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Consultation Document

Strategic Environmental Assessment: Environmental Report, 2014-2020 Rural Development Plan

Date of issue: **28 March 2013**
Action required: Responses by **23 May 2013**

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
The European Agricultural Fund for Rural Development: Europe Investing in Rural Areas

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UNDEB EWROPEAIDD
EUROPEAN UNION

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Overview

This consultation invites comment on the Strategic Environmental Assessment (SEA) Environmental Report for the 2014 – 2020 Rural Development Plan. The Welsh Government commissioned Bangor University to undertake the SEA. The report has been produced following full consultation with statutory bodies. The purpose of the SEA is to identify the significant environmental effects that are likely to result from the implementation of the Programme and to ensure that environmental and other sustainability aspects are considered effectively. We would like your views on the issues raised by this SEA. After the consultation closes, the Welsh Government will analyse all responses and will work with Bangor University to finalise the SEA.

How to respond

The Consultation Response form may be sent by mail or by e-mail to the address shown in "Contact Details" below to arrive by 22nd May 2013 at the latest.

Further information and related documents

Large print, Braille and alternate language versions of this document are available on request.

The consultation documents can be accessed on the Welsh Government website at **www.wales.gov.uk/consultations**.

Contact Details

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Data Protection

How the views and information you give us will be used

Any response you send us will be seen in full by Welsh Government staff dealing with the issues which this consultation is about. It may also be seen by other Welsh Government staff to help them plan future consultations.

The Welsh Government intends to publish a summary of the responses to this document. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. This helps to show that the consultation was carried out properly. If you do not want your name or address published, please tell us this in writing when you send your response. We will then blank them out.

Names or addresses we blank out might still get published later, though we do not think this would happen very often. The Freedom of Information Act 2000 and the Environmental Information Regulations 2004 allow the public to ask to see information held by many public bodies, including the Welsh Government. This includes information which has not been published. However, the law also allows us to withhold information in some circumstances. If anyone asks to see information we have withheld, we will have to decide whether to release it or not. If someone has asked for their name and address not to be published, that is an important fact we would take into account. However, there might sometimes be important reasons why we would have to reveal someone's name and address, even though they have asked for them not to be published. We would get in touch with the person and ask their views before we finally decided to reveal the information.

PRIFYSGOL BANGOR UNIVERSITY

oldbell 3

Research Policy Analysis
Ymchwil Polisi Dadansoddi

The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004

Wales Rural Development Plan 2014-2020

Strategic Environmental Assessment
Draft Environmental Report

March 2013

www.oldbell3.co.uk

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig: Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
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Ex-ante Evaluation and Strategic Environmental Assessment for Wales Rural Development Plan 2014-2020

STRATEGIC ENVIRONMENTAL ASSESSMENT

DRAFT ENVIRONMENTAL REPORT

MARCH 2013

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GLOSSARY OF ACRONYMS AND THEIR MEANINGS

AA	Appropriate Assessment, a statutory assessment of the likely and significant effects of a proposal on any site that is of European conservation interest (see SAC, SPA and Ramsar Site), under the terms of the Habitats Directive (92/43/EC).
AONB	Area of Outstanding Natural Beauty, a landscape designation under the National Parks and Access to the Countryside Act 1949.
BAP	Biodiversity Action Plan. Initially the UK government's response to the Convention on Biodiversity 1992 as its plan to halt biodiversity loss. Each of the UK nations now has its own BAP, as do all the local authorities (known as local biodiversity action plans or LBAPs). In Wales there are currently 24 of these. BAPs are non statutory documents.
Cadw	The name given to the Welsh Government's statutory body for the protection of Wales' built heritage, ancient monuments and sites.
CAP	Common Agricultural Policy. The EU's overarching policy for ensuring a fair standard of living for farmers and to provide a stable and safe food supply at affordable prices to consumers.
CCT	Cross-cutting themes, a term used in the context of the Structural Fund programmes to denote compliance in terms of sustainable development, equal opportunities and poverty alleviation.
CEH	Centre for Ecology and Hydrology. Carries out research into biodiversity and ecosystems.
COMAGRI	The European Parliament Committee on Agriculture and Rural Development.
CCW	The Countryside Council for Wales, the Welsh Government's statutory body for the protection of biodiversity and landscape and the promotion of access to the countryside (until April 2013).
CO_2	Carbon Dioxide, a greenhouse gas emitted when burning fossil fuels.
DEFRA	The Department for Environment, Food and Rural Affairs for the United Kingdom. Defra represents the UK's agriculture, fisheries, environment and rural community interests in Europe.
DG	Directorate-General, one of 32 departments of the European Commission.

EA	The Environment Agency, a non-departmental public body whose main duty is to safeguard the quality of air and the quality and availability of water.
EAFRD	The European Agricultural Fund for Rural Development
EAU	The Welsh Office Environmental Unit, a department of the Welsh Department prior to the establishment of the Welsh Assembly Government.
EC	The European Community
EEC	The European Economic Community
EIA	Environmental Impact Assessment (in the context of this document), a statutory assessment of the significant environmental effects of a plan or project, and the measures to avoid, mitigate or compensate, or to enhance the environment as an outcome. Operates under the terms of the EIA Directive 337/85/EEC.
ERDF	European Regional Development Fund, one of the EU's two structural funds. A financial tool designed to reduce disparities by creating sustainable jobs, economic development, research and development, environmental protection and risk management.
ESF	European Social Fund, also one of the EU's two structural funds. A financial tool designed to reduce disparities by promoting adaptability, access to employment, and social inclusion for disadvantaged people.
EU	The European Union.
FSC	The Forestry Stewardship Council, an international organisation set up to promote the sustainable use of the world's forests. Sets standards and certifies and labels forest products.
GAEC	Good Agricultural and Environmental Condition, a set of standards applied under the Agri-environment scheme
gha	Global hectares, the measure of a population's ecological footprint.
GHG	Greenhouse gas or gases. As well as carbon dioxide, greenhouse gases include water vapour, methane, nitrous oxide and ozone, all of which contribute to the 'greenhouse' effect by absorbing and emitting radiation within the thermal infrared range.
GVA	Gross Added Value, an economic measure of the total value of goods and services produced in an area, sector or industry.

