

Diffuse pollution mitigation measures cost methodology

Introduction

This methodology has been developed to illustrate the approach to deriving a cost for each mitigation measure. It is based on the work carried out for the User Manual produced in Defra project ES0203. Costs can be expressed per farm, per hectare, per tonne of animal excreta, kilogram or nutrient or whatever suits the need.

However, using per kilogram of nutrient will give one cost for nitrate and another for phosphorus. With faecal indicator organisms, biological oxygen demand (BOD) or other pollutant, the cost per individual pollutant will be different, so it will be better to express cost either per hectare or per tonne of animal excreta. Further, the cost per hectare may be expressed per hectare of farm or per hectare affected. For example, if a measure is carried out on 10 hectares of a 100 hectare farm at a cost of €100/ha, the cost per hectare will be €100/ha or €10 per farmed hectare.

In the User Manual, costs were expressed as the cost per farmed hectare. In that case, model farms were used when many assumptions were made that will not be used when calculating costs for real cases and actual measurements or units can be used.

The measures range from those delivering negative cost (a financial benefit) in terms of trading costs through normal trading costs to those with trading and capital costs. For capital costs, it will be necessary to annualise these costs at the appropriate rate and lifetime of the investment.

For example, the interest rate used in the User Manual was 7% per annum over an appropriate timescale for the investment. In the case of significant structures such as slurry stores, the appropriate time scale would be 20 years, for a fence it should 10 years and for a trough, five years, but judgements will vary. Most investments will require maintenance and a suggested rate may be 2% of the initial capital cost per annum.

The costs of measures will not be fixed in time but will vary, so where a measure involves a loss of crop, for example wheat, the cost will be different from year to year. For example, wheat prices in the UK doubled from 2006 to 2007. Recently, energy prices have increased substantially and are likely to continue to do so and this may be a significant element in the cost of a measure either as a direct cost or as an input into the materials used for a measure.

Costs for a given measure may also vary depending on the location or layout of the farm, the availability of materials, amount of materials purchased and the trading terms of the supplier. Other cost items may be the use of specialist contractors to carry out the work where the farmer does not have the machinery or the skills to do the work in-house. Contract rates will vary for many reasons, usually demand, fuel costs and size of job required.

Cost elements involved in cost calculations.

a). When there is a negative cost. For example, measure 22, do not apply P fertilisers to high P index soils.

In this case, the measure will save the cost of the fertiliser not applied in terms of the material. Where the fertiliser would have been applied separately, there will be a saving of application costs.

b). When the mitigation measure uses no materials, but is a management decision for example measure 24, avoid spreading fertiliser to fields at high risk times.

In this measure, fertiliser will not be spread to certain or all fields at high risk times, but this does not mean that it will not be spread. The result may be no effect on yield or significant effect if the high risk period was at the outset of the growth period.

The cost in this case will be the management time to re-allocate resources and the value of any crop lost as a result of delayed fertilisation. The latter may be in terms of the cost of feed used to substitute for lost grass in a grazing system or the estimated crop loss in an arable crop.

c). Where the mitigation measure requires materials in order to carry it out.

For example biological loosening or deep ploughing to destroy the plough pan and deep macropores. This requires a pass with a suitable machine either by the farmer or a contractor at an appropriate cost.

d). Where the mitigation measure uses materials that are not consumed within one year of application.

For example, measure 39, fence off rivers and streams from livestock. This measure will require a fence to be erected along the bank for a given length of field boundary on the farm. The cost of the fence will need to be annualised (amortised) by the appropriate factor; 5 years @ 7% was used in the User Manual. An annual maintenance figure of 2% of original capital cost may be used.

e). Some mitigation measures require radical changes to the farm system.

For example measure 1, convert arable land to extensive grassland. In this case, there are both trading and capital issues to address on both ceasing arable production and establishing grassland as well as livestock if production is entered into.

For ceasing arable production, trading income from crop sales will cease as will trading production expenses. The machinery needs to be sold, usually resulting in a capital sum being paid to the farmer.

Grassland establishment may be by allowing regeneration of green cover at no additional cost other than perhaps a scratch cultivation and the cover may be cut using a topper annually or periodically after four years to avoid woody scrub development or just left as a form of carbon sequestration.

Arable farmers may not wish to take on the commitment of livestock production and prefer to maintain extensive grassland or to let the land out to those requiring additional grazing for upland sheep, for example, where a rental income will be taken.

Where animal production is commenced, it may be that it is on an extensive scale. In this case, grass will need to be sown, the costs of which will include cultivations, seeds, fertiliser and pesticides. Conventionally, these costs will be spread over a five year period to reflect the long term nature of the grass.

Along with grass establishment costs may be the costs of providing buildings, water, hedges, fences, gateways and tracks. These will all be capital items which will need to be annualised and maintenance costs will be required on an annual basis usually at perhaps 2% of original capital cost.

Other measures such as wetlands will also involve capital expenditure along with trading losses from uncropped land. The latter will involve lost income as well as production costs not incurred. Maintenance costs at 2% of original capital cost will need to be included.

Five key questions in deriving the cost of mitigation

Do the costs need to be prepared on a per hectare, per head, per tonne of excreta or other basis?

Will the measure result in a saving? Calculate the savings in inputs saved and the possible costs avoided in not using them.

Will the measure incur management time and therefore a cost? Work out management time per hour.

Will the measure result in operational cost, i.e. carrying out work and using materials and/or lost production? Cost out all materials, labour and machinery costs required. Work out costs of lost production and savings on any materials not used.

Will these material costs be trading items or do they include capital items that need to be annualised? With capital items, annualisation should be appropriate to the life of the investment, i.e. over 5, 10 or 20 years at a reasonable interest rate and include an annual maintenance cost.

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