

# Country Report

for Finland

## Implementation and status of priority measures

Baltic Compass WP3

### Cover Note

In order to keep the focus of the data collection narrow, we are not interested in collecting information on EU regulatory requirements that are common to the BSR. Instead please focus on those requirements that are specifically national or local in design. For example, do not cover Nitrates Directive requirements that are common BSR (eg N-limit) but DO cover the way that action plans have been devised, what they include and how they operate.

To avoid repetition, if the information you are supplying in a section is common to several measure then please provide a description on one form only and then make links back to this form.

## 1. Promoting long-term grass cultivation of arable land

**Cultivation of grass or legume/grass crops** on arable land with high/low inputs of nitrogen (N) and phosphorus (P) and high/low outputs of feed, food or other services can reduce nitrogen and phosphorus leaching and surface run-off losses as well as soil erosion, compared with annual crops on arable land.

Crop rotations including **permanent grass or legume/grass crops** can decrease N leaching with 50%, compared with crop rotations dominated by annual crops.

*Describe this measure in your country if different* : Area of grassland production in Finland is 659 300 ha (2010) (OSF). The area of grasslands is increasing in whole the country. The area was 620 200 ha in 2005. In Finnish agri-environmental scheme there are 3 measures that aim to increase or maintain low-input grassland production:

1) "Extensive grassland production". Farms may use nitrogen for the fertilisation of grassland up to the maximum of 75% of the volumes permitted under the basic measure "Fertilisation of arable crops" (goal 200 000 ha; 2009: 28 000 ha).

Aim: As soil management practice it contributes to the reduction of transport of different compounds, including phosphorus, into waters (water management; EC 2005):

Subsidy: 55 €/ha (A and B), Additional measure

Note: Minimum 0.4 livestock units per eligible hectare of arable land or below 25 livestock units and a half of the fields grassland to get the subsidy

2) "Long-term grass cultivation of peaty arable land". The measure is available for parcels with peat or mull soil as the soil type. The soil type is defined by the valid soil fertility analyses. Herbaceous plants and grasses (incl. reed canary grass) must be cultivated in the contract area for the entire contract period. The vegetation cannot be renewed by tilling during the contract period, but the renewal of the grass without tilling through direct sowing is permitted (goal 30 000 ha/y 2009: 2600 ha).

Aim: As reduced use of nitrogen fertilisers the following operations so as to contribute to the reduction of nitrous oxide (N<sub>2</sub>O) emissions (climate change adaptation and mitigation; EC 2005)

Subsidy: 144 €/ha (arable crop farms) and 68 €/ha (livestock farms, Special measure)

3) "Nature management fields". Perennial grass areas functioning as nature management fields must be established no later than 30 June by sowing with perennial grass seed. The seed mixture may contain no more than 20% of seed of nitrogen fixing plants. Perennial grass areas may also be established in the preceding year by sowing with nurse cereal or other crop or into stubble or they may have been established earlier. Grasses must be kept on the same parcel for at least two growing seasons. Mowing is not compulsory, but the growth of bushes and trees must be prevented in the area, which is why the area must be mown at least every three years. If the crop is mown, the living conditions of wild species must be taken into account in the timing and implementation of the mowing so that the nesting of birds and young of mammals are not endangered. Mowing may not be done by rotating from the outer edge of the parcel to the middle. Mowing waste may be

collected and utilised 133 economically. Grazing is allowed, provided that the arable land surface stays covered with grass round the year. (goal ?, 2009: 130 000 ha, 2011 151 200 ha) .

Aim: No application of fertilisers and pesticides on high nature value agricultural land through the following operations so as to contribute to the conservation of species-rich vegetation types, protection and maintenance of grasslands (biodiversity; EC 2005)

Subsidy: perennial grass areas 170 €/ha and - biodiversity fields 300 €/ha, Payments to different crop groups for compliance with the basic measures

Note: Paid for the maximum of 15% of the total area eligible for the agri-environmental payment of the farm

Tike: Peltoalan käyttö OSF. Utilized arricultural area.

Article 16a of Council Regulation (EC) No 1698/2005

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **200 000 ha/y**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **3**  
 "0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **4**  
 "0"=Impossible; "10"=Very good

Comments: 28 426 ha implemented in the Agri-Environmental Programme for "Extensive grassland production" and 2800 ha in "Long-term grassland cultivation of peaty arable soils" and 130 000 ha for "Nature Management fields" according to the statistics of the Ministry of Agriculture and Forestry for the year 2009."

Most of the additional measures are set for 5 years at the beginning of the new Programme period. Thus the main change will happen, when new Programme starts.

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **Yes** If “Yes”; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**The Finnish rural development programme 2007-2013; link:

[http://www.mmm.fi/attachments/maaseutu/maaseudunkehittamishjelmat/ohjelmatkaudelle20072013/5paOlhQwF/Rural\\_Development\\_for\\_Mainland\\_Finland\\_070610\\_EN.pdf](http://www.mmm.fi/attachments/maaseutu/maaseudunkehittamishjelmat/ohjelmatkaudelle20072013/5paOlhQwF/Rural_Development_for_Mainland_Finland_070610_EN.pdf)

**Comments:** Support for nature management fields is not paid for arable areas under conventional grass, hay or energy crops or permanent pasture. It is not paid for areas covered by special measures other than organic production and organic livestock production.

## 2. Vegetative cover in autumn and winter of arable land

**Annual winter crops**, such as winter wheat or winter rape, can provide a vegetative cover that actively takes up available nitrogen and phosphorus from the soil more efficient than annual spring crops at a seasonal period with high precipitation and cool climate.

**Catch crops** can be under-sown in the main crop, simultaneously with, or just after the sowing of this crop. When the main crop is harvested, the catch crop has an established root system ready to take up nitrogen from the soil during late summer and autumn. Nitrogen that otherwise could have been leached is then taken up and incorporated into plant material. The catch crop is then ploughed-in as late as possible in autumn or in spring. Perennial ryegrass (*Lolium perenne* L.) as a catch crop is an effective measure to reduce N leaching in spring cereal crop production. The use of catch crops has reduced N leaching by 50% or more in several studies. The effect of the catch crop on N leaching depends on precipitation and drainage conditions, available N amounts in soil and how successful the establishment of the catch crop was.

**Describe this measure in your country if different :** In Finnish agri-environmental scheme, there are 3 measures that aim to increase plant cover during the winter period:

1a) Plant cover in winter. At least 30% of the farm's total area of parcels eligible for agri-environment payments located in support areas A and B must be maintained under vegetation or stubble outside the growing season (goal 110 000 ha/y, 2009: 241 000 ha/y). This is not possible measure for cattle farms.

Subsidy: 30 €/ha, Additional measure

1b) Plant cover in winter and reduced tilling. Outside the growing season, farmers must maintain at least 30% of the farm's total area of parcels eligible for agri-environment payments under vegetation or stubble or subject to reduced tilling in an acceptable manner. (goal 300 000 ha/yr, 2009 458 000 ha. This is not possible measure for cattle farms. Possible in support area C as well and for growing of catch plants and second-layer crops.

Reduced autumn stubble tilling on cereal, oilseed crop and seed spice parcels fulfils the condition if tilling is carried out with a cultivator, disc harrow, spring-tooth harrow, rotary spade harrow or a mini-plough in a single run.

Subsidy: 11 €/ha, Additional measure

2) Intensified plant cover in winter. At least 50% of the farm's total area of parcels that located support areas A and B eligible for agri-environment payments must be maintained under vegetation or stubble outside the growing season. Perennial cultivated grassland, reed canary grass, nature management fields, perennial horticultural crops and winter cereals fulfill this and above condition (goal 400 000 ha/y; 2009: 440 500 ha/y). This is possible for cattle farms.

Subsidy: 45 €/ha, Additional measure

Approved crops for arable land to be regarded as plant-covered are; 1. perennial cultivated grasslands and reed canary grass, 2. winter cereals, 3. flax or hemp harvested in spring 4. the stubble of cereals, seed spices and flax grown for fibre;, 5. perennial horticultural crops, 6. catch crops.

