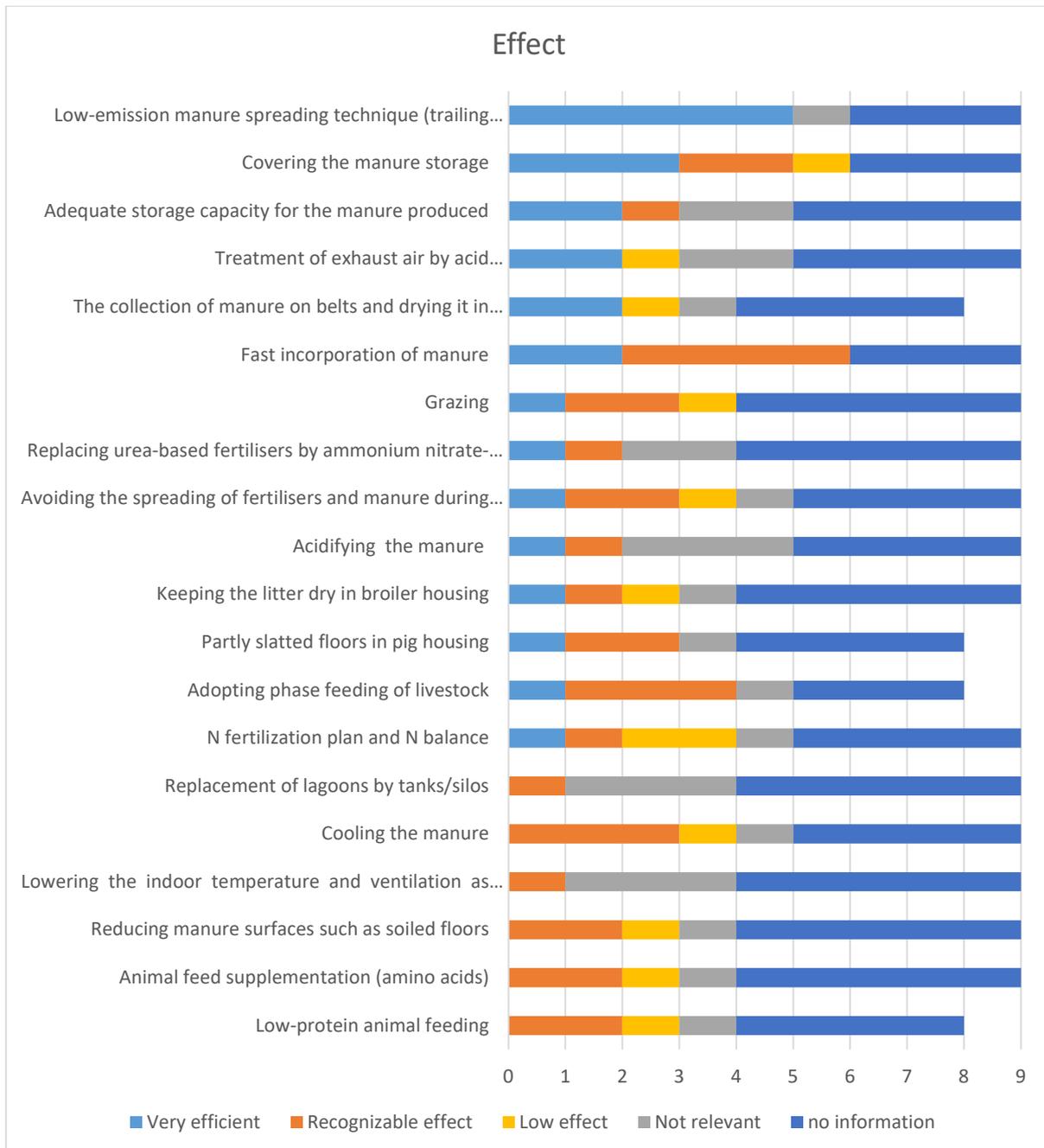


Figure 4. Evaluation of the effectiveness of the listed measures for countries

Additional measures and national programmes

The countries were invited to list also other measures that are used to mitigate ammonia emissions. The following three additional measures were mentioned:

- Limit values for categorized ammonia-sensitive nature areas for manure application
- Incorporation of synthetic fertilizer into the soil by cultivation
- Incorporation of urea-based fertilizers
- Obligatory use of urease inhibitors in solid urea fertilizer by 2020 onward

All countries reported that they have some national initiatives targeting ammonia emissions e.g. national action plan or inclusion of ammonia mitigation measures to BAT handbook.

