

**Flood and Coastal Defence Appraisal Guidance  
Economic Appraisal  
Supplementary Note to Operating Authorities:  
Valuation of Agricultural Land and Output for Appraisal Purposes  
May 2008**

## **1 Introduction and Background**

### **1.1 Purpose and Scope**

This supplementary guidance provides an update on the valuation of agricultural land and output for use in assessing flood and coastal defence projects in England only. It replaces Annex B of FCDPAG3. Its main purpose is to ensure that adequate adjustment is made in economic appraisals of agricultural benefits to allow for the effects of Government support to farmers on land values. This is in line with the Treasury Green Book's approach<sup>1</sup>. The approach is therefore concerned with determining a measure of the value of agricultural land that excludes the effects of direct transfers to UK farmers from the UK exchequer.

This guidance is based on market and policy conditions applying at the time of writing and hence is liable to change over time. It takes account of the decoupled Single Payment Scheme agreed by the Council of Ministers in June 2003 and introduced in the UK from 2005. Importantly, this guidance covers the economic value of land to allow comparison between FCERM options and not actual negotiated costs that may be involved during land purchase and compensation associated with an option. As with all whole life assessment of benefits and costs, account will need to be taken of changes to flood risk through time; e.g. future managed realignment.

In December 2005, Flood Hazard Research Centre (FHRC)<sup>2</sup> provided best practice implementation guidance on valuing agricultural output and land, for the purpose of benefits assessment for Flood and Coastal Erosion Risk Management (FCERM) investment.

### **1.2 Related Defra Policies**

The Government's "Making Space for Water"<sup>3</sup> programme has encouraged FCERM policies that include the need to consider how and where to best manage FCERM activities. Future policy direction encourages: a greater use of land for flood storage measures that may involve the surrender of land to water; and progressive implementation of coastal policies such as managed retreat and cessation of maintaining uneconomic sea defences. When considering the viability of managed retreat around the coast or realignment/removal of defences along rivers, the value of land which would be affected by a potential change in land use can form an important part of the appraisal.

### **1.3 Single Payment Scheme and Entitlements**

The EU Single Payment Scheme was introduced in the UK from 2005. It brings together various direct payment schemes paid formerly on the basis of arable land area and livestock numbers and makes a single payment to farmers.

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<sup>1</sup> Treasury Green Book (2008) Annex 3, para 15.

<sup>2</sup> FHRC (2005) The Benefits of Flood and Coastal Risk Management: A Manual (and Handbook) of Assessment Techniques, known as The Multi-Coloured Handbook and Manual.

<sup>3</sup> See <http://www.defra.gov.uk/enviro/fcd/policy/strategy.htm> for "Making Space for Water" Strategy.

There are two requirements for receipt of the Single Payment: 1) land kept in good agricultural and environmental condition (known as GAEC); and 2) entitlement to claim, following the award of an entitlement, which applies to most owners and occupiers with agricultural interests in 2005<sup>4</sup>.

Defra regards the Single Payment largely as a subsidy, and hence as a transfer payment<sup>5</sup> although a small element covers for environmental services arising from GAEC, known as cross compliance. Defra considers that the subsidy element of the Single Payment is reflected principally within the value of land and the value of an entitlement.

In England, there is a gradual move from predominantly historic payments under former EU payment schemes towards flat-rate area payments. Such payments are determined by the Rural Payments Agency<sup>6</sup>, where payments per Ha are made depending on the type of land. For example, if land lies within a Severely Disadvantaged Area (SDA), or if land is classed as moorland, then these land uses attract a different amount of payment.

Defra recognises that import tariffs also act as an implicit subsidy to producers by allowing domestic agricultural prices to remain above world levels. At present, the effect this may have on agricultural output values and land prices has not been included.

## 2 Three Scenarios

This supplementary guidance focuses on three scenarios typically encountered in FCERM appraisals where land and agricultural output would need to be valued:

- 1 *Land is abandoned or no longer fit for agricultural use for the foreseeable future.* This is the situation that typically arises as a result of the abandonment or permanent breach in sea or river embankments, sometimes due to a no-active-intervention policy or a WFD River Basin Management Plan measure.
- 2 *Occasional losses of output* as a result of flooding. This refers to losses where there is a reduction in yield for a period of time.
- 3 *Agricultural output per hectare* either: (a) falls as a result of increased flooding incidence or occasionally; (b) rises as a result of land drainage, which forms and results from necessary FCERM activities. In comparison to Scenario 2, this scenario reflects a more permanent change in output.