ICOMOS	The International Council of Monuments and Sites, a professional association that offers advice on the protection and conservation of cultural heritage sites and structures around the world.
ICT	Information and Communications Technology.
IMD	Index of Multiple Deprivation, a UK qualitative study of deprived areas in UK local councils. Based on a range of criteria including access to services and healthy environments.
IUCN	The International Union for the Conservation of Nature, a governmental and non-governmental forum that aims to find pragmatic solutions to environment and development challenges. It is the world's oldest and largest environmental network.
kWh/d/p	Kilo-watt hours per day per person, a measure of energy use.
LAG	Local Action Group. Volunteers from public, private and voluntary sector groups promoting community-led initiatives to deliver RDP funding.
LBAP	Local Biodiversity Action Plans identify local priorities for biodiversity conservation, produce action plans and targets to deliver protection on priority habitats and species.
LDP	Local Development Plan, the statutory local authority spatial plan policy document.
LFA	Less Favoured Area, a term used to describe an area with natural handicaps such as a lack of water, climate, or short growing season. Hilly areas with steep slopes are also designated LFAs.
LNR	Local Nature Reserve, a local authority level designation for biodiversity sites of local value.
LULUCF	Land use and land use change and forestry, a sector defined by the United Nations as 'a greenhouse gas inventory sector that covers the emission and removal of greenhouse gases resulting from direct human-induced land use, land change and forestry activities.'
NEA	National Ecosystem Assessment, an initial assessment of the state of a nation's ecosystems, their services to human well-being, and a description of pressures and trends likely to influence their future condition.
NGO	Non-governmental organisation.

NNR	National Nature Reserve, a statutory designation that protects the features of a site from potentially damaging operations, whether directly or indirectly.
NRW	The new single environmental body for Wales, Natural Resources Wales.
NSRI	National Soil Research Institute.
NUTS3	Nomenclature of Territorial Units for Statistics 3. A geocode standard for measuring land subdivisions. Used by the EU for assessing delivery of programmes.
NVZ	Nitrate Vulnerable Zone, an Environment Agency designation for areas that drain into existing or potential nitrate polluted waters. The threshold for nitrate polluted water is 50mg NO_3/litre.
OECD	The Organisation for Economic Development, an international organisation of 34 states, established to stimulate economic growth and free trade.
ODPM	The Office of the Deputy Prime Minister.
PGI	Protected Geographical Indication, a European product designation, designed to authenticate a brand and link it to a region, protecting it from other similar products.
R&D	Research and Development.
Ramsar	A site that is designated for its importance to migrating water birds and waders, under the Ramsar Convention signed in 1971 and coming into force in 1975. The UK has the highest number of Ramsar sites globally.
RDP	Rural Development Plan.
RSPB	The Royal Society for the Protection of Birds, a conservation NGO.
SAC	Special Area of Conservation, a designation for habitats and species requiring special protection as a site of European conservation interest under the Habitats Directive (92/43/EC).
SDA	Severely Disadvantaged Area, a designation within the Less Favoured Area subject to enhanced support by virtue of especially severe agricultural constraints.
SEA	Strategic Environmental Assessment

SF	Structural Fund(s) are the financial tools set up to reduce regional disparities across the EU. The structural funds are the European Regional Development Fund and the European Social Fund.
SME	Small to medium enterprise. Three categories are defined by the European Commission: 'micro', with a staff of fewer than10 and/or a turnover/balance sheet total of less than €2m; 'small', with a staff of fewer than 50 and/or a turnover/balance sheet total of less than €10m, and 'medium' , with a staff of fewer than 250 and/or a turnover/balance sheet total of less than €50m/€43m.
SoE	State of the Environment. An assessment of the environmental condition, pressures, responses and trends of a defined area, whether local or global.
SPA	Special Protection Area, a site or area designated for the protection of birds requiring special measures. As in the case of SACs (see above) these are sites of European conservation interest, established under the Birds Directive (79/409/EEC).
SSSI	Site of Special Scientific Interest, a statutory designation that protects the natural interest of a site from potentially damaging interventions, whether directly or indirectly.
SUDS	Sustainable Urban Drainage Systems.
TEN-T	The Trans-European Transport Network, a transport infrastructure and traffic management system that incorporates rail, road, inland waterways, sea and air transport. Its aim is to facilitate ease of transport and travel across Europe.
UK	The United Kingdom of Great Britain (England, Scotland and Wales) and Northern Ireland.
UNESCO	The United Nations Educational, Scientific and Cultural Organisation.
US	The United States of America
WAG	The Welsh Assembly Government, otherwise known as the National Assembly for Wales, is the Welsh legislature established by the Government of Wales Act in 1998.
WEFO	The Welsh European Funding Office
WFD	The Water Framework Directive
WG	The Welsh Government, the executive of the Welsh Assembly Government, established by the Government of Wales Act 2006.

GLOSSARY OF TERMS

Appropriate Assessment A process required by the Habitats Directive 92/43/EC to assess whether a proposed project or a plan, alone or in combination with other proposals or plans, is likely to have a significant impact on a designated site of European conservation interest, such as a Special Area of Conservation or a Special Protection Area.

Avoidance In the context of this report, avoidance is used to mean a decision not to proceed with a project in order to avoid an impact; to relocate a project in order to avoid an impact; or to manage a project in such a way that it avoids an impact that may be seasonal in nature.

Cumulative or synergistic In the context of this report, cumulative effects are effects which alone do not result in a significant impact, but collectively do so. For example the cumulative effect of a number of acceptable developments, or discharges that individually do not have a significant impact. Synergistic effects are those that are not simply cumulative, but result in a further effect that may be positive or negative. The effects of chemical cocktails in a river may be synergistic, as may be the economic and social effects of interventions.

Ecological footprint An indicator of the demands made on the environment by a population, measured in global hectares. The ecological footprint for Wales in 2006 was about 4.4 gha. In other words, the population is consuming the equivalent of 4.4 'planet earths'.

Environmental Assessment A method or procedure for predicting the effects on the environment of a proposal, either for an individual project or a higher-level strategy (a policy, plan or programme), with the aim of taking account of these effects in decision-making. The term “Environmental Impact Assessment” (EIA) is used, as in European Directive 337/85/EEC, for assessments of projects. In the SEA Directive, an environmental assessment means “the preparation of an environmental report, the carrying out of consultations, the taking into account of the environmental report and the results of the consultations in decision-making and the provision of information on the decision”, in accordance with the Directive’s requirements.