3) Cultivation of catch plants. Catch plants must be annually sown on at least 25% of the farm's arable area for agri-environment payments that is located in support areas A and B and eligible for agri-environment payments. Catch plants refer to ground plants sown in connection with sowing the actual crop or trap plants sown after harvesting the actual crop. Ground plants are normally used in connection with cultivating cereals and trap plants in connection with growing early potato or early vegetables. Catch plants may not be fertilised separately (goal 40 000 ha/y, 2009:23300 ha/y).

Subsidy: 13 €/ha, Additional measure

Regarding Finnish conditions, we must keep in mind that due to the short growing seasons t/ha capability of winter and catch crops take up nutrients in late summer and autumn is fairly low. These measures are more targeted towards decreasing soil erosion and losses of total P.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **alltogether 550 000 ha/y**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit.

2. To what extent is this measure implemented today in relation to goal set above? **10**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **10**  
"0"=Impossible; "10"=Very good

Comments:

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country: Area of grassland is high due to the milk production in areas outside of the southern Finland. In southern Finland, winter cereals and direct drilling are possible crops and management method to reach vegetative cover in winter.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules: The Finnish rural development programme 2007-2013

Comments: These measures are only applicable in the southern regions (A and B) in Finland.

### 3. Soil tillage management

**3.1. Reducing soil tillage** by conversion from ploughing to minimal or no cultivation management systems or conversion from deep ploughing to shallow ploughing can reduce mineralization of organic matter in soil. Type of techniques can be, i.e. using discs or tines to cultivate the soil, or direct drill into stubbles (no-till).

Describe this measure in your country if different : In Finnish agri-environmental scheme, there is **one measure** that aims specifically to reduce soil tillage:

Plant cover in winter and reduced tilling.

Outside the growing season, farmers must maintain at least 30% of the farm's total area of parcels eligible for agri-environment payments under vegetation or stubble or subject to reduced tilling in an acceptable manner. Reduced autumn stubble tilling on cereal, oilseed crop and seed spice parcels fulfils the condition if tilling is carried out with a cultivator, disc harrow, spring-tooth harrow, rotary spade harrow or a mini-plough in a single run.

A livestock farm within agri-environment payments raising more than two livestock units of cattle, sheep, goats or horses cannot select the measure, nor can farms that have selected plant cover in winter or intensified plant cover in winter as an additional measure.

The payment for the measure is 11 EUR/ha

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **300 000 ha/y**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **10**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments:

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:* The area stubble cultivated or direct drilled is considerable, thus farms are able to reach the 30% limit.. The Finnish subsidy system doesn't prevent ploughing in spring, but clay soils cannot be ploughed in spring .

*Is this measure regulated in legislation?* **No** If "Yes"; national  or regional  rules

*Reference(s) to legislation:*

*Comments:*

*Is this measure entitled to economic subsidy?* **Yes** If "Yes"; national  or regional  subsidy rules

*Reference(s) to subsidy rules:*The Finnish rural development programme 2007-2013

*Comments:*

**3.2 Time-of the year effects.** By postpone tillage actions from autumn to spring, the mineralized nitrogen will be available for uptake by the established spring crops, which also will provide surface cover.

*Describe this measure in your country if different :* Plant cover in winter and reduced tilling, plant cover in winter and intensified plant cover in winter approve the stubble of cereals. Thus this measure promotes postponing tillage from autumn to spring.

1. *Is there any official quantified goal that states to what extent this measure should be implemented?* **No**

- *If "Yes";*
  - a) *specify quantity and unit:*
  - b) *if applicable, what year to be realized?*
  - c) *give reference(s):*
- *If "No", what is your expert opinion of the desirable level in 5 years?*  
quantity and unit: **300 000 ha**

2. *To what extent is this measure implemented today in relation to goal set above?* **8**  
"0"=Not at all; "10"=Goal already reached

3. *If goal is not reached; how do you judge the possibilities to fulfill it?* **9**  
"0"=Impossible; "10"=Very good

*Comments:* Direct tillage with about 200 000 ha and spring ploughing on suitable sandy soils are rather stable measures at the moment.

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:*Spring ploughing is not especially suitable for clay soils. Direct tillage is not suitable with organic soils.

*Is this measure regulated in legislation?* **No** If "Yes"; national  or regional  rules

*Reference(s) to legislation:*

Comments:

Is this measure entitled to economic subsidy? **Yes** If “Yes”; national  or regional  subsidy rules

**Reference(s) to subsidy rules:** The Finnish rural development programme 2007-2013

Comments: Postponing tillage to spring is one possible management method in all three measures related to the plant cover.

#### 4. Fertilisation management

##### 4.1. Adapting amounts applied for both chemical fertilizer and manure.

Animal density is a tool to express the number and type of animals kept at the farm in relation to the arable area available for spreading their manure. The tool is used to balance amounts of produced N and P in manure to available spreading area at the farm in order to avoid surplus application of N and P with manure.

Considering crop requirements of N and P in the fertilising plan is a prerequisite for avoiding excessive applications. Nitrogen and P content in manure shall be considered in the fertiliser plan in order to adapt the need of chemical fertilizers and avoid excessive applications.

Sampling and analysing N and P in manure gives information of the N and P concentration and the distribution of plant available-N and organic-N. Then the effect of the manure can be valued in the fertilising plan. Manure characteristics can vary a lot. Liquid manure is a general term that denotes any manure from housed livestock that flows under gravity and can be pumped. Liquid manure can have a high proportion of plant available N (NH<sub>4</sub>-N + NH<sub>3</sub>-N) of total-N content. Solid manure is a general term that denotes any manure from housed livestock with large amounts of bedding that does not flow under gravity, cannot be pumped but can be stacked in a heap. Solid manure can have a high proportion of organic-N of total-N content.

Sampling and analysing N and P in arable soil gives information of soil fertility concerning these nutrients, which should be considered in the fertilising plan in order to avoid excessive fertilizer applications or deteriorated soil fertility.

*Describe this measure in your country if different :* This measure is related to several aspects of legislation and rural development programme. Whole Finland is declared as nitrate sensitive area and thus the national implementation of the nitrate directive is valid on the whole agricultural area. Furthermore, the Environmental legislation concerns permission for animal farms. The Finnish rural development programme 2007-2013 gives several measures to control fertilisation management.

Implementation of nitrate directive demands measuring manure total-N content and restricts the annual manure N application to 170 kg/ha. The scale of use and application of nitrogen fertilizers is based on average crop yield, cultivation zone and crop rotation with the aim of retaining a balanced nutrient level in the soil.

Farms may use the following maximum amounts of nitrogen on fields as fertilizer, contained in both mineral fertilizer and animal manure and organic fertilizers:

- 1) winter cereals up to 200 kg of nitrogen/ha/year, of which 30 kg of nitrogen/ha in the autumn and 170 kg of nitrogen/ha in the spring, or if slowly dissolving nitrogen is used, up to 40 kg of nitrogen/ha in the autumn and 160 kg of nitrogen/ha in the spring;
- 2) potato 130 kg of nitrogen/ha/year;

- 3) grassland and pasture, silage and horticultural plants 250 kg of nitrogen/ha/year;  
 4) spring cereals, sugar beet, oilseed crops and other crops up to 170 kg of nitrogen/ha/year.

For very fine sand and coarser mineral soils, 10 kg/ha/year is deducted from the nitrogen amounts laid down in paragraph 2 above. The total amounts of nitrogen presented in paragraph 2 above are reduced by 40 kg/ha in the case of cultivation of cereals or sugar beet on peat soil, and by 20 kg/ha in the operating areas covered by Lapland, Northern Ostrobothnia and Kainuu Regional Environment Centres. For grasslands, the reduction is 10/ha on peat soil throughout the country. If the amount of permissible nitrogen fertilizer exceeds 170/kg/year, this amount must be split into at least two doses with at least two weeks between applications.

The Environmental Protection Act (86/2000) and [Environmental Protection Decree \(169/2000\)](#) define the necessary field hectares that should be available for manure application. Manure can be applied on the fields owned by the farmer or surrounding fields with application contracts. The farmer must show for the environmental permission that there exists sufficient area of field to apply manure.