## 3 Scenario 1 - Abandonment of Agricultural Land

This scenario will need to be considered under:

- the do nothing (walk-away) option for an existing embankment scheme or coast protection situation
- the managed realignment 'do something' option
- options where breaches in embankments would not be repaired; e.g. for management reasons.

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<sup>4</sup> Entitlement Background. To qualify for entitlement, a claimant has to be in control of a matching number of hectares of eligible land which must be kept in good agricultural and environmental condition (GAEC). The claimant does not have to engage in agricultural production. An initial analysis of data suggested that entitlements were established on just under 97% of agricultural land, at the scheme's inception in 2005. <http://statistics.defra.gov.uk/esg/ace/a1data.htm>

<sup>5</sup> For definition, of a Transfer Payment, see FCDPAG3.

<sup>6</sup> For information on Flat Rate Payments, see:

<http://www.rpa.gov.uk/rpa/index.nsf/UI/Menu/DA5D20101021751680257030004F44F0?Opendocument>

The land in this case ceases to have any value for its current agricultural use although it may retain value for other uses. For example, land might convert to salt marshes, freshwater wetlands, or there might even be some agricultural use for grazing, where benefits may be assessed separately. Other residual issues may need to be assessed, such as if an appraisal option involving abandonment affects productivity in adjacent land. For example, options that may impact upon freshwater aquifers or change wetlands to saline, which may in turn affect adjacent water supply and irrigation regimes.

The previous approach to valuing abandoned land, as reflected in FHRC's Multi Coloured Manual, involved applying a factors of 0.65 to the market price of land, to allow for the transfer payment<sup>5</sup> element of the single payment. This approach did not reflect the dynamic state of the land market, nor likely future trends in land values and diversification<sup>7</sup>.

### *New approach*

The new approach is based on the assumption that the Single Payment is treated as a transfer payment in economic terms, part of which is capitalised into land prices. In most cases, the economic value of land for use in appraisal will simply be **Market Value less £600/ha**, where the £600/ha allows for the transfer payment element<sup>5</sup>. See Annex A for further rationale.

This approach should be followed for: all assessments at a National and Catchment Flood Management Plan / Shoreline Management Plan level; all initial stages of appraisal; and most detailed stages of appraisal. Appraisers may be required to apply sensitivity testing at some detailed stages of appraisal, but only if the option choice has a high probability of changing as a result of the test, and where it is not disproportionate to the scale of appraisal. Exceptionally, any sensitivity testing would:

- investigate the value of land if: 1) land does not attract a Single Payment; 2) land attracts the area component of the Single Payment only, for high value fruit and vegetables; and
- manage the uncertainties in the level of Single Payment to be negotiated between EU member states after 2012.

See Annex A for further details on conducting sensitivity tests in these circumstances.

## **4 Scenario 2 – Occasional Losses of Agricultural Output**

This scenario will need to be considered when flooding would result in the complete loss of a crop or make the land unusable for production for a year or longer. Under this scenario, where agricultural output is lost for a single year or longer, the use of a gross margin (broadly defined as sales less variable costs) is generally adequate to reflect losses to the farmer. The Single Payment should not be included in the calculation for gross or other margins.

This approach assumes that the farmer's fixed costs will not change, and where land is flooded before most variable costs have been incurred. However, appraisers will need to consider circumstances where variable costs are incurred prior to flooding, such as the likelihood of spring and summer flooding, after which most variable costs will have been invested into the land.

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<sup>7</sup> The Valuation Office Agency (VOA) have reported on agricultural land market trends in their Property Market Report for January 2007. See: [http://www.voa.gov.uk/publications/property\\_market\\_report/pmr-jan-07/agricultural.htm](http://www.voa.gov.uk/publications/property_market_report/pmr-jan-07/agricultural.htm).

If fixed cost savings do appear likely, they should be included in the appraisal: in cases where the effects of a breach persist for more than one year there would almost certainly be some fixed cost savings.

Appraisers should consider if losses are likely to extend to more than one year, such as arising from interruptions to a livestock production cycle, which may lead to additional costs. A critical yield indicator here is stocking rate (number of animals per ha). Stocking rates, under various criteria, are reflected in FHRC's Multi-coloured Handbook<sup>8</sup>.

For another adjustment, appraisers should use cereals (the most common arable crop), as a proxy for high value crops such as potatoes, sugar beat, and dairy, where it takes more than one year to recover. If an area experiences losses in output due to flooding, it is assumed, for appraisal purposes, that production will move to other areas, where production is feasible and economically viable. Hence, the estimate of the loss of economic output is not measured for the high value crop, but instead, the loss of wheat crop output that is assumed to be displaced. Two rare exceptions to this approach are described in Annex B.

