4 MANURE PLANNING PART-1

This booklet provides guidance on:

- preparing a Risk Assessment Plan for Organic Manures
- calculating the Farm Based Limit for livestock manures
- calculating Field Based Limits for all organic manures.

Section 1: Risk Assessment Plan

You must prepare a risk assessment plan if you apply organic manures on your farm.

This section provides guidance on what must be included in the risk assessment plan and also some good practice guidance. In preparing the plan, you must draw up a risk assessment map showing:

- the boundary of every field within a NVZ;
- the area of every field in hectares within a NVZ;
- areas of the farm within a NVZ where the NVZ rules do not allow you to apply organic manures e.g. 10 metre buffer strips next to water courses;
- areas within a NVZ where the use of organic manures would pose a high risk to the water environment;
- the location of any field heaps within a NVZ used for the temporary storage of solid manures.

This information relating to no-spread areas must then be used to calculate the available spreading area of each field within a NVZ.

You need to know this in order to:

- undertake your Nmax calculations (see Booklet 6).
- calculate the maximum amount of organic nitrogen that can be applied to each field (see Section 2 of this booklet).

The information relating to the total field areas is also used to calculate the 170 kg N/ha loading limit for livestock manure (see Section 2 of this booklet).

The Risk Assessment Map

Drawing up a risk assessment map is an important starting point for planning the application of FYM, slurry and other organic manures. The risk assessment map also provides a quick visual reference for farm staff and contractors employed in the spreading of manure and slurry.

Once you have drawn up this risk assessment map, it can generally be used in future years without change, unless you reduce or increase the area of your farm, or undertake new drainage works. However, if you store solid manure in temporary field heaps, you will have to update the map each year to show their location.

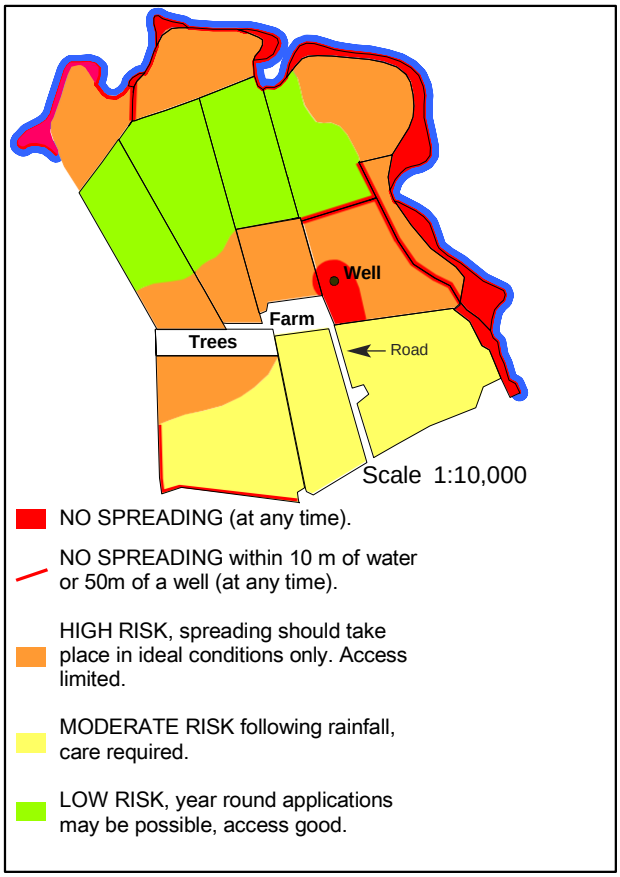
The guidance provided here is similar to that contained in “The 4 Point Plan, Straightforward Guidance for Livestock Farmers to Minimise Pollution and Benefit Your Business”. If you have already completed a RAMS map for another purpose, please go to Step 2.

Step 1 – Risk Assessment Map

To draw up the land plan for your farm you will need:

- a photocopy of a map of the farm showing ditches and fences (1:10 000 or larger).A copy of your IACS map would be ideal.
- coloured pens/pencils (red, orange, yellow, blue and green), and
- a calculator.

