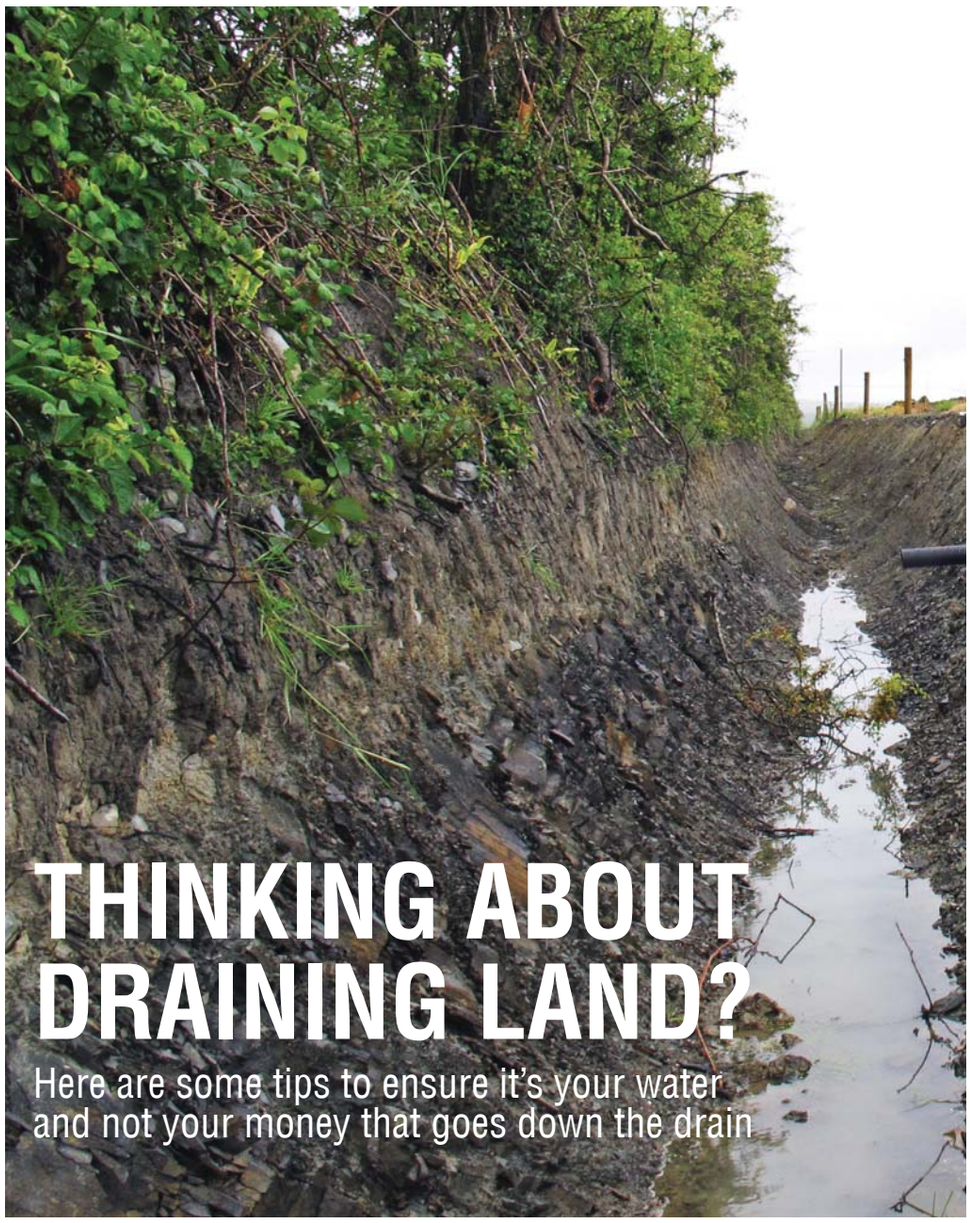
Owen Fenton,
Teagasc, Crops Environment and Land Use Programme, Johnstown Castle.
Pat Tuohy,
Teagasc, Animal and Grassland Research & Innovation Centre, Moorepark



THINKING ABOUT DRAINING LAND?