Environmental Report A key output of the SEA process as required by the SEA Directive. Sets out to identify, describe and evaluate the likely significant effects on the environment of implementing a plan or programme.

Ex-Ante Evaluation The process of evaluating the overall effects of a programme prior to its adoption. Carried out in parallel with the development of a programme, in order to inform it in terms of likely outcomes in order to optimise its implementation.

Glastir The Welsh agri-environment scheme, comprising an All Wales entry level element which is accessible to all farmers, an upper level Targeted element which targets issues of concern in pre-defined priority areas, a Common Land element, the ACRES (Agricultural Carbon Reduction and Efficiency Scheme) capital grant element and a stand-alone Woodland Creation element

Indicator A measure of variables over time, used in this case to measure the extent to which objectives are being attained.

Mitigation Used in this case to refer to measures to reduce or offset significant adverse effects on the environment.

Objective: A statement of what is intended, specifying the desired direction of change as a result of interventions..

Plan or Programme: The term "plan or programme" covers any plans or programmes to which the SEA Directive applies.

Responsible Authority: The organisation which prepares a plan or programme subject to the Directive and is responsible for the SEA. In this case WEFO is the responsible authority.

Scoping: The process of determining the extent and level of detail of an SEA, including the environmental effects and alternatives which need to be considered, the assessment methods to be used, and the structure and contents of the Environmental Report.

Screening: The process of deciding whether a plan or programme requires SEA.

Strategic Environmental Assessment (SEA): Generic term used to describe environmental assessment as applied to policies, plans and programmes. In this report, "SEA" is used to refer to the type of environmental assessment required under the SEA Directive.

SEA Directive: European Directive 2001/42/EC "on the assessment of the effects of certain plans and programmes on the environment".

SEA Regulations: The regulations transposing the SEA Directive into law, namely The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004.

1 INTRODUCTION

1.1 Purpose

1.1.1 This Strategic Environmental Assessment (SEA) report of the Wales Rural Development Plan ('the RDP') has been produced by Bangor University in association with Old Bell 3 Ltd. on behalf of the Welsh European Funding Office (WEFO).

1.1.2 The assessment has been carried out in accordance with the requirements of the European SEA Directive (2001/42/EC) and the implementing regulations for Wales, the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (Welsh Instrument 2004 No. 1656 (W.170)). We have also considered the provisions of Statutory Instrument 2007/2933, the Environmental Impact Assessment (Agriculture) (Wales) Regulations 2007.

1.1.3 The objective of the SEA Directive is *" to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes […] by ensuring that […] an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment*."[1]

1.1.4 Articles 3(2)(a) and 3(4) apply the legal obligation to carry out an SEA to the Rural Development Programme. Furthermore, article 3(2)(b) of the Directive requires an environmental assessment to be undertaken for plans and programmes requiring assessment under article 6 or 7 of the Habitats Directive.[2]

1.1.5 This SEA is carried out in conjunction with the development of the RDP and its overall Ex-Ante Evaluation. It sets out to ensure that the RDP contributes positively to a high level of environmental protection, as well as supporting the goal of the Welsh Government of working towards sustainable development. It does this:

- by setting out the environmental parameters within which the RDP will operate;
- by identifying, describing and assessing likely significant effects on the environment arising from the RDP's implementation;
- by considering reasonable alternatives.

[1] Article 1 of the SEA Directive

[2] Council Directive 92/43/EEC of 21 May 1992

1.1.6 The purpose of this SEA is therefore is to help to inform the development of the RDP prior to its adoption, and to provide an environmental context for its implementation.

1.1.7 Possibly the most important function of the SEA is to influence strategic changes that might result from the assessment. Changes should have already occurred by the time that the report is finalised, confirming that the right approach has been taken to the SEA process, namely that it has been used to improve the environmental performance of the programme, rather than merely presenting a snapshot of it.[3]

1.2 SEA requirements

1.2.1 This Environmental Report complies with the requirements of the Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (Welsh Instrument 2004 No. 1656 (W.170)).

Table 1 identifies those sections within the Environmental Report that relate to the specific requirements of Regulation 12 and Schedule 2 of the Regulations.

Table 1: References to the SEA Regulations

Environmental Report - Information to be included	Relevant Section
1. An outline of the contents, main objectives of the plan, and of its relationship with other relevant plans and programmes.	**Section 2, page 18**
2. The environmental characteristics of areas likely to be significantly affected.	**Section 4, page 42**
3. Any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC.	**Section 4, page 90**
4. The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation.	**Appendix 2**

[3]"Getting the most from your RDP. Guidelines for the Ex-Ante evaluation of 2014-2020 RDPs." Draft August 2012.European Evaluation Network for Rural Development. DG Agriculture and Rural Development.

5. The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage including architectural and archaeological heritage; landscape; the interrelationship between the above factors.	**Section 5, page 94** **Annex 6**
6. The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan.	**Section 5, page 94/section 6 page 116**
7. An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken.	**Section 6, page 116**
8. A description of measures envisaged concerning monitoring in accordance with Regulation 17.	**Section 8, page 125**
9.. A non-technical summary of the information provided under paragraphs 1 to 9.	**Accompanying document**

1.3 SEA process prior to the Environmental Report

1.3.1 An **initial meeting** was held on 10 December 2012 in Cardiff to determine the broad nature and scope of the structural fund and rural development programmes and to establish a timetable for developing the SEA and consultation.

1.3.2 Subsequently, a **Screening Report** was produced on 4 January 2013 for consultation with the statutory bodies (the Environment Agency, the Countryside Council for Wales and Cadw), in accordance with the requirements of the SEA Directive, in order to determine the need for a full SEA of the RDP. It was confirmed that, owing to the potentially significant effects that could arise from the proposals, a full SEA was required.

1.3.3 A meeting was held with the Countryside Council for Wales to discuss our approach to the SEA in terms of biodiversity concerns.

1.3.4 A **Scoping Report** was produced on 13 February 2013. This Environmental Report is based on responses to the Scoping Report and to subsequent consultations with statutory and non-statutory interests.

1.3.5 WEFO organised a series of consultation events to engage stakeholders in the development of the 2014-2020 SF and RDP programmes. As part of these events, stakeholders were given the opportunity to comment on the emerging Environmental Reports.

1.4 Relationship to other assessments

1.4.1 The SEA Directive applies to programmes and plans that may be at national or local levels. Land use plans, river basin management plans and programmes of measures under the Water Framework Directive, Shoreline Management Plans, Catchment Flood Management Plans, National Park Management Plans and so on are all subject to the provisions of the SEA Directive.