By the end of this section, you should have a map of your farm with coloured sections, looking something like this.



Identification of surface waters

Draw on the map in blue all surface waters e.g. ditches, burns, rivers, lochs and any ponds or wet areas on your farm (especially marsh/bog areas and areas that are prone to flooding).

Identify unavailable land on your map

Identify areas where spreading cannot be carried out e.g. woodlands, steading areas, farm roads and yards or any areas with separate management agreements such as SSSI or agri-environment scheme habitats, where the management prescription prohibits the spreading of organic manures. These areas must be identified on your map to allow you to deduct the unavailable area from the gross field area and determine the spreading area.

Step 2 – You Must Identify the Following Areas on the Map

2.1: Mark the following no-spread areas in RED

- areas within 50m of a well or borehole or similar underground facility for the purpose of any water supply. Remember also to consider any wells or boreholes on neighbouring land;
- areas within 10m of any surface water e.g. ditch, stream, river, pond or loch.

2.2: Mark the following High risk areas on the map in ORANGE

- land with a slope more than 12 degrees and lesser slopes where spreading would represent a high risk to the water environment.

Any other area of high risk to the water environment. This includes:

- areas with a risk of flooding more often than one in five years;
- fields with drainage installed in previous 12 months; or
- land which has a tendency to being water-logged.

2.3: Mark the location of any temporary field sites used for the storage of solid manures.
Note that temporary field storage sites **cannot** be located on no-spread or high risk areas.

Good Practice

The following steps are not specifically required under the NVZ Regulations. However, identifying the areas of your farm that fall into the Yellow and Green categories is regarded as good practice and will provide a full visual assessment of the spreading risks associated with each area of your farm.

Moderate risk areas – mark these on the map in Yellow
Care will still have to be taken in spreading fertilisers in areas categorised as moderate risk. Ground conditions should be checked before spreading.

Moderate risk areas
- slopes with a gradient of between 4 and 12 degrees in the vicinity of watercourses.
- land sloping towards watercourses or water supplies or imperfectly drained or saturated land.

Low risk areas – mark these on the map in Green
Land in this category presents a **lower pollution risk**, but other factors that could change the spreading risk, such as flooding or frost/snow conditions, will still have to be taken into account.

Low risk areas
- slopes with a gradient up to 4 degrees.
- land with no artificial drainage.

Step 3: Measuring exclusions

By following the steps above you will have identified the areas of your farm where there is the greatest risk of nitrogen pollution from the spreading of manure and slurry. Where parts of a field have been identified as a particular risk e.g. buffer strips next to watercourse, you will need to work out the total area that is excluded and then subtract this from the total field area.

You can do this with scale ruler if available but in many cases to be accurate you will have to measure the linear distance of water courses etc. Remember that watercourses have two sides. Where a water course intersects a field you will be effectively counting the exclusion twice, while a water course on a field boundary would be attributed to two or more fields.

In the case of boreholes or wells the 50 metre exclusion area may overlap more than one field. Where this results in an irregular shape, you should mark the exclusion as a square or other ‘practical’ shaped area. For slopes where the application of nitrogen fertiliser would present a significant risk of nitrogen entering surface water, an estimation of the area in question will suffice as long as the estimation can be justified as a reasonable assessment.

You and your employees or contractors should refer to the Risk Assessment Map before applying any organic manures. You must also take account of weather and ground conditions and the NVZ rules before applying any nitrogen fertiliser, even on areas identified as being low risk.

Step 4: Calculating spreading land and field loading

By referring to your Risk Assessment Map, please complete Table 1 below for every field that you have within the NVZ. This will allow you to calculate:

1. the maximum amount of nitrogen that can be applied to each field in the form of organic manure (250 kg N/ha over the available spreading area of the field);
2. 170 kg N/ha/year loading limit for livestock manure.