Cross-compliance defines that the maximum amount of phosphorus fertiliser that can be applied is 80 kg/ha/year. Phosphorus balancing may be applied to the amounts of phosphorus. The limit is determined on the basis of the average nitrogen and phosphorus amount of solid chicken manure in proportion to nitrogen fertilisation under the Nitrates Decree. The maximum amount of phosphorus fertiliser that may be applied on horticultural crops is 120 kg/ha/year.

Fertilisation of arable crops is a basic measure of the Environmental subsidy scheme. Fertilisation is based on the result of the soil fertility analysis, carried out sufficiently frequently. A new soil fertility analysis must be carried out when five years have passed from the previous sampling. At least one sample per base parcel must be taken if the size of the parcel exceeds 0.5 ha. For parcels larger than 5 ha, one sample for each 5 ha or part thereof must be taken. For parcels less than 0.5 ha in size, one sample for each 2 ha of arable land or part thereof must be taken. The nutrients of livestock manure are calculated either on the basis of table values or the results of a manure analysis. Soluble nitrogen is taken into account as such excluding the spreading of manure in the autumn, when 75% of the soluble nitrogen in the manure is taken into account. 85% of total phosphorus is taken into account. 40% of the phosphorus of farm animal manure and slurry is taken into account.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **2.16 million ha = total agricultural area**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years?  
quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **9**  
 "0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **10**  
 "0"=Impossible; "10"=Very good

Comments: 2.12 million ha in the subsidy programme in 2009

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:* Goal has been easy to reach as subsidy programme has a high economical meaning for farmers.

*Is this measure regulated in legislation?* **Yes** If "Yes"; national  or regional  rules

**Reference(s) to legislation:** Nitrate directive and its implementation in Finland.

The Environmental Protection Act (86/2000), and Environmental Protection Decree (169/2000)

**Kotieläintalouden ympäristönsuojeluohje** (Guidelines for environmental protection in animal husbandry). Environmental Administration Guidelines 1/2010 (Table 5, page 60)

*Comments:* Implementation of Nitrate Directive covers whole Finland and sets maximum N limits for crops.

The environmental permit of animal houses according to the Environmental Protection legislation calculates manure production according to the animal number and compares it to the available manure spreading area.

*Is this measure entitled to economic subsidy?* **Yes** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:** The Finnish rural development programme 2007-2013

*Comments:* The basic measure in the Finnish Agri-Environmental Programme sets fertiliser N and P limits. The additional measures include "More accurate nitrogen fertilisation" which requires soil soluble N sampling and analyses in spring or before the second N application from 30% of farm's field parcels. The goal of this measure is 700 000 ha and in 2009 there are about 790 000 ha include on the measure. Fertilisation rules are described in Finnish [http://www.mavi.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5FSJ2pUCH/912996\\_lannoiteopas\\_LR\\_vii.pdf](http://www.mavi.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5FSJ2pUCH/912996_lannoiteopas_LR_vii.pdf) or in Swedish [http://www.mavi.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5FSJ5LIY4/lannoiteopas\\_ru\\_LR\\_iii.pdf](http://www.mavi.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5FSJ5LIY4/lannoiteopas_ru_LR_iii.pdf)

#### 4.2. Calculating nutrient balances on farm- and/or field level

Calculating N and P inputs/outputs and balances on farm and/or field level is a performance tool and a policy tool for assessing the environmental impact. The tool can also be used to monitor and evaluate the impacts of alternative manure and chemical fertilizer management practices and technologies on N and P use at the farm. When farm N and P balances can be linked to within-farm N and P sources and flows, there is a good possibility to identify the weakest link and possible improvements on the farm. The tool can be used to assess the risk of ammonia losses from manure management and the risk of N leaching losses to water.

*Describe this measure in your country if different :*

In Finnish agri-environmental scheme, there is a measure, where:

A parcel-specific field balance of each growing season must be prepared by the end of each commitment year for all farms that have selected this measure.

Balance calculations must be done for phosphorus and nitrogen. In addition, an action plan for nutrient balance must be prepared for each farm by the end of the second and fourth commitment year. If the ratio between the nutrient surplus and the quantities of nutrient used has grown more than 20% on 2<sup>nd</sup> year compared to the 1<sup>st</sup> or on 4<sup>th</sup> year compared to the 3<sup>rd</sup> year, fertilisation must be reduced in the third or fifth year.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **250 000 ha**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **9**  
 "0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **9**  
 "0"=Impossible; "10"=Very good

Comments: 241 000 ha was under measure in 2009.

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country: Nutrient balance calculation has been rather easy to farms to be implemented. However, the practical implementation of measure is so unsatisfactory that the measure in this format cannot be continued. Seasonal variation can cause increase on NP balances that have nothing to do with optimisation of the fertiliser rate.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules: The Finnish rural development programme 2007-2013

Comments: Nutrient balance measure is described in Finnish  
[http://www.mavi.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5FSJ2pUCH/912996\\_lannoiteopas\\_LR\\_vii.pdf](http://www.mavi.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5FSJ2pUCH/912996_lannoiteopas_LR_vii.pdf) on page 21 and  
[http://www.mmm.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5uWe8uHRL/Ravinnetaseohje\\_2008.pdf](http://www.mmm.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5uWe8uHRL/Ravinnetaseohje_2008.pdf) and  
<http://www.mmm.fi/attachments/mavi/viljelijatuet/hakuoppaatjaohjeet/ymparistotuenperusjalisatoimenpiteidenoppaat/5vnrmbiCo/sv-Ravinnetaseohje.pdf>.

The implementation of this measure is not particularly good, as the variation between

growing season of years (1<sup>st</sup> against 2<sup>nd</sup> and 3<sup>rd</sup> against 4<sup>th</sup>) can cause increase in nutrient surplus that is not at all related to the nutrient use efficiency.

#### 4.3. Avoiding the spreading of chemical fertilizers and manure during high-risk periods.

The timing of chemical fertilizer and manure application is a key factor to have a high plant nutrient use efficiency. Poor timing is one of the most important sources of large N leaching loads.

*Describe this measure in your country if different :* The national implementation of the Nitrate directive sets the minimum time limits to spread manure. Manure may not be applied on frozen, snowcovered or water-saturated ground. Manure may not be spread between 15 October and 15 April. Manure may be spread until 15 November and in the spring, manure may not be spread earlier than 1 April, provided the ground is not frozen and it is dry enough so that runoff into watercourses and any danger of subsoil compaction are avoided. Manure may not be applied on grassland after 15 September. Organic fertiliser applied in the autumn must always immediately, and within 24 hours at the latest, be incorporated, or arable land must be ploughed. The maximum amounts of manure that can be applied in the autumn are 30 tonnes/ha of solid manure, 20 tonnes/ha of cow slurry, 15 tonnes/ha of pig slurry or 10 tonnes/ha of poultry or fur animal manure.

In the Finnish Agri-environmental Programme, there is an additional measure "Spreading of manure during the growing season", where manure may be spread until 10 September if a winter crop, a winter oilseed crop or herbaceous plant is sown or a perennial horticultural crop is planted in the parcel. In other cases, manure spreading is allowed until 15 August. The measure can only be chosen by a livestock farm within agri-environment payments. A farm that has chosen this measure can deliver manure from the farm in limited quantities only.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: Nitrate directive for whole country, additional measure for **270 000 ha**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years?  
quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **6**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **5**  
"0"=Impossible; "10"=Very good

*Comments:* Nitrate directive covers the whole Finland. "Spreading of manure during the growing season" covers 170 000 ha in 2009.

*Comments on why the goal is easy/difficult to reach, what are the most important*

*parameters in your country:* Manure storage capacity is not sufficient to apply manure in spring or before 15th August. On some farms lack of man power and other resources restricts the spring applications. Time window in spring is very narrow for manure application before sowing and too early applications will destroy soil structure. Slurry applications after sowing often reduce yield due to crop damages and poor N availability.