1.4.2 Other forms of environmental impact assessment under the EIA Directive[4] allow a detailed assessment of the key environmental issues identified at project level under the spatial planning system.

1.4.3 Agriculture and Forestry have their own statutory assessment provisions, including the Environmental Impact Assessment (Agriculture) (Wales) Regulations 2007, and the Environmental Impact Assessment (Forestry) (England and Wales) Regulations 1999.

1.4.4 Of great importance at farm scale is the set of Good Agricultural and Environmental Condition (GAEC) standards that provide a baseline of environmental protection for soil and water, habitats and landscape features. GAEC 5 in particular supports the provisions of the above regulations, in relation to increasing the productivity of uncultivated or semi-natural land. Other GAEC standards apply to the protection of hedgerows, water courses, buffers zones, grazing, heather and grass burning and so on.

1.4.5 European Directive 92/43/EEC on the 'Conservation of Natural Habitats and Wild Fauna and Flora', referred to as the 'Habitats Directive', provides legal protection for habitats and species of European importance[5]. Article 2 of the Directive requires the maintenance or restoration of habitats and species of European Community interest, at a favourable conservation status.

1.4.6 Articles 3 - 9 provide the legislative means to protect habitats and species of Community interest. In particular, Article 6 (3) of the Directive states:

[4] Council Directive 85/337/EEC as amended and codified by 2011/92/EU

[5] Council Directive 92/43/EEC of 21st May 1992 on the conservation of natural habitats and of wild fauna and flora

"*Any plan or project not directly connected with, or necessary to, the management of the [European] site, but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives*".

1.4.7 A 'European site' includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs). For the purposes of Habitats Regulations Assessment in Wales, the Welsh Government also expects plan making to treat all Ramsar sites, candidate SACs (cSACs) and potential SPAs (pSPAs) in the same manner as European sites when considering the implications of development plans[6].

1.4.8 The Directive is transposed into Welsh law by the Conservation (Natural Habitats etc) Regulations 1994. Following a judgment of the European Court of Justice[7], consolidated regulations were laid before the National Assembly for Wales in March 2010[8] that replace all the earlier versions.

1.4.9 The purpose of Appropriate Assessment is to ensure that any plan or project, alone or in combination with other plans or projects, shall not have an adverse impact on the integrity of European sites, and that competent authorities shall agree to a plan or project after ascertaining that it will not affect the site concerned.

1.4.10 In this context the screening report on the Wales Spatial Plan[9] concluded that

'...it was not possible to confirm that the Wales Spatial Plan, alone or in combination with other plans or projects, would not have a significant effect on European and international sites in Wales, its offshore waters and across the border in England'..[10]'

An Appropriate Assessment was subsequently carried out to assess the likelihood and significance of impacts resulting from the plan and/or from any programmes that arise from it.

[6] Annex 6: the Appraisal of Development Plans in Wales under the provisions of the Habitats Regulations.

[7] ECJ case C – 6/04, Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland, 20th October 2005

[8] The Conservation of Habitats and Species Regulations 2010

[9] Wales Spatial Plan Update. Habitats Regulations Assessment &Appropriate Assessment. June 2008

[10] Wales Spatial Plan 2008 update. Welsh Assembly Government. Pages 7-8

1.4.11 The Welsh Government's Flood and Coastal Erosion Risk Management Strategy (June 2011) stated that its strategy

'...is a very high-level document without a spatial basis, therefore potential impacts of the strategy itself on European sites is difficult to determine. However, the strategy sets out broad policies to be implemented by subsequent lower level plans and strategies, and also sets the strategic framework to influence individual flood risk and coastal erosion works, which could potentially result in significant effects on European sites. It is therefore considered that the strategy does fit within the definitions of a 'plan' as defined by the Habitats Directive[11]*'*

1.4.12 Section 4.5 of this report describes designated sites of nature conservation value. A stated purpose of Glastir is to promote the conservation of those sites[12], as well as biodiversity and ecosystems beyond them. The explicit nature of its strategic proposals would indicate that it would fall within the scope of Article 6(3) of the Habitats Directive.

[11] Flood and Coastal Erosion Risk Management Strategy (June 2011). Welsh Assembly Government. p7

[12] See for example National Assembly for Wales (2011). Introduction to Glastir. p3

2 THE RURAL DEVELOPMENT PLAN

2.1 Introduction

2.1.1 The European Agricultural Fund for Rural Development (EAFRD) does not define the term 'rural', but requires the Managing Authority (in this case the Welsh Government) to define 'rural area' at programme level[13]. In terms of the Organisation for Economic Development (OECD) definition, which classifies local areas as 'rural' where their population density is below 150 inhabitants/km^2, the whole of Wales can be termed rural with the exception of the major population centres of Cardiff, Newport and Swansea. This is supported by work undertaken by the Office of National Statistics[14] (ONS) and means that with the exception of certain densely populated areas as shown in Map 1, Wales is predominantly rural in nature.

2.1.2 The term ‘Rural Wales’ is thus defined as the nine predominantly rural unitary authorities (Isle of Anglesey, Gwynedd, Conwy, Denbighshire, Ceredigion, Pembrokeshire, Carmarthenshire, Powys and Monmouthshire). Despite the undoubted rural character of parts of their areas, Flintshire and the Vale of Glamorgan are not 'rural' in terms of this definition. However, with the removal of the axes in the forthcoming RDP, rural Wales will effectively be the whole of Wales, so that eligibility cover will apply to all farms, forestry operations and primary processors[15]. Map 2 shows all the EU NUTS3 areas.

2.1.3 The Welsh Government asserts that addressing environmental and climate related challenges is a key component of RDP programmes:

"Sustainable and climate-friendly land uses are promoted through several of the proposed interventions for the Wales RDP."