For further information on the procedure to be adopted, please refer FHRC Multi Coloured Manual and Handbook, which provides details on implementation and any changes. Appraisers should note that key changes are applied by the supplementary guidance to Tables 9.3, 9.4 and 9.6 in FHRC's Handbook. In particular, up-to-date gross margins are available from the latest farm management handbooks, and these should replace standard values set out in the FHRC tables. Appraisers should refer to the ABC costing book or Nix farm management pocket book or Defra's Farm Business Survey<sup>9</sup>.

## **5 Scenario 3 - Permanent Change in Agricultural Output (Partial Loss / Gain)**

(a) The partial loss scenario will need to be considered when a rise in water levels and/or occasional flooding results in a reduction in output, where this reduction may include partial loss of crops or simply a lower yield, or changes in flood risk. Two particular circumstances when it will need to be considered are under:

- Do nothing (walk-away) option for land drainage schemes;
- Do something option probability of failure (e.g. for pumped drainage).

(b) The partial gain scenario can be considered when a flood management option increases or maintains productivity.

As with Scenario II, please refer to FHRC Multi Coloured Manual and Handbook for details on the procedure to be adopted, and please note that the use in appraisal of cereals, as a proxy for the production of high value crops, also applies in this scenario. See Annex B.

## **6 Future Advice**

This supplementary advice note will take effect from 2<sup>nd</sup> June 2008 for all appraisals that commence after this date. Operating Authorities shall review this guidance, the methodology and the calculation of transfer payment element of the Single Payment to be deducted, whenever there are changes in the Single Payment system and payments.

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<sup>8</sup> The FHRC Multi coloured manual refers to stocking rates at different field drainage conditions and therefore is defined by the ability of that land to support stock under those drainage/ flood risk conditions.

<sup>9</sup> <http://statistics.defra.gov.uk/esg/publications/fab/default.asp>

## Annex A

### A1 New Approach to Scenario 1

The new approach to Scenario 1, Abandonment of Agricultural Land, focuses on several adjustments that determine the sum of £600/Ha (for year 2008), to deduct from the market value of land. These are described below and in Table 1, with algebraic terms used to represent the different adjustments.

The costs of modulation per Ha (*b*) and cross compliance per Ha (*c*) are firstly deducted from the value of Single Payment (*a*). An adjustment for leakage<sup>10</sup> (*d*) is then made. This value (*e*) is capitalised into land prices (*e\**), where the present value of the adjusted single payment is derived, whilst discounting future payments appropriately. The value of an entitlement (*f*) is deducted from this sum. The resultant sum is then deducted from the market value of land (*g*), to arrive at a value of land (*h*) for use in appraisal.

**Table 1 – Illustration deriving the New Approach to Scenario 1**

Treatment of Single Payment Adjustment	Value	Algebraic Terms	For A2 - Note on Rationale
Average Annual Single Payment (non-SDA):	£190/Ha/yr	( <i>a</i> )	
Less Modulation <sup>11</sup> (up to 19%):	£36/Ha/yr	( <i>b</i> )	Note 1
Less Costs of Cross Compliance	<u>£20/Ha/yr</u>	( <i>c</i> )	
Net Single Payment:	£134/Ha/yr	( <i>d</i> ) = ( <i>a</i> ) - ( <i>b</i> )+( <i>c</i> )	
Net Single Payment following leakage adjustment	£121/Ha/yr	( <i>e</i> ) = 0.9( <i>d</i> )	Note 2
Capitalised Net Payment Sum:	£865/Ha	( <i>e*</i> ) = $disc_{10\%} \sum_0^{10yrs} (e)$	Note 3
Less Value of Entitlement:	<u>£250/Ha</u>	( <i>f</i> )	Note 4
Total Deduction. (should represent the net Single Payment value in market land value)	£615/Ha <b>[say £600/Ha]</b>	( <i>e*</i> ) - ( <i>f</i> )	
<b>Adjusted Damages Avoided</b>			
Typical Market Value	£10000/Ha <sup>12</sup>	( <i>g</i> )	
Less Total Deduction	<u>£600/Ha</u>		
Adjusted damages avoided	£9400/Ha	( <i>h</i> )	

<sup>10</sup> Leakage refers to a small proportion of subsidy that tends to flow to the wider industry, rather than transferring onto the applicant of the Single Payment.

<sup>11</sup> For information on Modulation, see:

<http://www.defra.gov.uk/farm/singlepay/furtherinfo/modulation.htm>

<sup>12</sup> For latest land valuation data see RICS H2 2007 Rural Land Market Survey

## A2 Rationale and Sensitivity Testing

### Notes on Rationale and Table 1

1 *Modulation and Cross Compliance* are regarded as amounts that are not subsidy.