Is this measure regulated in legislation? **Yes** If "Yes"; national  or regional  rules

**Reference(s) to legislation:** Nitrate directive.

*Comments:* Manure may not be applied on frozen, snowcovered or water-saturated ground. Manure may not be spread between 15 October and 15 April. Manure may be spread until 15 November and in the spring, manure may not be spread earlier than 1 April, provided the ground is not frozen and it is dry enough so that runoff into watercourses and any danger of subsoil compaction are avoided. Manure may not be applied on grassland after 15 September. Organic fertiliser applied in the autumn must always immediately, and within 24 hours at the latest, be incorporated, or arable land must be ploughed. The maximum amounts of manure that can be applied in the autumn are 30 tonnes/ha of solid manure, 20 tonnes/ha of cow slurry, 15 tonnes/ha of pig slurry or 10 tonnes/ha of poultry or fur animal manure.

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:** The Finnish rural development programme 2007-2013

*Comments:*

#### **4.4. No or reduced P-fertiliser for high soil P fields or part of fields.**

When the soil P values increase beyond agronomical optimum ranges, there is a reasonable consistence pattern whereby P leaching increase significantly. However, P leaching has large spatial and temporal variations and can be influenced by several factors interacting with each other. It is therefore important to consider site-specific factors to be able to find measures to reduce P leaching.

*Describe this measure in your country if different :* In basic measures, P application is forbidden on fields with soil P level of "possibly excessive". Furthermore P application rates are decided according to the soil P levels analysed from the fields every 5<sup>th</sup> year.

"More efficient reduction of nutrient load" is a specific measure in support areas A and B. The measure is available for cultivated parcels in the soil fertility class "high" or "possibly excessive" for phosphorus. The measure may also be available for cultivated parcels where the fertility class for phosphorus is at least "good" if the parcel is located alongside main ditches and a water body bigger than a main ditch as well as on pond, lake and sea shores in case the parcels slope towards the water body or the main ditch. The farmer gives a commitment not to fertilise the parcels covered by the contract. The parcels are kept under grass all through the year. In order to impoverish the soil phosphorus content, vegetation must be removed from the arable area. Dry hay must be harvested from the parcel at least once during the growing period, grass growth at least twice. In connection with sowing the first grass or hay growth the use of nitrogen up to the maximum of 50 kg per hectare is allowed to safeguard the early development of the vegetation. To monitor

the changes in the phosphorus status, a soil fertility analysis must be carried out on the parcel every three years. The sampling density must be at least one sample per each 1 ha of arable land.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **3500 ha**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): **The Finnish rural development programme 2007-2013**
- If "No", what is your expert opinion of the desirable level in 5 years?  
quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **10**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **10**  
"0"=Impossible; "10"=Very good

Comments: 130 000 ha is already among this measure in 2009.

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country: Farmers want to decrease costs by reducing P fertilisation and recent studies have also shown that soil P target can be lower for sufficient yield levels.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules: The Finnish rural development programme 2007-2013

Comments: The subsidy is only available for the southern Finland areas (A and B).

## 5. Improved spreading technology of manure and chemical fertiliser

**5.1 Site-specific dosage.** In all fertiliser application, the use of **Global Positioning System** (GPS) signals for the purpose of determining the device's current location on earth can improve the possibilities for a controlled and proper distribution. GPS devices provide latitude and longitude information, and some may also calculate altitude. GPS in combination with **steering aid systems** means that the fertiliser can be spread with a minimum of bare spots and overlaps. The simpler variant of the steering aid system is called **guidance**, where a ramp with a series of LEDs shows whether the driver is located right on line or if he should adjust to the right or left. **Auto steer** is an automated steering system where the driver does not need to actively steer the vehicle except perhaps in curves or when turning. With the use of

GPS technology, it is also possible to map different properties in the field, and later on use this information e.g. for **site specific spreading** of fertilisers.

*Describe this measure in your country if different:* No specific measure in Finland., .

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **1**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **3**  
"0"=Impossible; "10"=Very good

*Comments:* Precision on manure and fertiliser spreading can be increased, and steering aid systems have also become more common in Finland. There are no statistics about the use of these systems..

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:*

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

*Comments:*

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**

*Comments:*

**5.2 Combined drilling** is when seeding and fertilisation is done with one and the same machine in one working operation. A drilling machine with normal distance between the drill coulters is equipped with coulters for chemical fertilisers placed in front of the drill coulters between every other row. Fertiliser coulters are placing chemical fertiliser a few centimetres deeper than the seeds.

Chemical fertiliser placed at this depth, provides good conditions for the crop to take up the added nutrients. This procedure is, in addition to time savings and a better nutrient utilization, reducing competition for plant nutrients from weeds and reduces the risk of nutrient surface runoff. Phosphorus in fertilizers binds quickly to soil particles and is thus less exposed to leaching.

The recommended nitrogen ration at a given harvest level can be reduced by 10 kg N / ha, if combined drilling is applied (Albertsson, 2010). Leaching will probably be reduced by 1-2 kg N/ha compared with other fertilization techniques.

*Describe this measure in your country if different :* This is a common practice for arable crops in Finland and it is not included in the measures.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years?  
quantity and unit: **98% of spring cereals sown with combined drilling.**

2. To what extent is this measure implemented today in relation to goal set above? **10**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments:

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:* Combined drilling was developed as a main practice in Finnish spring cereal production in 1960's. The yield benefit has been analysed to be 5-15% and especially dry early growing seasons show the difference between broadcasting and fertiliser placement.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules:

Comments:

**5.3 Incorporation** of manure and chemical fertiliser may be achieved with equipments such as discs or cultivators depending on soil type and soil conditions. Usually the incorporation is done in a separate working operation. The manure/chemical fertiliser must be completely incorporated within the soil to achieve maximum efficiency. As regards liquid manure, incorporation should be made quickly after spreading as ammonia losses takes place immediately after spreading.

This method will help to prevent the exposure of manure to the surface runoff and drain-flow losses. It will also increase the utilisation of manure nutrients compared with surface application.

*Describe this measure in your country if different :* Incorporation demand of 24 h for manure applied in autumn is implemented according to the Nitrate directive. "Incorporation of liquid manure in the soil" is an additional measure in the Finnish Agri-Environmental Programme and is discussed in 5.4. Incorporation of chemical fertilisers is done for spring cereals by combi-drilling. For winter cereals N fertilisers are topdressed in spring and for grassland topdressing without incorporation is also the method used.

1. *Is there any official quantified goal that states to what extent this measure should be implemented?* **No**

- *If "Yes";*
  - a) *specify quantity and unit:* [redacted]
  - b) *if applicable, what year to be realized?* [redacted]
  - c) *give reference(s):* Nitrate directive, The Finnish rural development programme 2007-2013
- *If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:* [redacted]

2. *To what extent is this measure implemented today in relation to goal set above?* **5**  
 "0"=Not at all; "10"=Goal already reached

3. *If goal is not reached; how do you judge the possibilities to fulfill it?* [redacted]  
 "0"=Impossible; "10"=Very good

*Comments:* 112 000 ha is among the measure of incorporation of liquid manure in 2009. The whole Finland is Nitrate sensitive area and thus all autumn applications of manure should be incorporated in 24 hours.

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:* Increased fertiliser prices have made farmers also interested to increasing manure N efficiency by incorporating manure. Incorporation of chemical fertilisers topdressings for winter cereals and grasslands is hardly even discussed. The aim has been to fulfil as much as possible of the grassland P demand during the establishment, but on the 3-5 years of grass P fertiliser demand can become actual.

*Is this measure regulated in legislation?* **Yes** If "Yes"; national  or regional  rules

**Reference(s) to legislation:** Nitrate directive

*Comments:* Nitrate directive demands incorporation of organic manure in 24 h after autumn application.

*Is this measure entitled to economic subsidy?* **Yes** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:** The Finnish rural development programme 2007-2013

*Comments:* "Incorporation of liquid manure in the soil" is included as an additional measure in the Finnish Agri-Environmental Programme and is discussed in 5.4.

**5.4 Liquid manure.** Distribution uniformity of liquid manure has improved significantly with the introduction of **band spreading** technology, where the manure is discharged just above ground level in strips or bands through a series of hanging or trailing pipes attached to a boom. As the liquid manure is distributed laterally via a ramp, good lateral distribution uniformity is achieved. The spread in the longitudinal direction can also be kept at a constant level by means of the pumping equipment which is part of the equipage. Some newer spreaders are also equipped with a **control system** that automatically adjusts the output to the driving speed, which will keep the application rate to the desired level.