[13] Regulation of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). COM(2011) 627 final/2, article 50

[14] Rural/Urban definition England and Wales. http://www.ons.gov.uk/ons/guide-method/geography/products/area-classifications/rural-urban-definition-and-la/rural-urban-definition--england-and-wales-/index.html (accessed 03/03/2013)

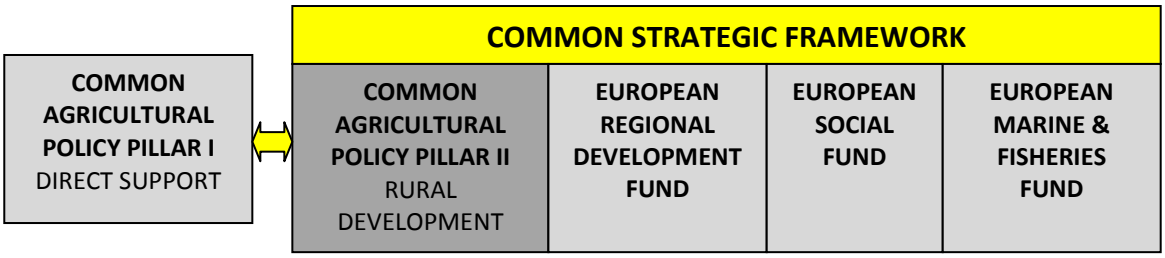
[15] RDP consultation February 2013. p28

2.1.4 It also asserts that the implementation strategy "*...is based on the principle of sustainability. It is proposed that the RDP is structured to reflect the integrated model for Sustainable Development adopted by Welsh Government as its central organizing principle, with its three key interlinking spheres of Economy, Environment and Social aspects."* [16]

2.2 Purpose of the RDP

2.2.1 The RDP comes under Pillar II of the European Common Agricultural Policy (CAP). It is subject to its own regulation[17], and will operate under common funding rules operating under a Common Strategic Framework (CSF). The CSF is transposed into national Partnership Contracts. The RDP is designed to complement the provisions of Pillar I of the CAP, as well as those of the other funds operating under the CSF (see Figure 1)[18]. The intention is to ensure harmonisation of funds, to promote administrative efficiency and to minimise the likelihood of double-funding.

Figure 1 : Relationship between pillars I and II within the CSF



2.2.2 The RDP aims to improve competitiveness in the agriculture and forestry sectors; safeguard and enhance the rural environment; and foster competitive and sustainable rural businesses and thriving rural communities. It is a seven year European Union and Welsh Government-sponsored programme. The Programme supports farmers and foresters to deliver environmentally beneficial land management practices, which do not always win market support. The Programme will also assist the farming and forestry sectors to modernise and adapt to changing circumstances. Funding is also available to develop wider rural

[16] RDP consultation February 2013. p45

[17] Regulation of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). COM(2011) 627 final/2

[18] The current legislative framework comprises Council Regulation (EC) No 73/2009 (direct payments), Council Regulation (EC) No 1234/2007 (market instruments), Council Regulation (EC) No 1698/2005 (rural development) and Council Regulation (EC) No 1290/2005 (financing).

businesses and enhance opportunities in communities where deprivation exists.

2.2.3 The EU sees a strong agriculture sector as vital for its food industry and for global food security. The current CAP reform proposals are based on the Communication on the CAP towards 2020[19] that outlined broad policy options to respond to the future challenges for agriculture and rural areas and to meet the objectives set for the CAP, namely:

Viable food production

To preserve the food production potential on a sustainable basis throughout the EU, so as to guarantee long-term food security for European citizens and to contribute to growing world food demand.

Sustainable management of natural resources and climate action

To support farming communities that provide European citizens with quality, value and diversity of food produced sustainably, in line with our environmental, water, animal health and welfare, plant health and public health requirements. The active management of natural resources by farming is one important tool to maintain the rural landscape, to combat biodiversity loss and contributes to mitigate and to adapt to climate change. This is an essential basis for dynamic territories and long term economic viability.

Balanced territorial development

To maintain viable rural communities, for whom farming is an important economic activity creating local employment.

2.2.4 These three broad objectives reflect both Pillar I and II of the CAP, and within them the EU is seeking to enhance competitiveness, to improve sustainability, and to seek enhanced effectiveness.

2.2.5 Innovation and Climate Change Mitigation are cross-cutting Objectives across all the funds within the CSF (ERDF, ESF, EAFRD and EFF), which require all the funds to work in a complementary fashion to address them (see 2.2.1).

[19] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions (2010). The CAP towards 2020: Meeting the food, natural resources and territorial challenges of the future. COM(2010) 672 final. http://ec.europa.eu/agriculture/cap-post-2013/communication/index_en.htm (accessed 03/03/2013)

2.3 Intervention context

2.3.1 The draft Wales RDP 2014-2020 is based on the provisions of the EAFRD as set out in the relevant regulation[20]. The RDP presents a range of interventions that are intended to address the framework prescribed by Europe and to achieve the aims and objectives of the Welsh Government, as set out in 'Programme for Government'. Of the 12 key priorities in the latter, priorities 10 (rural communities) and 11 (environment and sustainability) are an obvious focus for the RDP, but given the linkages across all the priorities, there is a clear potential to deliver on growth and sustainable jobs (priority 1), supporting people (priority 5), tackling poverty (priority 9), and especially the culture and heritage of Wales (priority 12).

2.3.2 It is not the intention for the proposals to be prescriptive but rather to act as a framework that helps with the development of the viable schemes. They will also form the basis for securing complementarity with other EU and Welsh Government funds. The RDP presents its proposals under the EU priority areas to ensure consistency.

2.3.3 There are 6 Rural Development Priorities which set the context for objectives of the EAFRD[21], namely:

- Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas.
- Enhancing competitiveness of all types of agriculture and enhancing farm viability.
- Promoting food chain organisation and risk management in agriculture
- Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry
- Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors.
- Promoting social inclusion, poverty reduction and economic development in rural areas[22]

[20] Regulation on Support for a European Agricultural Fund for Rural Development 2011. European Commission Brussels.

[21] EAFRD Regulation pp7-8

[22] It is worth noting that there is no indication that these are prioritised or weighted and the assumption is that equal consideration is given to all the interventions.