Here are some tips to ensure it's your water and not your money that goes down the drain

It is important to make the most of what you already have. Many land drainage systems are poorly maintained. Maintenance or re-instatement of outfalls and open drains are great ways to begin. Open drains should be clean and as deep as possible. Field drains feeding into them should be regularly rodded or jetted.

Investigate

Establish the source of your problem. The water to be drained may be falling from above (as rain) or coming up from below (a rising water table). Sometimes, you are dealing with both.

Never carry out land drainage work before you have investigated the drainage characteristics of the soil. Don't accept an 'off the shelf' drainage design or pre-determined depth for the drainage pipes from a contractor. The drainage design should maximise the rate of water discharge from the soil and the means of achieving this will vary with soil type.

Vital information can only be gathered through a thorough soil test pit investigation on your land. Dig a number of soil test pits (2.5m deep) on the land to be drained to capture any differences in the soil profile. You are looking for a representative soil profile which best describes your drainage problem. Dig a soil test pit in both wet and dry areas of the field and compare the two.

Soil test pits are potentially very dangerous because the walls are prone to collapse so don't get into the soil test pit. Instead, observe from a safe distance and inspect soil profile material as it comes up in the digger bucket.

There are two types of drainage systems: groundwater drainage systems and shallow drainage systems. Choosing between the two types of drainage system comes down to whether a permeable soil layer is present (at a workable depth) in the soil profile which water flows through easily.

If there is a permeable layer present, a piped drain system at that depth is likely to be effective.

If no such layer is found during soil test pit investigations, your only option is to improve the drainage capacity of the soil. This involves soil disruption techniques, such as moling, gravel moling or sub-soiling in tandem with collector drains.

Groundwater drainage

Groundwater drainage is the most effective way to drop the watertable and dry out the soil.

Having tapped into the permeable layer, the drain will be discharging water throughout the year, even in dry summer conditions. This will lower the water table and will allow for natural (cracking, root penetration and biological activity) or artificial (sub-soiling/ripping) improvements in permeability in the shallower layers over time, facilitating surface drainage. The outfall level must not dictate the drainage system depth. If a free draining layer is present, it should be utilised.

Shallow drainage

The aim of shallow drainage techniques is to improve permeability by fracturing and cracking the soil to form a network of closely spaced channels allowing for improved surface water drainage.

Mole drainage requires soils with high clay content that form stable channels. Gravel mole drainage is an alternative technique in soils where mole drains are unstable, due to low clay content or the presence of sands, gravels or stones. Sub-soiling usually refers to a more general loosening of the soil and provides another alternative method of improving permeability.

All disruption techniques are most effective when carried out in dry soil conditions which ensure maximum soil disturbance.

A well-laid piped collector system is essential as an outlet for these systems. The collector drains are installed across the slope of the field

Pipe and stone

Drain pipes should always be used for drains longer than 30m. If pipes get blocked, it is almost certainly a drainage stone and not a drainage pipe issue.

Drainage stone should not be filled to the top of the field trench except in unusual conditions (the bottom of an obvious hollow for example). Otherwise, it is an extremely expensive way of collecting little water. In groundwater drains, stone should be filled to a minimum depth of 300mm from the drain bottom and usually to the top of the high permeability layer.

In collector drains, fill the trench to within 200mm of ground surface and provide connectivity with disruption channels and topsoil.

Most of the stone used for land drainage today is too large. Clean aggregate in the 10mm to 40mm (0.4in to 1.5in) grading band should be used. Generally, you get what you pay for.

OPEN DAYS

The Teagasc Heavy Soils Programme has been working with farmers on difficult soils in designing and implementing land drainage systems. Four open days will be held on these farms in May.