**Injection** of liquid manure means that it is applied directly into the active layer of soil, either in open or in closed slots. In the latter case manure is fully covered after injection, by closing the slots with press wheels or rollers fitted behind the injection tines. Closed-slot injection is more efficient than open-slot for decreasing the ammonia emission. To obtain this added benefit, soil type and conditions must allow effective closure of the slot.

*Describe this measure in your country if different :* In the agri-environmental scheme two measures are related:

1) "Spreading of manure during the growing season". Manure used on the farm must be spread on arable land during the growing season in the spring and summer. In accordance with the Nitrates Decree (931/2000), manure may be spread in the spring no earlier than 15 April. The spreading may start on 1 April if the soil is not frozen and is dry to avoid runoff into watercourses and any danger of subsoil compaction. When spreading solid manure, liquid manure and urine on seedlings and grass lands during the growing season, alternatively either incorporation equipment, precision spreaders for solid manure or trailing hoses must be used to cover up unpleasant smells. Manure may be spread until 10 September if a winter crop, a winter oilseed crop or herbaceous plant is sown or a perennial horticultural crop is planted in the parcel. In other cases, manure spreading is allowed until 15 August (goal 270 000 ha, 170 000 ha in 2009).

2)"Incorporation of liquid manure in the soil". Liquid manure or urine must be spread on the parcel using incorporation or earthing up equipment. The accepted types of equipment are defined separately. Payments are granted for parcels where these methods are used and the minimum amount of 20 m<sup>3</sup>/ ha/year of liquid manure or urine is spread under the conditions of a valid agri-environmental commitment and possible other special measures (goal 30 000 ha, 112 000 ha in 2009).

1. *Is there any official quantified goal that states to what extent this measure should be implemented?* **Yes**

- *If "Yes";*
  - a) *specify quantity and unit:* **300000**
  - b) *if applicable, what year to be realized?* **2013**
  - c) *give reference(s):* The Finnish rural development programme 2007-2013
- *If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:*

2. *To what extent is this measure implemented today in relation to goal set above?* **8**  
*"0"=Not at all; "10"=Goal already reached*

3. *If goal is not reached; how do you judge the possibilities to fulfill it?* **9**  
*"0"=Impossible; "10"=Very good*

Comments:

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country: The increase of fertiliser prices have risen the interest to use slurry N as well as possible.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules: The Finnish rural development programme 2007-2013

Comments: This measure is related to two Finnish measures: "Spreading of manure during the growing season" and "Incorporation of liquid manure in the soil".

**5.5 Solid manure.** In solid manure handling, **disintegration equipment** has been developed that breaks the manure better and gives greater working width and more uniform spreading laterally. Distribution of solid manure in the longitudinal direction and opportunities to set the intended application rate still leaves much to be desired.

Describe this measure in your country if different : Not covered in Finland.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit.

2. To what extent is this measure implemented today in relation to goal set above?   
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments:

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country: The number of disintegration equipment on the farms is not known.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**

Comments:

**5.6 Manure spreading and NH<sub>3</sub> emissions – general measures.** Variables significantly affecting NH<sub>3</sub> emissions after spreading of manure are soil water content, air temperature, wind speed, manure type, dry matter content of manure, total ammoniacal nitrogen content of manure (TAN=NH<sub>3</sub>-N+NH<sub>4</sub>-N), application method and rate and manure incorporation. Losses of NH<sub>3</sub> can vary between 3 to 90% of the NH<sub>4</sub>-N applied with manure.

*Describe this measure in your country if different :* In autumn, manure incorporation must be implemented in 24 h by Nitrate decree and with special equipment in the special measure "Incorporation of liquid manure in the soil" of the Finnish Agri-environmental Programme,

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above?   
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments: The implementation of the Nitrate directive requires incorporation of manure in 24 hours in autumn and is valid in whole Finland. The special measure "Incorporation of liquid manure" has a target value of 30 000 ha/yr and it has been used for 112 000 ha/yr in 2009. But this measure is already discussed in 5.3 and 5.5.

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation? **Yes** If "Yes"; national  or regional  rules

**Reference(s) to legislation:** Nitrate decree

Comments:

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional

*subsidy rules*

**Reference(s) to subsidy rules:** The Rural development Programme of Finland 2007-2013

*Comments:*

**6. Avoiding the application of chemical fertilisers and manure to high-risk areas**

Examples of high risk areas on arable land are those: with a significant slope, with flushes draining to a nearby watercourse, soils with cracks over field drains, fields adjacent to water or fields with phosphorus values beyond agronomical optimum ranges.

*Describe this measure in your country if different :* Implementation of nitrate directive sets up rules for fertiliser and manure applications close to water course. Use of nitrogen fertilizers is prohibited on areas closer than five metres to a watercourse. Along the width of the next five metres, surface application of nitrogen fertilizers is prohibited if the field slope exceeds two per cent. Surface application of animal manure is always prohibited on fields whose average slope exceeds 10 per cent.

Cross-compliance rules demand that arable parcels alongside watercourses and main ditches must have an untilled headland of at least 0.6 m, to which fertilisers and plant protection products are not applied.

The measure of agri-environmental scheme, "Arable farming in groundwater areas", demands that farms must carry out arable farming in groundwater areas in accordance with a specific plan. The objective is to reduce the use of fertilisers, particularly of nitrogen, in groundwater areas. The measure decreases the risks to groundwater caused by the use of fertilisers, livestock manure and plant protection products.

1. *Is there any official quantified goal that states to what extent this measure should be implemented?* **Yes**

- *If "Yes";*
  - a) *specify quantity and unit:* 1300 ha for "Arable farming in groundwater areas"
  - b) *if applicable, what year to be realized?* 2013
  - c) *give reference(s):* The Finnish rural development programme 2007-2013
- *If "No", what is your expert opinion of the desirable level in 5 years?*  
*quantity and unit:*

2. *To what extent is this measure implemented today in relation to goal set above?* **10**  
*"0"=Not at all; "10"=Goal already reached*

3. *If goal is not reached; how do you judge the possibilities to fulfill it?* **10**  
*"0"=Impossible; "10"=Very good*

*Comments:* 1700 ha among the measure "Arable farming in groundwater areas" in 2009. Nitrate decree is valid in whole Finland.

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:*

*Is this measure regulated in legislation?* **Yes** *If "Yes"; national*  *or regional*  *rules*

**Reference(s) to legislation:** Nitrate decree

**Comments:**

*Is this measure entitled to economic subsidy? Yes* If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:** The Finnish rural development programme 2007-2013

**Comments:** The measure is implemented throughout the country in agricultural parcels located in Class I and II groundwater areas. Preference is given to objects which have a valid special measure under Government Decree 644/2000 or in which water intake plants are located or which have other special need for groundwater protection.

## 7. Measures to optimize soil pH and improve soil structure

Measures to improve soil fertility and soil structure can increase the crop's plant nutrient use efficiency and decrease the risk of N and P leaching and surface run-off. Such measures can be liming for improved soil structure or liming for optimizing soil pH.

**Describe this measure in your country if different:** Not among the direct Finnish measures at the moment. However, soil structure can be improved by addition of organic matter into soil through following measures: Nature management fields (basic measure), plant cover in winter and reduced tilling, plant cover in winter, intensified plant cover in winter (additional measures), cultivation of catch crops and establishment and management of riparian zones (specific measures).

1. *Is there any official quantified goal that states to what extent this measure should be implemented?* **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit.

2. *To what extent is this measure implemented today in relation to goal set above?*   
 "0"=Not at all; "10"=Goal already reached

3. *If goal is not reached; how do you judge the possibilities to fulfill it?*   
 "0"=Impossible; "10"=Very good

**Comments:** Recommendations include targeted pH-values for each soil types. Liming materials are nowadays used 450–650 million kg/yr, which is about 50% of the amount used in 1990's.

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:*

*Is this measure regulated in legislation?* **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

Comments:

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**

Comments: Addition of organic matter into the soil by several measures can improve soil structure but it is not the main purpose of them.