2.3.4 These priorities have been disaggregated within the EAFRD into 18 Focus Areas (Table 2)[23]:

Table 2: EAFRD priorities and focus areas

Priorities	Focus Areas
Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas.	Fostering innovation and the knowledge base in rural areas
	Strengthening the links between agriculture, food production and forestry and research and innovation
	Fostering lifelong learning and vocational training in the agricultural and forestry sectors
Enhancing competitiveness of all types of agriculture and enhancing farm viability.	Facilitating restructuring of farms, notably farms with a low degree of market participation, market-oriented farms in particular sectors and farms in need of agricultural diversification
	Facilitating entry into the farming sector, and in particular generational renewal in the agricultural sector
Promoting food supply chain organisation and risk management in agriculture.	Better integrating primary producers into the food chain through quality schemes, promotion in local markets and short supply circuits, producer groups and inter-branch organisations and promoting animal welfare
	Supporting farm risk management

[23] See Rural Development Plan 2014-2020: Next Steps. pp 12-14 http://wales.gov.uk/topics/environmentcountryside/farmingandcountryside/ruraldevelopment/ruraldevplanwales20142020/rdp-14-20-next-steps/?lang=en

Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry	Restoring, preserving and enhancing biodiversity, including in Natura 2000 areas and high nature value farming, and the state of European landscapes
	Improving water and land management and contributing to meeting the Water Framework Directive objectives
	Improving soil, erosion, fertiliser and pesticide management

Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors.	Increasing efficiency in water use by agriculture
	Increasing efficiency in energy use in agriculture and food processing
	Facilitating the supply and use of renewable sources of energy, of by-products, wastes, residues and other non food raw material for purposes of the bio-economy
	Reducing green house gas and ammonia emissions from agriculture and improving air quality
	Fostering carbon sequestration in agriculture and forestry

Promoting social inclusion, poverty reduction and economic development in rural areas	Facilitating diversification, creation and development of small enterprises and job creation
	Fostering local development in rural areas
	Enhancing accessibility to, use and quality of information and communication technologies (ICT) in rural areas

2.4 Proposed Interventions

2.4.1 The proposed interventions are subject to consultation and are therefore indicative. They are presented in line with the three overarching EU priorities, namely, competitiveness, environment and community, and the six EAFRD priorities described above. Rather than repeating in full the proposals that can be found elsewhere[24], the following is a summary of those proposals, with elements that are of particular relevance to this SEA underlined (see also table 3).

2.4.2 **Competitiveness**

The following areas of support are proposed:

- Redirect as much day-to-day farming / forestry advice and support as possible to the Farm Advisory Service (FAS)...a very important link to FAS and Farming Connect in getting messages across about the fact that improving farm competitiveness and sustainability can also reduce GHGs and give other natural environmental benefits.

- Develop a support mechanism to encourage and facilitate the formation of producer groups and co-operatives. This could be extended to provide more general supply chain support where producer groups/producers working in co-operation but not as a co-operative are eligible for support.

- By having a mix of private training providers and college networks, alongside statutory levy boards covering Wales, improved penetration and uptake of training could be achieved.

- This could...cover how IT and communications could support sales and marketing for small rural firms and speed up communications in all ways to reduce journeys, promote joint purchasing and marketing.

- A mixed capital and revenue mechanism to support on-farm/forest improvements linked to welfare and environment standards, genetics and breeding, cost reduction, energy efficiency, distribution, renewable energy, health and safety etc. This would include Animal Health Plans and their implementation and review.

[24] See Rural Development Plan 2014-2020: Next Steps http://wales.gov.uk/topics/environmentcountryside/farmingandcountryside/ruraldevelopment/ruraldevplanwales20142020/rdp-14-20-next-steps/?lang=en

A mixed capital and revenue mechanism to support diversification away from agriculture, forestry and food processing. Types of areas could include:

1. Test-trading and marketing support
2. Possibly low value business grants (under £5k)
3. Start-up premises
4. Community based retail support

- Investments in primary processing/supply chain/knowledge transfer/ R&D – including forestry products and wool. This essentially builds upon the existing Processing and Marketing Grant and Supply Chain Efficiency schemes...to ensure that food products meet consumer expectations in terms of quality, provenance i.e. Protected Geographical Indication (PGI), animal health and welfare and environmental credentials.

2.4.3 **Environment**

- Develop opportunities for support for activities that complement Glastir and which target specific outcomes either geographically, thematically or co-operatively (e.g. community based projects focused on the non-agricultural environment, pilots on the ecosystems goods and services theme, buffer zones and corridors, and use of group based models).

- Consider the potential for the use of targeted hedge and/or shelterbelt creation/improvement where it would significantly improve the ability to mitigate flooding – linked to land contours, proximity to headwaters/ reservoirs and ability to increase the porosity of soils. This could also cover planting along watercourses which both absorbs excess water and keeps stock out thus protecting banks from erosion and compaction.

- There would be strong links with on-farm support and advice but this proposes a watercourse-focused scheme targeting the Water Framework Directive requirements that would improve water quality and management by addressing issues along a watercourse rather than being restricted to a farm by farm approach. Support could be extended into non land-based businesses and interventions might be possible that address the problems linked to pollution from metal mines (e.g. reed beds, settling ponds etc.).

- There is the potential for specific actions on species and habitats that work in support of Glastir and which would provide an alternative,

more cost effective and efficient approach (e.g. to the Glastir Regional Packages). There may also be options for maintaining/improving Natura 2000 sites and addressing connectivity issues. We may consider using wider spatial measures linked to land-use.

- Provision of support for renewable energy designed to add value to the major interventions under ERDF. This would primarily be community-based and on-farm activities which could include the development of local supply chains and investment in alternative energy systems for community buildings. This would consider all forms of alternative energy including biomass, solar and hydro.

- Support for opportunities for on-farm anaerobic digestion as a means of dealing with animal and green waste including the scope to develop supply chains for green waste.

- Woodland/Forestry. To deliver maximum benefits this would need to include support for early non-economic operations such as planting, fencing, thinning, pruning and pest control. It could be extended to building supply chains for timber products, developing commercial outlets for non-coniferous timber, linking to community energy schemes and local tourism and craft opportunities.

- Develop proposals to engage more fully in respect of farm woodland to bring about significant additional woodland creation and; improved management; improve/develop shelter belts for stock shelter and disease barriers; low density planting for sheltered grazing and landscape preservation; introduce the use of shrubs to diversify habitat; creation of small woodland areas/ copses to allow lower cost investments and develop scope for small scale timber/biomass cropping.

- Much of the threat from plant disease is exacerbated by the limited genetic pool which allows for easy disease transmission. This could be mitigated if any scheme supported by the RDP took account of the need to broaden the genetic mix through stock selection and sources of supply. Possible spin-off benefit for development of local tree nurseries.

- There is a potential link to other commercial use of woodland and forestry around the construction sector and tourism/recreation activities.