Teagasc Heavy Soils Programme open days

Date	Venue
Wednesday 21 May	John O'Sullivan, Castleisland, Co Kerry
Thursday 22 May	John Leahy, Athea, Co Limerick
Wednesday 28 May	TJ Ryan, Rossmore, Co Tipperary
Thursday 29 May	Danny Bermingham, Doonbeg, Co Clare

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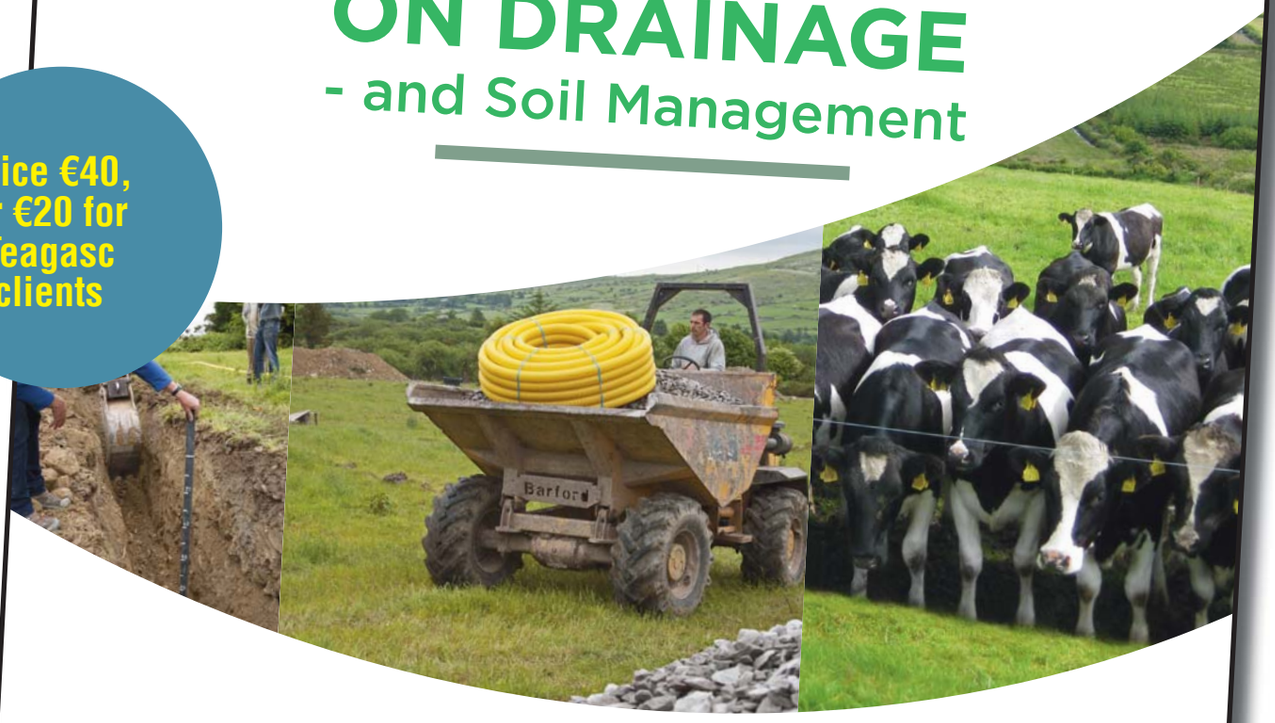
before mole/gravel mole ploughing or subsoil. They should be 0.75m to 1m deep and spaced at 15m to 40m for mole drains and sub-soiling, and 20m to 60m for gravel mole drains, depending on soil type and slope. The shallow drainage technique of choice is then installed at right angles to these collectors (up-slope).

Land drainage systems will be more sustainable if you follow the steps outlined in the **Teagasc Manual on Drainage and Soil Protection**. This 200-page publication goes into great detail on all aspects of land drainage. It addresses technical, financial and environmental aspects of drainage decisions. It is produced on water-proof, tearproof paper for use in real world conditions. The manual is a vital investment for anyone considering a drainage project. It is available in Teagasc offices.

TEAGASC MANUAL ON DRAINAGE

- and Soil Management

Price €40, or €20 for Teagasc clients



A Best Practice Manual for Ireland's Farmers

teagasc
Agriculture and Food Development Authority

AVAILABLE AT TEAGASC OFFICES