## 8. Adapted feeding

### 8.1 Adopting phase feeding of livestock

Livestock at different growth stages or stages of the reproductive cycle have different optimum nutritional requirements. Greater division and grouping of livestock on the basis of their feed requirements allows more precise formulation of individual rations. This increases the animal's nutrient use efficiency and results in reduced excreted amounts of nitrogen and phosphorus in fresh animal faeces and urine.

*Describe this measure in your country if different :* The recommendations for livestock feeding include phase feeding. This web service ([https://portal.mtt.fi/portal/page/portal/Rehutaulukot/feed\\_tables\\_english](https://portal.mtt.fi/portal/page/portal/Rehutaulukot/feed_tables_english)) consists of the Feed tables and nutrient requirements of farm animals used in Finland. It is published by MTT Agrifood Research Finland based on a mandate from the Finnish Ministry of Agriculture and Forestry . Animal welfare payments require written feeding plans that are based on calculations and which take into consideration the growth and production phase of the animals must be complied with when feeding the animals.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above?   
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments:

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

Comments:

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**

Comments:

## 8.2 Reducing dietary nitrogen and phosphorus intakes

Farm animals are often fed diets with higher than recommended contents of nitrogen and phosphorus as a safeguard against a loss of production arising from a deficit of these nutrients. A surplus intake of nitrogen and phosphorus is not utilised by the animal and is excreted with faeces and urine, leading to a larger N and P content in the manure. Therefore a ratio balancing of nutrients in feed is a key factor to both ensure animal health and production requirements and minimizing adverse environmental impacts. To improve nutrient use efficiency purchased as well as home-produced feed components need careful management and analysis of nutrient content and dietary value.

*Describe this measure in your country if different :* The recommendations for livestock feeding are updated on regular basis. Recommendations are on web service ([https://portal.mtt.fi/portal/page/portal/Rehutaulukot/feed\\_tables\\_english](https://portal.mtt.fi/portal/page/portal/Rehutaulukot/feed_tables_english)) which consists of the Feed tables and nutrient requirements of farm animals used in Finland. It is published by MTT Agrifood Research Finland based on a mandate from the Finnish Ministry of Agriculture and Forestry.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above?   
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments: The advisory services have a key role in transferring the updated feeding recommendations to the farms.

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

Comments:

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**

Comments:

### 8.3 Phytase supplementation

Supplementation of synthetic phytase to pig feed reduces the need for the addition of mineral phosphate. Phytase increases the availability of phosphorus in the feed and allows total phosphorus contents to be reduced without affecting productivity. With the addition of phytase the phosphorus content of the feed can be reduced by up to 30% for pig feed.

*Describe this measure in your country if different* : The recommendations for livestock feeding include phytase supplementantation for pigs and poultry.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit.

2. To what extent is this measure implemented today in relation to goal set above?   
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments: Phytase supplementation will become more common if the price of feed P will increase.

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:*

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

Comments:

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**

Comments:

#### 8.4 Wet feed and fermentation

Endogenous phytase in grain can be activated by wetting the pig feed some time before feeding thereby reducing or even eliminating the need for mineral phosphorus supplementation. This means that pig production with wet feed systems should be able to utilise feed with lower phosphorus content than normally recommended.

Fermentation of the feed can reduce the need for mineral phosphate supplementation. Fermentation occurs naturally in wet feed after a certain amount of time. The fermentation process is difficult to manage and the method is still to be developed.

*Describe this measure in your country if different :* Not among the measures and not emphasised in the recommendations.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above?   
 "0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
 "0"=Impossible; "10"=Very good

Comments: The current practices and economy in animal production will decide if these measures would become more widely used.

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules:

Comments:

**9. Reducing ammonia losses in stable**

Key emissions to air from animal housing emissions are ammonia (NH<sub>3</sub>), odor and dust. The level and variation of ammonia emissions from animal housing are determined by many factors, which also interact. Factors influencing ammonia emissions from animal housing are:

- Increased nitrogen use efficiency.
- Decreased emitting areas with manure in the stable.
- Avoiding high temperature in stable and manure
- Adapting airflows along manure surfaces.
- Use and choice of bedding material.

*Describe this measure in your country if different :* In Finland, the reduction of greenhouse gases and ammonia emissions is based on several action plans and initiatives. The implementation of these plans helps Finland attain international and EU objectives (the so-called transboundary agreement under the Convention on Long-range Transboundary Air Pollution, FTS 15/1983, and its good practices for ammonia emissions, as well as the commitments of the Kyoto Protocol).

Environmental permission of livestock shelters will also estimate odor, ammonia and dust emissions.

1. *Is there any official quantified goal that states to what extent this measure should be implemented?* **No**

- *If "Yes";*
  - a) *specify quantity and unit:*
  - b) *if applicable, what year to be realized?*
  - c) *give reference(s):*
- *If "No", what is your expert opinion of the desirable level in 5 years?*  
*quantity and unit:* Improvements would be related the air quality in animal housing and increased N use efficiency.

2. *To what extent is this measure implemented today in relation to goal set above?*   
 "0"=Not at all; "10"=Goal already reached

3. *If goal is not reached; how do you judge the possibilities to fulfill it?*   
 "0"=Impossible; "10"=Very good

*Comments:* Environmental permissions will give the basic requirements for livestock shelters.

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:*

*Is this measure regulated in legislation?* **No**    *If "Yes"; national*  *or regional*  *rules*

*Reference(s) to legislation:*

*Comments:*

*Is this measure entitled to economic subsidy?* **No** *If "Yes"; national*  *or regional*  *subsidy rules*

*Reference(s) to subsidy rules:*

*Comments:*

## 10. Storage of manures

Adequate collection and storage facilities provide the possibility to choose a time to apply manure to fields when the crops can utilize N and P and there will be fewer occasions when lack of capacity forces the farmer to spread manure at unsuitable times.

Manure storage must be of such a quality that it prevents N, P and manure losses. The main influencing factors on the ammonia losses from storages are manure properties (pH, dry matter content) temperature and wind conditions, filling technology, storage time, and for liquid manure storage ratio surface: volume, crust formation and mixing methodology.

Ammonia losses can be sharply reduced if the air directly above the liquid manure store is prevented from circulating. A method that efficiently reduces NH<sub>3</sub> losses is to cover the liquid manure stores with, for instance, a roof, a floating plastic cover or a stable natural crust. If the liquid manure storage is filled underneath the cover, this can be kept intact even during filling, which reduces the risk of NH<sub>3</sub> losses.

From storages with solid manure, especially if composting take place with high temperatures, NH<sub>3</sub> losses could be high. Peat included in the bedding material will reduce NH<sub>3</sub> losses during storage. Roofs on solid manure storages could be an effective measure to reduce ammonia losses from solid manure storages. Additionally, a roof keeps rainwater away, which could prevent nutrient leakage from the manure pad if it has insufficient or lacking drainage leading to a collection pit.

*Describe this measure in your country if different :* Nitrate decree (implemented in whole Finland) sets the following requirements for storage of manure: The manure storage for waste products excreted by animals must be sufficiently large for manure accumulated over 12 months, excluding manure remaining on pasture during the same grazing season. In determining the size of storage, farmers' joint storage, appropriate small outdoor yards and loose housing sheds with litter bedding are also considered.

Manure storages and manure gutters must be watertight. The structures and equipment used must be such that no leakage occurs when the manure storage is emptied and the manure is transferred. The size of storage must follow the principles set out in Annex 2 of Nitrate decree. Manure heaps must not be sited in areas that may become flooded or in groundwater areas.

In connection with the building investments in milk production and cattle husbandry financing under the programme may also be granted to investments in manure storage facilities to improve the storage of manure.

Environmental permit is required from livestock shelters housing at least 30 dairy cows, 80 beef cattle, 60 full-grown sows, 210 finishing pigs, 60 horses or ponies, 160 ewes or goats, 2,700 laying hens or 10,000 broiler hens, or other livestock shelters which correspond in terms of manure production or environmental impact of at least 210 finishing pigs ([Environmental Protection Decree \(169/2000\)](#)).