2.4.5 **Community**

- Consideration could be given to the provision of software and mobile equipment linked to local ICT services. Further targeting could be decided locally to meet the needs of specific individuals / groups / businesses.

- Community and voluntary transport. Small scale complementary activities that are linked to mainstream provision and fill gaps/enhance provision and which support acquisition of skills and employment but there could also a wider remit where the need is demonstrated. It could also focus on the use of alternative fuels and transport methods and extend to the 'Wheels to Work' type approach.

- Access to Services. In all cases activities under the RDP would need to add value to other Welsh Government supported measures whether through other EU funds or domestically funded programmes.

- Focused packages that give meaningful, sustainable improvements to identified areas that serve as foci for communities and/or service provision. This element could seek to link to Community Asset Transfer and support the re-utilisation of unwanted/disused buildings and also support physical improvements to the physical/built environment in villages subject to prioritisation and a value for money assessment.

- Given the vital economic contribution the tourism sector makes to the rural economy in Wales, consideration should be given to the delivery of destination management plans and there is a need to work closely with Visit Wales to ensure RDP activity adds value to other support.

2.4.6 **Leader**

- Consideration could also be given to developing opportunities for sharing ideas with Welsh Government and other organisations which could lead to collaboration on the delivery of key objectives (e.g. Commons Development Officers, wider agri-environment support, facilitating producer groups/ organisations, co-operative management of shared areas including forestry and watercourse, use of community asset transfer.

2.4.7 **Sub-themes**

- An Uplands sub-theme would be developed around the report 'Unlocking the Potential of the Uplands' prepared by the Uplands Forum (linking also to work of the Cambrian Mountains Initiative (CMI)).

Table 3: EAFRD focus areas and Wales RDP proposed interventions

Innovation and knowledge base *primary processing/R&D in forestry products/wool* *enhanced co-operative working* *enhanced FAS role*
Links between agriculture/food production/ forestry and research/ innovation *primary processing/R&D in forestry products/wool* *enhanced co-operative working*
Lifelong learning/ vocational training in agriculture and forestry *improved uptake of training* *enhanced FAS role*
Restructuring of farms *diversification away from farming/forestry* *farm/forest improvements - environment, genetics, animal welfare, energy*
Entry into the farming sector
Integrating primary producers into the food chain *Protected Geographical Indication* *improved supply chain support*
Farm risk management *broaden genetic mix* *significant woodland creation - stock shelter/disease barriers*
Restoring, preserving and enhancing biodiversity *small scale timber/biomass cropping* *shrubs to diversify habitat* *significant woodland creation - stock shelter/disease barriers* *specific actions on species & habitats* *maintaining/improving Nat 2K/connectivity* *hedge/shelterbelt creation - flood mitigation - bank protection* *watercourse management schemes linked to WFD* *community based projects, pilots on ecosystems, buffers & corridors*
Improving water and land management/ meeting WFD *hedge/shelterbelt creation - flood mitigation - bank protection* *watercourse management schemes linked to WFD* *pollution from mines*
Improving soil, erosion, fertiliser and pesticide management *GAEC? Parallel measures*
Efficiency in water use by agriculture *GAEC? Parallel measures*
Efficiency in energy use in agriculture and food processing *anaerobic digestion*
Supply and use of renewable sources of energy, of by-products, wastes, residues and other non food raw material *small scale timber/biomass cropping* *anaerobic digestion/green supply* *renewables/alternative energy for community buildings*
Reducing green house gas and ammonia emissions from agriculture and improving air quality *anaerobic digestion/green supply*
Carbon sequestration in agriculture and forestry *local tree nurseries*

significant woodland creation - stock shelter/disease barriers
Diversification, creation and development of small enterprises and job creation *access to services* *community based projects, pilots on ecosystems, buffers & corridors* *community transport gaps/alternative fuels* *woodland for tourism/recreation* *local tree nurseries* *renewables/alternative energy for community buildings* *LEADER*
Local development *community built environmental improvements in target areas/community service provision* *LEADER*
Accessibility to, use and quality of information and communication technologies (ICT) *ICT* *IT support*

2.4.8 Although the interventions have yet to be refined, they are somewhat unclear at this stage, and it has been difficult to assign some of them with a high degree of confidence. However, the assessment will be based on the 18 focus areas and the assigned interventions. The methodology used in this assessment is discussed in the next section.

3 SEA PROCESS AND ASSESSMENT METHODOLOGY

3.1 Approach and overall SEA tasks

3.1.1 The approach that has been adopted is based on a number of advisory documents, chiefly the guidelines of the former Office for the Deputy Prime Minister (ODPM) 2005[25], and the EC's guidance documents on implementing the SEA Directive[26] and RDP Ex-Ante Evaluation guidance 2012[27]. Note was also taken of guidance provided by the Environment Agency[28], the Countryside Council for Wales[29], RSPB[30], and the Scottish Executive[31].

3.1.2 Table 4 describes the SEA stages and tasks.

Table 4: SEA stages and tasks

STAGE	TASK
Setting the context and objectives	• *Establish the baseline and decide on the scope.* • *Identify/review relevant policies, plans and programmes and sustainable development objectives that will affect or influence the programme.* • *Collect relevant baseline information.* • *Identify key issues for the SEA to address and define objectives.* • *Develop SEA framework, objectives, indicators and targets.* • *Test the plan or programme objectives against the sustainability objectives and whether the programme objectives are consistent with one another.* • *Produce scoping report and undertake consultation with the consultation bodies.*

[25] "A Practical Guide to the Strategic Environmental Assessment Directive". ODPM 2005.

[26] "Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment". European Commission DG Environment. Undated.

[27] "Getting the most from your RDP. Guidelines for the Ex-Ante evaluation of 2014-2020 RDPs." Draft August 2012.European Evaluation Network for Rural Development. DG Agriculture and Rural Development.

[28] "Strategic Environmental Assessment and Climate Change: guidance for practitioners". Environment Agency. August 2011.

[29] "Strategic Environmental Assessment. Guidance for Practitioners". Countryside Council for Wales. SEA Guidance Note series. August 2007.

[30] "Strategic Environmental Assessment. Learning from Practice". RSPB. Undated.

[7] "Strategic Environmental Assessment Toolkit". Natural Scotland. Version 1 September 2006.