Annex 1. Measures to mitigate ammonia emissions

Category	Measure
N management taking into account the whole N cycle	N fertilization plan and N balance
Livestock feeding strategies	Low-protein animal feeding
	Adopting phase feeding of livestock
	Animal feed supplementation (amino acids)
Animal housing techniques	Reducing manure surfaces such as soiled floors
	Partly slatted floors in pig housing
	The collection of manure on belts and drying it in housing of laying hens
	Keeping the litter dry in broiler housing
	Treatment of exhaust air by acid scrubbers or biotrickling filters
	Lowering the indoor temperature and ventilation as animal welfare and/or production allow
	Acidifying the manure
	Cooling the manure
Manure storage	Covering the manure storage
	Adequate storage capacity for the manure produced
	Replacement of lagoons by tanks/silos
Fertilizer/manure application techniques	Avoiding the spreading of fertilisers and manure during high-risk periods
	Low-emission manure spreading technique (trailing hose, trailing shoe or injection)
	Replacing urea-based fertilisers by ammonium nitrate-based fertilisers
	Fast incorporation of manure
Other measures related to agricultural N	Grazing

Attachment 2

HELCOM RECOMMENDATION 24/3 *)

Adopted 25 June 2003

having regard to Article 20, Paragraph 1 b)
of the Helsinki Convention

MEASURES AIMED AT THE REDUCTION OF EMISSIONS AND DISCHARGES FROM AGRICULTURE

THE COMMISSION,

RECALLING of Article 6 of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992 (Helsinki Convention), in which the Contracting Parties undertake to take all appropriate measures to control and minimize land-based pollution of the marine environment of the Baltic Sea Area,

HAVING REGARD also to Article 3 of the Helsinki Convention, in which the Contracting Parties undertake individually or jointly to take all appropriate legislative, administrative or other relevant measures to prevent and abate pollution,

RECALLING FURTHER the Ministerial Declaration of 1988, the Baltic Sea Declaration of 1990 and the Baltic Sea Environmental Declaration of 1992, calling, inter alia, for a substantive reduction of the inputs caused by diffuse sources,

RECALLING FURTHER that this recommendation supplements Annex III of the Helsinki Convention concerning regulations on prevention of pollution from agriculture,

RECOGNIZING the fact that a substantial part of the eutrophication problems observed in the Baltic Sea Area are caused by nutrient inputs from diffuse sources,

CONSCIOUS that agricultural activities within the Baltic Sea catchment are responsible, inter alia, for pollution of water and air by nitrogen, phosphorus and plant protection products, causing negative effects on the Baltic Sea ecosystem including eutrophication, oxygen depletion and reduced biological diversity,

AIMING at a reduction of this pollution,

RECOMMENDS to the Governments of the Contracting Parties to the Helsinki Convention that:

*) Superseding, together with requirements in Annex III of the Convention, HELCOM Recommendations 7/2, 13/7 (except Annex), 13/9, 13/10, 13/11 and 14/4

1) Ammonia volatilisation from animal housing

- a. in order to reduce ammonia emissions from animal husbandry,
 - a surplus of nitrogen in the manure should be avoided by adjusting the composition of the diet to the requirements of the individual animal;
 - in poultry production emissions should be brought down by reducing the moisture content of the manure or by removal of manure to storage outside the housing system as soon as possible;
- b. programmes including strategies and measures for reducing ammonia volatilization from animal husbandry are developed;

2) Manure handling

- c. storages should be constructed to safeguard against unintentional spillages;
 - solid manure should be stored in dung yards with watertight floor and side walls;
 - manure effluents should be drained off through outlet pipes and collected in liquid manure storages;
- d. containers for the storage of liquid manure and farm waste should be made of strong material impermeable to moisture and to resist the impact of manure handling operations;
- e. animal manure should be used in such a way that as high utilization efficiency as possible is promoted;
- f. co-operation between farmers in the use of manure has to be encouraged;
- g. studies on nutrient contents of animal manures and the related conversion factors to animal units should be promoted;

3) Agricultural waste water handling

- h. farm animal houses and similar enclosures for animals is designed in such a way that ground and surface water will not be polluted;
- i. programmes including strategies and measures for reducing discharges from agriculture household wastewater and cleaning of equipment are developed;

4) Reduction of soil erosion

- j. conservation tillage techniques to reduce soil erosion should be promoted,

RECOMMENDS FURTHER that the actions taken by the Contracting Parties should be reported to the Commission in 2006 and thereafter every three years.