Permissions for new and modified livestock shelters are approved by the regional environmental authorities and they can use following instructions: Guidelines for environmental protection in animal husbandry; in Finnish;( <http://www.ymparisto.fi/download.asp?contentid=117243&lan=fi>). Instructions include

requirements for manure storage facilities and manure handling.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **100%**
  - b) if applicable, what year to be realized? **2015**
  - c) give reference(s): **Nitrate decree and Environmental Protection Decree**
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **7**  
 "0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **8**  
 "0"=Impossible; "10"=Very good

Comments: Legislation sets the basic requirements for storage of manure.

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation? **Yes** If "Yes"; national  or regional  rules

Reference(s) to legislation :Article 16a of Council Regulation (EC) No 1698/2005.

Comments: The Environmental Protection Act (86/2000) and [Environmental Protection Decree \(169/2000\)](#) define the permission requirements of livestock shelter that are collected in "Guidelines for environmental protection in animal husbandry".

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules:

Comments:

## 11. Constructed wetlands for nutrient reduction/retention

### 11.1 Sedimentation ponds

Small surface flow wetlands designed primarily to retain phosphorous. This is achieved by retaining eroded phosphorous bound to aggregates and particulate materials in the run-off water by optimizing the conditions for sedimentation processes. To some extent phosphorous and other nutrients are reduced due to biological and chemical decomposition and transformation processes as well as plant uptake.

A sedimentation pond is suitable for establishment in highly intensive small-scale agricultural areas. The ponds are relatively small representing approximately 0.1 – 0.5 % of the run-off area. The sedimentation pond is constructed for instance by widening a section in a ditch into a sedimentation pond slowing down the speed of the run-off water hence increasing sedimentation.

A sedimentation pond is often designed as a serial combination of (i) a sedimentation basin with a water depth of 1-1.5 m representing 20-30% of the total area of the sedimentation pond where the main sedimentation of larger particles takes place, followed by (ii) a wetland filter covered with typical wetland plants providing good conditions for sedimentation of smaller particles. In case the area is highly sloped it is suitable to include an overflow area followed by a second wetland filter prior to the outlet to further induce the sedimentation efficiency.

The accumulated sediments in the sedimentation basin need to be removed on regular basis for maintenance.

*Describe this measure in your country if different* : There is now no measure to promote establishing of new sedimentation ponds but those established during the previous agri-environmental schemes can be managed among the special measure, "Management of multifunctional wetlands".

Sedimentation ponds established under 5-year contracts in accordance with the agrienvironmental programme for 1995–1999 and sedimentation ponds established under 5- or 10-year contracts in accordance with the agri-environmental programme for 2000–2006 may be covered by the management contract once the previous special measure has terminated. Sedimentation ponds, wetlands and water meadows must be managed in accordance with a specific plan. The contract is made for an arable area affected by the project or other land area that is subject to a management measure, including sufficient edge areas. Annual management measures include the removal of slurry, dam management and the mowing and removal of plants in the wetland and its edges. The plants mown and removed in this connection can be utilised, or the area can be managed by grazing, for instance, if this is not prevented from the perspective of water conservation or for other reasons and provided the biodiversity is not jeopardized. The management of wetlands and sedimentation basins must be recorded in a management log.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **No**

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years?  
quantity and unit: Sedimentation ponds are not any more subsidied but there are 185 contracts for management of those constructed on the previous programme periods.

2. To what extent is this measure implemented today in relation to goal set above?   
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
"0"=Impossible; "10"=Very good

Comments:

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

*Comments:*

Is this measure entitled to economic subsidy? **No** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**The Finnish rural development programme 2007-2013

*Comments:*

## 11.2 Constructed wetlands

Large free water surface wetlands are designed and constructed primarily for removal of nutrients, e.g. nitrogen and phosphorous and other pollutants from run-off water through sedimentation, biological and chemical transformation and degradation and plant uptake. Constructed wetlands have additional benefits, i.e. improved biodiversity, water storage capacity, resource recovery, irrigation possibilities and production of crop biomass.

Constructed wetlands are established, or re-established, to receive water from large run-off areas in arable as well as agricultural areas. The run-off area should be represented by at least 50 percent intensive agricultural land use with the constructed wetland covering approximately 0.5–4 % of the total run-off area.

An important characteristic is the establishment of typical emerges and submerges wetland vegetation. A constructed wetland provides heterogenic water regimes and environments. It is common with a mixture of areas with (i) permanently high water level, more or less covered with typical wetland vegetation, as well as (ii) periodically waterlogged areas with low water level. The water regime can also vary over the year.

*Describe this measure in your country if different :* Special measure:Wetlands and sedimentation ponds established under 5-year contracts in accordance with the agrienvironmental programme for 1995–1999 and wetlands and sedimentation ponds established under 5- or 10-year contracts in accordance with the agri-environmental programme for 2000–2006 may be covered by the management contract once the previous special measure has terminated.

Sedimentation ponds, wetlands and water meadows must be managed in accordance with a specific plan. The contract is made for an arable area affected by the project or other land area that is subject to a management measure, including sufficient edge areas. Annual management measures include the removal of slurry, dam damagement and the mowing and removal of plants in the wetland and its edges. The plants mown and removed in this connection can be utilised, or the area can be managed by grazing, for instance, if this is not prevented from the perspective of water conservation or for other reasons and provided the biodiversity is not jeopardized. The management of wetlands and sedimentation basins must be recorded in a management log.

Non-productive investment :Establishment of multifunctional wetlands. The measure may be implemented only in areas in which arable areas account for more than 20% of the catchment area of the watercourse or main ditch. The measure may be implemented only in the catchment areas of rivers running into the Gulf of Finland, the Archipelago Sea, the Bothnian Sea, the Kvarken of Archipelgao or Bothnian Bay and in the catchment areas of

lakes for which the measure can considerably decrease the load to the watercourse from agriculture, increase the biodiversity of agricultural areas and promote game husbandry and the fishing and crayfish industries.

Wetlands must primarily be established by damming in naturally suitable locations on arable land, in the marginal zones of arable land, or on forest land. Nutrient-rich topsoil that contains phosphorus must be removed at least from the areas that will be permanently covered by water. Suitable locations include natural hollows and depressions, water meadows susceptible to flooding, and terraced drainage areas. The area of a wetland must be at least 0.5–1.0% of the area of the upstream catchment area. Wetlands and flooded areas must be established so that they will retain both the solids and nutrient load from the catchment area as efficiently as possible.

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **Management 400 farms/y or 600 ha/y**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years?  
quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **5**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **6**  
"0"=Impossible; "10"=Very good

*Comments:* About 100 agreements covering about 600 ha are made for management of wetlands in 2009. Thus management aim is fulfilled although quite large proportion of agreements originates from periods 1995-1999 and 2000-2006. Not many new wetlands were established in 2007-2009 but after the interest for this has increased.

*Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:* The cost for establishing new wetland are rather high compared to the subsidy. There are, however, activities that promote the establishment like WWF-project for wetlands.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

*Comments:*

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**The Finnish rural development programme 2007-2013

*Comments:*

## 12. Buffer-zones along water areas and erosion sensitive field areas

Buffer zones are uncultivated areas between fields and water courses, main ditches, ponds, lakes or gulfs. Buffer zones are also to be implemented in erosion sensitive field areas such as around surface water wells or surrounding field areas with high ground water levels.

Buffer zones reduce the speed of water surface run-off mitigating losses of eroded aggregates, soil particles, and particulate phosphorous and other soil borne pollutants. They also decrease the risk of freshly spread manure and pesticides to reach the water environment. Buffer zones are an especially important measure in areas with eroding problems. Buffer zones also provide conditions for biological and chemical transformation of pollutions as well as plant uptake.

The buffer zones are under permanent plant cover of dense grass or vegetation. Buffer zones are situated on former agricultural land and have a width of 5-20 m. They are not allowed to be cultivated, fertilized or sprayed with herbicides or pesticides. The vegetation should be kept dense and plants should be established if needed for maintenance.