Full details of these rules can be found in Section 2 of this booklet

Table 1

Field name/no.	Agricultural area (ha)	Ditches and Watercourses		Other red areas (ha)	Unavailable areas (ha)	Land available for spreading (ha)	Multiply by 250 to calculate the maximum nitrogen that can be applied to each field in the form of organic manure (kg/ha)
		Length in metres	Length (m) divide by 1000 for ha				
Totals	(a) Total			(b) Total red area	(d) Total unavailable area	Total available land or areas	

Calculate the 170 kg N/ha/year ha loading limit for livestock manure, completing Table 2 below

Table 2

Total area from (a) above		Nitrogen loading limit for livestock manure	Carry this figure forward to Table 7, box (g) in Section 2 of this booklet
	X170	= Kg →	

Section 2: Farm Based Nitrogen Limits for Livestock Manures and Field Based Nitrogen Limits for all Organic Manures

You must understand and distinguish between the following rules:

170 kg N/ha/year – loading limit for livestock manure

This rule sets an annual farm limit of 170 kg/ha of total N produced by farm livestock across the agricultural area within the NVZ. It is based on the nitrogen actually excreted by animals on the farm, plus the nitrogen content of any livestock manure that is brought onto the farm. You must use standard figures to calculate this loading limit, unless you can provide satisfactory scientific evidence that a different figure is appropriate to your farm. If you wish to use a different figure, you must get written approval from your RPID Area Office.

250 kg N/ha – field application limit for organic nitrogen

This rule sets a field limit of 250 kg/ha of total N from all organic manures, other than compost, that are applied to land in any 12 month period, excluding grazing deposition and nitrogen applied as manufactured nitrogen fertiliser.

500 kg N/ha – field application limit for compost

This rule sets a field limit restriction for the application of compost to 500 kg/ha of total N from all organic manures (including compost) that are applied to land in any 24 month period, excluding grazing deposition and nitrogen applied as manufactured nitrogen fertiliser.

170 kg N/ha/year loading limit for livestock manure – what does it mean?

The Nitrates Directive establishes an annual limit of 170 kg N/ha on the loading of total nitrogen (N) produced by farm livestock across the utilisable agricultural area of land within an NVZ. It includes livestock manure spread to land or deposited during grazing and also takes account of any livestock manure moved off (exported) or onto (imported) the holding. The loading is calculated as:

(Total N excreted by livestock on the farm plus the N content of imported manure)

÷

(the total agricultural area of the farm within a NVZ)

Page 9 will help you to calculate whether you comply with the farm loading, based on standard N output figures for different types and classes of livestock.

Before proceeding to this section, you will have to complete the Risk assessment, Steps 1 to 4.

250 kg N/ha field application limit for organic nitrogen – what does it mean?

The total nitrogen content of organic materials, other than compost, spread on an individual field must not exceed 250 of nitrogen per ha in any 12 month period. This limit excludes grazing deposition. The individual field application limit is calculated as:

(Total nitrogen content of all organic manures, other than compost to be applied to the field)**

÷

(the available spreading area of the field)

****This includes all livestock manures, slurries and other organic materials used as fertiliser e.g. compost, sewage sludge etc. It excludes grazing deposition.

500 kg N/ha field application limit for compost – what does it mean?

The total nitrogen content from spreading compost (including all other applications of organic manures) on an individual field must not exceed 500 of nitrogen per ha in any 24 month period. This limit excludes grazing deposition. The individual field application limit is calculated as:

(Total nitrogen content of all organic manures, including compost, to be applied to the field)**

÷

(the available spreading area of the field)

****This includes all livestock manures, slurries and other organic materials used as fertiliser e.g. compost, sewage sludge etc. It excludes grazing deposition.

Nitrogen content of non-livestock derived organic manures. If you import organic manures and wastes derived from non-livestock sources, the supplier of the organic manure must provide you with an analysis of the nutrient and other chemical content. This analysis will specify the nitrogen content per tonne or m3 of the waste or manure.

You should already have calculated the available spreading area and the organic nitrogen field application limit for each field, when you completed Table 1 in Section 1 of this Booklet. When planning organic manure applications you must refer to these calculations and ensure that the total applications of organic nitrogen to individual fields do not exceed the calculated field limit.

