10. EFFLUENT

Dairy effluent is a valuable resource which, when managed well, increases pasture production, and reduces fertiliser costs.

10. EFFLUENT

Nutrients in the effluent from 100 cows under different scenarios

	Nutrients in effluent from 100 cows (kg/yr)			Effluent area needed to apply 150 kgN/ha*	
No feed pad – farm dairy effluent					
	N	P	K	% of farm	ha /100 cows
All grass system (milking 270 days, twice a day)	590	70	540	11	4
Feeding 2tDM/ha of maize silage in paddock	668	80	668	12	4.4
Using a feed pad – farm dairy effluent plus feed pad effluent (Feeding 2tDM/ha of maize silage)					
Time on the pad	N	P	K	% of farm	ha /100 cows
½ hour per day on pad	838	100	868	14	5.6
1 hour per day on pad	1008	120	1044	17	6.8
2 hours per day on pad	1348	160	1396	22	8.8
Feed comparisons (2 hours/day on pad)					
4tDM/ha/yr maize silage	1360	164	1460	25	8.8
4tDM/ha/yr grass silage	1588	184	1668	29	10.4

Table adapted from B. Longhurst, AgResearch 2004 – Adding Environmental and Economic Value to Dairy Effluent

*** Overseer should be used to determine effluent block size**

Note that, at minimum nitrogen loading (i.e., 4ha effluent area/100 cows for an all-grass system) potassium (K) loading may become an issue for metabolic problems.

The average dairy cow produces about $25 worth of nutrients annually as farm dairy effluent (FDE). For a 400 cow dairy herd this represents about $10,000 of nutrients annually.

Typical nutrient concentrations (kg/m3) of different effluent sources

Source	%DM	N	P	K	Spreader type
Liquid – farm dairy (fresh or sump)	< 1.0	0.45	0.06	0.35	Irrigator
Liquid – storage pond	< 0.5	0.25	0.03	0.30	Irrigator
Feed pad – slurry	4	1.5	0.3	1.0	Slurry tanker
Feed pad – liquid (post separation)	0.3	0.25	0.03	0.3	Irrigator
Feed pad – solids (post separation)	20	4.5	0.8	2	Muck spreader
Stand-off pad solids	25	2.0	1.5	2.0	Muck spreader
Wintering pad scrapings	15	2.0	0.3	0.75	Muck spreader
Wintering shed bunker	20	5.0	2.0	7.5	Muck spreader

Effluent spreading rates and depths for different effluent sources

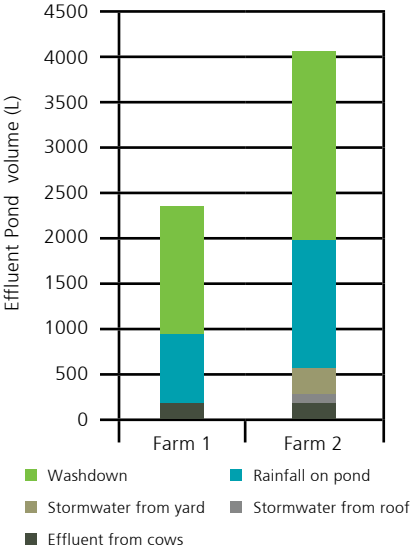
Use the Farm Dairy Effluent Spreading Calculator to determine nutrient loading based on effluent source and the effluent irrigation depth applied. Download at **www.dairynz.co.nz/effluent.**

Effluent storage requirements

There is no fixed number of days of required Farm Dairy Effluent storage on dairy farms. Each individual farm has its own unique storage requirements. The graph shows how water use in different parts of the farm dairy can affect dairy effluent pond volumes.

In this example, both farms milk 300 cows, but the effluent volume on Farm 1 is almost half that of Farm 2. This is because:

- Farm 1 uses less washdown water per cow per day than Farm 2 (50 L/cow/d vs. 80 L/cow/d).
- Farm 1 has guttering on the farm dairy roof and diverts stormwater from the yard.
- Farm 1 collects less rainwater as the pond is smaller, due to the lower storage requirements.



Storage requirements should be determined by the Dairy Effluent Storage Calculator (DESC). This can be downloaded from **www.dairynz.co.nz/desc**.

This uses a combination of local climate, soil types and your farm information to determine the volume of storage required by a farm.

We recommend working with a **Dairy Effluent WOF assessor** or **Accredited Effluent System Designer** to use this Calculator and identify the most appropriate storage requirements for your farm.

Soil risk framework for effluent application

Category	A	B	C	D	E
Soil and landscape feature	Artificial drainage or coarse soil structure	Impeded drainage or low infiltration rate	Sloping land (>7°) or land with hump & hollow drainage	Well drained flat land (<7°)	Other well drained but very light flat land (<7°)
Risk	High	High	High	Low	Low
Application depth (mm)	< SWD[1]	< SWD	< SWD	< 50% of PAW[2]	≤ 10 mm & < 50% of PAW[2]
Storage requirement	Apply only when SWD exists	Apply only when SWD exists	Apply only when SWD exists	24 hours drainage post saturation	24 hours drainage post saturation
Max depth: High rate tool	10 mm	10 mm	10 mm[3]	25 mm[4] (10 mm at field capacity)	10 mm
Max depth: Low rate tool	25 mm	25 mm	10 mm	25 mm	10 mm

[1] SWD is the soil water deficit

[2] PAW is the plant available water in the top 300 mm of soil

[3] Only applicable when instantaneous application rate from the irrigator is less than the infiltration rate

[4] Suggested maximum application depth when a suitable SWD exists (≥ 15 mm)

For all the risk categories the application rate should always be less than the soil infiltration rate otherwise you will get ponding (on sloping land the instantaneous application rate needs to be less than the soil infiltration rate or you will get run-off).

For more information, refer to the *Pocket guide to detemine soil risk for FDE application*

Common hazards of effluent irrigation

Ensure the maintenance and operation of all areas related to your effluent system are included in your farm Health and Safety plan.