*Describe this measure in your country if different :* Under cross-compliance, arable parcels alongside watercourses and main ditches must have an untilled headland of at least 0.6 m, to which fertilisers and plant protection products are not applied. Basic measure (Headlands and filter strips): Parcels alongside main ditches must have a minimum of 1-m headlands, covered with perennial herbaceous plants, next to the main ditches. Headlands may be wider than 1 m if this is necessary for reasons of water conservation or the management practices used; however, the maximum width must not exceed 3 m on average. The headlands need not be mown. Mowing is, however, required if the headland begins to sprout woody growth. Mowing can also be used to prevent the spreading of weeds. If the vegetation from the headland is mown, the mowing waste can be utilised commercially. Filter strips that are 3 m wide on average and covered with perennial herbaceous plants, grasses or meadow grasses must be established alongside watercourses in parcels located adjacent to watercourses that are larger than main ditches, by ponds, lakes, the sea and next to wells from which water is drawn for household use. The filter strips may be wider than 3 m if this is necessary for reasons of water conservation or the management practices used; however, the maximum width must not exceed 10 m on average. If the filter strip is over three metres and on average maximum 10 metres wide, a separate agricultural parcel has to be formed. Filter strips should be mown once during each growing season. Mowing is, however, required if the filter strip begins to sprout woody growth. The mowing waste should be removed from the strip and can be utilised commercially. The filter strips must not otherwise be treated with plant protection products, nor must fertilisers be applied to them. The timing and implementation of the mowing must take into account the living conditions of wild birds and mammals, so that mowing shall not start before 1 August, unless it is necessary for the destruction of weeds, plant diseases or vermin, to prevent them from spreading or for similar reasons. Grazing is permitted on headlands and in filter strips. If the vegetation is mown or the headland or filter strip is grazed, it has to be done in a way that on the area concerned there will remain a sufficient vegetation also after mowing or grazing. Filter strips of 3-10 m are required along main water courses.

Special measure: Establishment and management of riparian zones: Riparian zones refer to agricultural parcels established and managed in accordance with a specific plan that are covered by perennial grasses. The plants of the riparian zone must be mown annually or at intervals specified in the plan. The timing of the mowing must take into account the living conditions of wild birds and mammals, so that mowing

shall not start before 1 August, unless it is necessary for the destruction of weeds, plant diseases or vermin, to prevent them from spreading or for similar reasons. The plants mown must be cleared from the riparian zone and can be used in agricultural production. The riparian zone can also be used for grazing provided the biodiversity is not jeopardized and, there are not other related to water protection or other similar reasons. Riparian zones must be at least 15 m wide (goal: 15000 ha; 8700 ha in 2009).

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **15000 (Riparian zones)**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-2013
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **6**  
 "0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **8**  
 "0"=Impossible; "10"=Very good

Comments:

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country: Basic measure, headlands and buffer strips, is used in almost all Finnish farms as they have joined the Agri-Environmental Scheme. Despite the active planning that has suggested sites for riparian zones, farmers have not been especially interested for these zones. On many areas, riparian zones would take out arable land that is too valuable for the farmers.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

Reference(s) to legislation:

Comments:

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

Reference(s) to subsidy rules: The Finnish rural development programme 2007-2013

Comments: Headlands and filter strips are required as a basic measure in the Finnish Agri-environmental Programme.

Headlands: Parcels alongside main ditches must have a minimum of 1-m headlands, covered with perennial herbaceous plants, next to the main ditches. Headlands are part of the agricultural parcel on which they are located. Headlands may be wider than 1 m if this is necessary for reasons of water conservation or the management practices used; however, the maximum width must not exceed 3 m on average. The headlands need not be mown. Mowing is, however, required if the headland begins to sprout woody growth.

Filter strips that are 3 m wide on average and covered with perennial herbaceous plants,

grasses or meadow grasses must be established alongside watercourses in parcels located adjacent to watercourses that are larger than main ditches, by ponds, lakes, the sea and next to wells from which water is drawn for household use. The filter strips may be wider than 3 m if this is necessary for reasons of water conservation or the management practices used; however, the maximum width must not exceed 10 m on average.

### Added measure; 13 Runoff water treatment methods

#### Description of measure

*Describe this measure in your country if different* : Runoff water treatment consist of three different measures:

a) Controlled subsurface drainage refers to subsurface drainage, the drainage efficiency of which can be controlled. The water control mechanism is usually located in a control sump installed in the collector ditch. The spacing between the existing subsurface drains has to be taking into account in the controlled-drainage plan, if any, the implementation of a new drainage system, the installation of control sumps, and the regulation of the water level in the sumps by raising or lowering the height of backwater. (24 000 ha in 2009)

b) Controlled irrigation refers to a combined irrigation and drainage method that relies on open ditches and subsurface drains. Irrigation water to the controlled-irrigation area is derived from natural watercourses either by pumping or by gravity. Irrigation water is retained in the area's ditches by means of controllable weirs or control sumps and is conducted to arable areas as required. The controlled-irrigation plan specifies the need for an irrigation water pumping station, an electrical control centre, irrigation water pipes and an irrigation basin. The plan also specifies the location of irrigation mains and filter pipes, as well as control sumps or weirs that regulate the water level. (2200 ha in 2009).

c) The recycling of drainage waters refers to the storing of runoff waters from the arable area during spring runoff and heavy rains in a separate basin, from which they are conducted back to the arable area as irrigation water during the dry season. (120 ha in 2009)

1. Is there any official quantified goal that states to what extent this measure should be implemented? **Yes**

- If "Yes";
  - a) specify quantity and unit: **9000 ha**
  - b) if applicable, what year to be realized? **2013**
  - c) give reference(s): The Finnish rural development programme 2007-201
- If "No", what is your expert opinion of the desirable level in 5 years?  
quantity and unit:

2. To what extent is this measure implemented today in relation to goal set above? **10**  
"0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it? **10**  
"0"=Impossible; "10"=Very good

Comments: total 26300 ha in 2009

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country: Controlled drainage fields have been established and

constructed in Finland since 1980's.

Is this measure regulated in legislation? **No** If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

Comments:

Is this measure entitled to economic subsidy? **Yes** If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:** The Finnish rural development programme 2007-2013

Comments:

**Added measure; no and title**

Description of measure

Describe this measure in your country if different :

1. Is there any official quantified goal that states to what extent this measure should be implemented?

- If "Yes";
  - a) specify quantity and unit:
  - b) if applicable, what year to be realized?
  - c) give reference(s):
- If "No", what is your expert opinion of the desirable level in 5 years? quantity and unit.

2. To what extent is this measure implemented today in relation to goal set above?   
 "0"=Not at all; "10"=Goal already reached

3. If goal is not reached; how do you judge the possibilities to fulfill it?   
 "0"=Impossible; "10"=Very good

Comments:

Comments on why the goal is easy/difficult to reach, what are the most important parameters in your country:

Is this measure regulated in legislation?  If "Yes"; national  or regional  rules

**Reference(s) to legislation:**

Comments:

Is this measure entitled to economic subsidy?  If "Yes"; national  or regional  subsidy rules

**Reference(s) to subsidy rules:**

**List of used words**

**Agricultural land** (also **agricultural area**) denotes the land suitable for agricultural production, both crops and livestock.

**Arable land** is land under temporary agricultural crops, temporary meadows for mowing or pasture, land under market and kitchen gardens and land temporarily fallow (less than five years). The abandoned land resulting from shifting cultivation is not included in this category.

**Permanent crops** - land cultivated with long-term crops which do not have to be replanted for several years; land under trees and shrubs producing flowers, such as roses and jasmine; and nurseries (except those for forest trees, which should be classified under "forest")

**Permanent meadows and pastures** - land used permanently (five years or more) to grow herbaceous forage crops, either cultivated or growing wild (wild prairie or grazing land).

**References**

Pain B. and Menzi H., 2003: Glossary of terms on livestock manure management 2003. RAMIRAN Network, 59 pp. Copies available from: H. Menzi, Swiss College of Agriculture, Laenggasse 85, CH-3052, Zollikofen, Switzerland.  
[harald.menzi@shl.bfh.ch](mailto:harald.menzi@shl.bfh.ch)

Definitions of agricultural words can be found in the FAO glossary  
<http://faostat.fao.org/>

Albertsson, B., 2010. Riktlinjer för gödsling och kalkning (Guidelines for fertilizing and liming). Jordbruksverket Jönköping. 84 pages. [www.sjv.se](http://www.sjv.se)