Do you comply with the 170 kg N/ha/Year loading limit for livestock manure? – Average annual stocking records

Step 1

It is a requirement of the NVZ Regulations that farmers in the designated NVZ areas keep records detailing "the number of livestock kept on the farm, their species and type, and the length of time kept on the farm".

You must compile a record of the classes of livestock kept on your farm for the year preceding the year in which you are completing your fertiliser and manure management plan. The purpose of keeping specific livestock records for NVZ farms is to enable you to check your compliance with the 170 kg N/ha/year loading limit for livestock manure and to help you in accurately assessing the storage requirements for slurry.

Working out the average number of each livestock category kept on the farm

Table 3 in this booklet must be completed as a primary step toward assessing your compliance with the 170 kg N/ha/year loading limit for livestock manure. It will also satisfy the NVZ regulatory requirement for livestock records (you must continue to maintain all other statutory livestock records).

To help you in working out the numbers of animals contributing to the farm loading limit you should complete Table 3 on the next page. You **do not** need to calculate an average figure for pigs and poultry as the totals at Step 3, Table 5 are based on animal places and percentage occupancy.

1. Use your statutory livestock records to identify the numbers of each livestock class that were present on the farm on the first day of each calendar month in the previous year.

2. Add the monthly totals and divide by 12 to give the average annual stocking rate per livestock class.

You should carry the calculated average figure forward to Step 2, Table 4 and follow the stages thereafter to assess your compliance with the 170 kg N/ha/year loading limit for livestock manures.

If your calculations show that your previous year's stocking was close to the limit, then you will need to monitor livestock numbers carefully in the forthcoming year to ensure that you do not breach the limit. In this situation you should consider maintaining a copy of Table 3 on a month by month basis as this will allow you to monitor the situation carefully.

Table 3 – Average annual stocking records

Livestock type	Numbers present on first day of calendar month													
	J	F	M	A	M	J	J	A	S	O	N	D	Total	12 month average = total ÷ 12
1 Dairy cow, (over 9000 litre milk yield)														
1 Dairy cow, (6000 to 9000 litre milk yield)														
1 Dairy cow, (up to 6000 litre milk yield)														
1 Dairy heifer replacement, 13 to first calf														
1 Dairy heifer replacement, 3 to 13 months														
1 Beef suckler cow (over 500 kg)														
1 Beef suckler cow (up to 500 kg)														
1 Steer/Heifer for slaughter														
1 Steer/Heifer, over 25 months														
1 Steer/Heifer, 13 to 25 months														
1 Steer/Heifer, 3 to 13 months														
1 Bull beef, 3 months and over														
1 Bull for breeding, over 25 months														
1 Bull for breeding, 3 to 25 months														
1 Calf, up to 3 months														
1 Breeding ewe up to 60 kg (inc lamb to 6 months where applicable)														
1 Breeding ewe over 60 kg (inc lamb to 6 months where applicable)														
1 Lamb (from 6 months up to 9 months)														
1 Lamb/Hogg (from 9 months old to first lambing, tupping or slaughter)														
1 Goat														
1 Breeding deer														
1 Deer (other)														
1 Horse														

Do you comply with the 170 kg N/ha/year loading Limit for livestock manure?

Step 2: Work out the total nitrogen produced by grazing livestock on your holding by completing Table 4 below (if you have no grazing livestock go to Step 3, or Step 4 if you only import livestock manure)