*Modulation* refers to the deduction in the single payment of a sum which is used to fund EU Pillar 2 schemes.

*Cross Compliance* refers to the need to meet various conditions relating to keeping land in good agricultural and environmental condition. Figures for Cross Compliance and Modulation were derived from policy expert advice within Defra.

2 *Leakage effects*. This refers to the proportion of subsidy that 'leaks' to other agricultural costs and income, and does not become capitalised in land or entitlement prices. Evidence<sup>13</sup> suggests that this leakage percentage amounts to about 10% of the capitalised Single Payment.

3 *Capitalising the Single Payment*. Oxera<sup>14</sup> estimated a post-tax real discount-rate for the UK agricultural sector as under 5%. However Oxera also estimated a range of discount rates of up to 7.7%, which included estimates from international data. Allowing for tax and inflation, a reasonable discount rate would tend towards 10%. A period of 10 years was chosen for discounting the single payment. This is viewed by Defra Economists as a sensible time period to assess farm investment.

4 *The Value of Entitlement*. An entitlement is a tradable asset, which must be purchased in order to apply for Single Payment. The typical value of entitlement varies between £200/Ha and £250/Ha on the open market<sup>15</sup>. £250/Ha is viewed by Defra as an appropriate value for this illustration.

The total capitalised value of Single Payment (based on the assumptions on discount rate, time period and other leakages) is apportioned between the two assets needed to realise the Single Payment; the Entitlement and the Land. The approximate *Value of Entitlement* is known from market transactions. This value can be deducted from total capitalised value of Single Payment, with the remaining balance ascribed to land.

### Notes on Sensitivity Testing

5 *Single Payment Adjustments*. If sensitivity testing is likely to be proportionate to the scale of appraisal conducted, and it is likely to lead to a change in option choice, then sensitivity testing will be beneficial to investigate the effect of:

- Land not in receipt of Single Payment. Here, no adjustment to market value should be made.
- Land attracting the historic component of the Single Payment, for high value fruit and vegetables (e.g. in the Cambridgeshire Fens). Here, consultations with CLA/NFU indicate that the Single Payment value may be as low as 25% of the value for the majority of cases.

<sup>13</sup> OECD (2002) The Incidence and Income Transfer Efficiency of Farm Support Measures. [http://www.oilis.oecd.org/oils/2001doc.nsf/LinkTo/agr-ca-apm\(2001\)24-final](http://www.oilis.oecd.org/oils/2001doc.nsf/LinkTo/agr-ca-apm(2001)24-final)

<sup>14</sup> Oxera (2007) Report to Defra: Economic Analysis for the Water Framework Directive: Estimating the Cost of Capital for the Cost-Effectiveness Analysis, Financial Viability Assessment, and Disproportionate Costs Assessment – Phase II.

<sup>15</sup> Value of entitlement ranges determined from discussions with the Valuation Office Agency.

Towards the end of 2008, changes in the single payment for high value fruit and vegetables are likely, due to current 'health-check' negotiations with EU. Thus, appraisers should keep aware of the outcome of such changes.

- 6 *Uncertainties after 2012.* Subject to the same caveats on proportionality, It may be necessary to explore uncertainties with the level of Single Payment after 2012. Here, appraisers should consider the effect of a *50% reduction*<sup>16</sup> in the Single

Payment after 2012. Year 1 is assumed as commencing in 2008. If appraisal is undertaken after 2008, then clearly a time adjustment will be required, as the Capitalised Net Payment Sum will change for each year up to and including 2012.

## **Annex B Use of Wheat as a Proxy for High Value Crops**

### **Use and Exceptions**

Appraisers should consider using wheat values as a proxy for other crops, in most appraisals, to simplify the process and avoid unnecessary analysis work. However, there are two cases where a simplified approach would not be appropriate. These cases are where there are unlikely to be suitable alternative locations to grow crop:

- where the impact of repeated flooding in the appraisal area affects a scarcely grown high value crop, which in turn impacts on national levels of production for that crop. For example, Lower River Trent flood plain, grows a significant share of national production in specialist red beet.
- where the appraisal area enjoys significant advantages over other areas in terms of better quality soils and market conditions, which in turn render relocation elsewhere a less viable option. For example, Cambridgeshire Fens, characterised by specialist salad crop, which would be less viable to grow in other locations.

In these cases, actual cropping regimes, supported by evidence of scale and competitive advantage, should be considered as the basis for economic analysis.

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<sup>16</sup> Reduction derived from discussions and expert advice involving CLA/NFU.