Table 4

Livestock type	Number of stock units (Step 1)	Total N excreted by 1 stock unit (kg/year) [1]	Total nitrogen
	(a)	(b)	(a x b)
1 Dairy cow, (over 9000 litre milk yield)		115	
1 Dairy cow, (6000 to 9000 litre milk yield)		101	
1 Dairy cow, (up to 6000 litre milk yield)		77	
1 Dairy heifer replacement, 13 months to first calf		61	
1 Dairy heifer replacement, 3 to 13 months		35	
1 Beef suckler cow [2] (over 500 kg)		83	
1 Beef suckler cow [2] (up to 500 kg)		61	
1 Steer/Heifer for slaughter		50	
1 Steer/Heifer, 13 to 25 months		50	
1 Steer/Heifer, 3 to 13 months		33	
1 Bull beef, 3 months and over		54	
1 Bull for breeding, over 25 months		48	
1 Bull for breeding, 3 to 25 months		50	
1 Calf, up to 3 months		8.4	
1 Sheep up to 60 kg (inc lamb to 6 months where applicable)		7.6	
1 Sheep over 60 kg (inc lamb to 6 months where applicable)		11.9	
1 Lamb (from 6 months up to 9 months)		2.0	
1 Lamb/Hogg (from 9 months old to first lambing, tupping or slaughter)		1.4	
1 Goat		15	
1 Breeding deer		15.2	
1 Deer (other)		12	
1 Horse		21	
Total nitrogen produced by grazing livestock (kg) year)[1] →			**(A)**

[1] includes an allowance for N losses from livestock housing and manure storage

[2] Suckler Cow: includes calf up to weaning age

Step 3: Work out the total nitrogen produced by non-grazing livestock on your holding by completing Table 5 below

Table 5

Livestock type	% occupancy	No. of animal places	Total N excreted by 1 stock unit (kg/year)[1]	Total nitrogen
		(a)	(b)	(a x b)
1000 Laying chickens (caged) over 17 weeks	97		400	
1000 Laying chickens (free range)(2) over 17 weeks	97		530	
1000 Broiler chickens (table)	85		330	
1000 Laying chickens up to 17 weeks	89		210	
1000 Broiler chickens (breeder) up to 25 weeks	92		290	
1000 Broiler chickens (breeder) 25 weeks and over	95		700	
1000 Turkeys (male)	90		1230	
1000 Turkeys (female)	88		910	
1000 Ducks	83		750	
1 Ostrich	100		1.4	
1 Sow place (including litter up to 7 kg) fed on a diet supplemented with synthetic amino acids	100		16	
1 Sow place (including litter up to 7 kg) fed on a diet without synthetic amino acids	100		18	
1 Breeding boar 66 kg to 150 kg	100		12	
1 Breeding boar over 150 kg	100		17.5	
1 Weaner place (7 to 13 kg)	71		1	
1 Weaner place (13 to 31 kg)	82		4.2	
1 Grower place (31 to 66 kg) (dry fed)	88		7.7	
1 Grower place (31 to 66 kg) (liquid fed)	88		7.7	
1 Finisher place (66 kg to slaughter) (dry fed)	86		10.6	
1 Finisher place (66 kg to slaughter) (liquid fed)	86		10.6	
1 Maiden gilt place	80		11.1	
Total nitrogen excreted by non-grazing livestock (kg) →				(B)

[1] N output in manures and excreta output is per poultry place Includes an allowance for N losses from poultry housing and manure store

[2] 80% of excreta is deposited in the building (assumed)

Step 4: Calculate the nitrogen content of imported or exported livestock manure by completing Table 6 below

Table 6

Manure type	Total N kg/m^3 or kg/t	Quantity imported or exported m^3 or tonnes	Total N content of imported/exported livestock manure
	A	B	C = A x B
Cattle farmyard manure	6.0		
Pig farmyard manure	7.0		
Sheep farmyard manure	7.0		
Duck manure	6.5		
Poultry layer manure	19		
Poultry broiler manure (litter)	30		
Turkey manure (litter)	30		
Cattle slurry, 2% dry matter	1.6		
Cattle slurry, 6% dry matter	2.6		
Cattle slurry, 10% dry matter	3.6		
Pig slurry, 2% dry matter	3.0		
Pig slurry, 4% dry matter	3.6		
Pig slurry, 6% dry matter	4.4		
Strainer box cattle slurry	1.5		
Weeping-wall cattle slurry	2.0		
Mechanically separated cattle slurry	3.0		
Mechanically separated pig slurry	3.6		
Dirty water, less than 1% dry matter	0.5		
Total kg of imported/exported nitrogen to include in 170 kg N farm loading calculation →			**(C)**

Step 5: Are you within the 170 kg N/ha/year loading limit for livestock manure?

Table 7

Total N produced by grazing livestock (A from Step 2)	(c)
Total N produced by non-grazing livestock (B from Step 3)	(d)
Total N content of imported livestock manure (C from Step 4), Note this will be a minus figure if exporting	(e)
Total N from livestock manure (c + d + e)	**(f)**
Farm loading value (from Table 2)	(g)

You are complying with the 170 kg N/ha/year loading limit for livestock manure if **f** is less than or equal to **g**. However, if **f** is greater than **g** you must take action to achieve compliance.

This could be achieved by exporting livestock manure to another farm, reducing livestock numbers, or by increasing the area of agricultural land under your control.

You must keep records if you are moving livestock manure off, or onto, the farm. These must include details of:

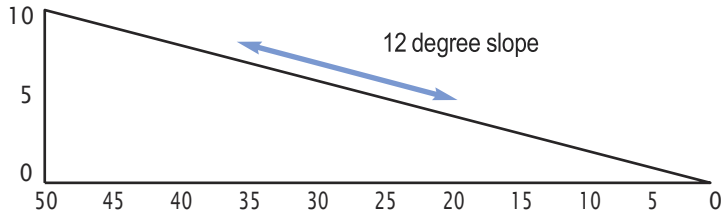
- **The type of livestock manure;**
- **The quantities moved;**
- **The estimated N content;**
- **The dates of export or import; and**
- **The recipient's or sender's details.**

You must keep these records for at least three years (see Booklet 7).

Assessment of Slope – what is 12 degrees and how do I assess a slope?

The NVZ Regulations specify that you must “clearly show on your Risk Assessment Map any area of land with a slope of 12 degrees or more” and provide a ruling that “Nitrogen fertiliser must not be applied to any land if there is a significant risk of nitrogen entering surface water, taking into account – the slope of the land, particularly if greater than 12 degrees”.

A 12 degree slope can also be expressed as 1 in 5 or 20%, you should use the scale that you are most familiar with.



From the diagram above you can see that a 12 degree slope provides a 1 metre rise for every 5 metres travelled on the horizontal plain.

It may be clear from a visual assessment that a slope is either above or below 12 degrees. In a case where you cannot determine the inclination of a slope or believe it to be a border line case, you can easily determine the slope incline using the following method.

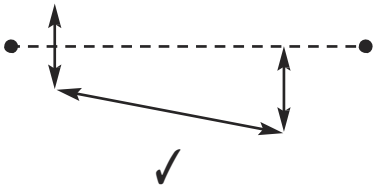
Method of assessment

You will need 2 straight poles approx 1.3 metres in length, clearly marked at the point where they are exactly 1 metre long (the remaining length is to allow you to place the pole securely in the ground), and a measuring tape.

At the slope you wish to measure select a safe site that is representative of the overall aspect of the slope, be sure that you have sufficient space available around you that you are able to step back to safely assess the inclination.

Drive the poles into the ground 5 metres apart so that only 1 metre is showing above ground. Step back to a distance where you can assess the poles in relation to each other. If the top of the lower slope pole is above the bottom of the higher slope pole then the slope is less than 12 degrees, consequently if the top of the lower slope pole is below the bottom of the higher slope pole then the slope is greater than 12 degrees.

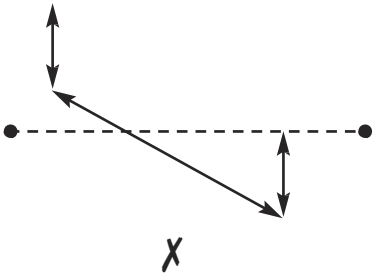
Example a): (not to scale)



Example a)

The dashed line represents the horizontal plane in relation to the two poles. In this example the top of the lower pole intersects the higher pole and confirms that the slope is less than 12 degrees.

Example b): (not to scale)



Example b)

The dashed line represents the horizontal plane in relation to the two poles. In this example the top of the lower pole does not intersect the higher pole and confirms that the slope is greater than 12 degrees.

Notes

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