Developing and refining the options	• *Carry out appraisal of the proposed programme options and make recommendations for improvement.*
Appraising the effects of the draft programme	• *Predict effects and carry out assessment of the effects of the draft programme* • *Propose measures to maximise benefits and mitigate adverse effects.* • *Develop proposals for monitoring.* • *Prepare the Environmental Report of the draft programme.*
Consulting on the Environmental Report and draft programme	• *Consult on the Environmental Report along with the draft programme.* • *Carry out appraisal of significant changes made as a result of consultation.*
Monitoring and Implementing the programme	• *Inform consultees that the programme has been adopted.* • *Issue statement summarising information on how the SEA results and consultees' opinions were taken into account, etc.* • *Make programme and final Environmental Report available for public viewing.*

3.2 Challenges in undertaking the SEA

3.2.1 The assessment was constrained by three key factors:

- By its nature the proposed RDP is not spatial, but provides generic descriptions of the kind of activities likely to be supported. It was therefore difficult at times to envisage potential significant environmental effects with certainty, and therefore a precautionary approach has been taken to the assessment of effects.

- The interventions are based on EAFRD objectives and focus areas, rather than on objectives articulated at a Wales RDP level. There may be issues around the attempt to assess the EAFRD objectives and RDP interventions against the generic objectives described below.

- Conversely, the plan is itself constrained by the need to prioritise regional economic activity, funding and the timescale over which it will operate. Therefore, the identification of *reasonable* alternatives is constrained in terms of alternative themes or combinations of themes, alternative timescales and alternative priorities.

3.3 Development of SEA objectives

3.3.1 Whilst there is no requirement under the SEA Directive to produce objectives or indicators as part of the SEA process, their use is promoted as an appropriate tool for identifying and assessing potential environmental effects, both positive and negative.

3.3.2 The objectives were developed from a review of literature that included:

- European Commission Core Indicators[32]
- EU2020 targets and Lisbon Structural Targets and Indicators[33]
- EU 6th Environmental Action Plan & Sustainable Development Strategy[34]
- The draft 2014-2020 programme consultation documents and thematic working group papers[35]
- The Welsh Government: Programme for Government[36]
- Wales Environment Strategy[37]
- Wales National Ecosystem Assessment[38]

[32]European Commission. Programming period 2014-2020. Monitoring and evaluation of European cohesion policy - European Regional Development Fund and Cohesion Fund. Concepts and Recommendations. Guidance document. November 2011. (http://ec.europa.eu/regional_policy/information/evaluations/guidance_en.cfm#1)

[33] Communication from the Commission. Europe 2020 - a strategy for smart, sustainable and inclusive growth. (http://eur-lex.europa.eu/LexUriServ/LexUriServ. do?uri= COM: 2010: 2020: FIN:EN:PDF) (see also http://ec.europa.eu/ europe2020/pdf/targets_en.pdf for specific targets). See also http://epp.eurostat.ec.europa.eu/portal/page/portal/structural_indicators/indicators/environment on Lisbon environment indicators

[34]Decision No 1600/2002/EC of the European Parliament and the Council laying down the sixth community environmental action programme. July 2002.(http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2002:242:0001:0015:EN:PDF)Summary and explanation. (http://europa.eu/legislation _summaries/ agriculture/ environment/l28027_en.htm)

[35]The consultation documents issued 4 March 2013: situation analysis and next steps; water thematic report 14/11/2012; forestry thematic report 25/10/2012; agri-environment-organic report (undated); biodiversity report 26/10/2012

[36] Programme for Government. Welsh Government. 2011 (http://wales.gov.uk/docs/strategies/ 110929fullen.pdf & http://wales.gov.uk/docs/strategies/120528fullen.pdf)

[37]WAG Cardiff. Environment Strategy Action Plan October 2008. (http://wales. gov.uk/ desh/publications/enviroprotect/environmentstrategy/environmentactionplan/esap0811e.pdf;jsessionid=7D4C112D25E2CF42B4AD153E9C57CDA0?lang=en)

- 2007-13 Rural Development Plan Strategic Environmental Assessment[39]
- Wales Spatial Plan[40]
- Sustainable Development Indicators for Wales[41]

3.3.3 The management plans of some of Wales' protected landscapes were reviewed in order to confirm the scope of environmental objectives, and to highlight any new objectives not identified already. The following management plans were selected and analysed:

- Wye Valley AONB
- Llŷn AONB
- Snowdonia National Park
- Brecon Beacons National Park
- Pembrokeshire Coast National Park
- Clwydian Hills AONB
- Anglesey/Ynys Môn AONB
- Gower AONB

3.3.4 The range of comments on the SEA of the 2007-2013 RDP proposal were reviewed, including those from NFU Cymru, FUW, CCW and RSPB[42], as well as submissions to the subsequent Glastir Stocktake[43].

3.3.5 Parallel to this process was the development of 52 questions based specifically on the key issues that emerged from the environmental baseline, namely:

In its delivery, will the Programme:

• *increase levels of light pollution?* • *increase levels of noise pollution?* • *reduce health inequalities among different groups in the community?*	Population and human health

[38]National Ecosystems Assessment (2011): Chapter 20: Status and Changes in the UK's Ecosystems and their Services to Society: Wales. World Conservation Monitoring Centre Cambridge.

[39] Agra CEAS Consulting/Collingwood Environmental Planning (2006): Annex to the ex-ante evaluation of the Wales Rural Development Plan: the Strategic Environmental Assessment. Draft Final Report.

[40] Welsh Assembly Government (2008): People, Places, Futures. The Wales Spatial Plan. 2008 update. July 2008. WAG Cardiff.

[41] Welsh Government (2012): Sustainable Development Indicators. WG Cardiff

[42] Appendix 3 to the 2006 SEA.

[43] Glastir Stocktake: A Report on the Findings. June 2012.

• *protect and enhance rare or endangered species and habitats and provide opportunities for habitat creation/restoration?* • *protect habitats and minimise the fragmentation of nature corridors and networks in accordance with Biodiversity Action Plans?* • *avoid damage to sites of geological interest?* • *avoid damage to sites of European conservation value and enhance them where possible?*	Biodiversity
• *protect and enhance landscape and seascape character?*	Landscape
• *help to protect or enhance historic buildings, areas and areas of landscape/townscape character?* • *provide development patterns that do not harm the linguistic character of Welsh speaking communities?* • *encourage the mainstreaming of the Welsh language?* • *ensure settlements can absorb growth without damage to character?* • *promote and market locally sourced products?*	Culture, architecture and archaeology
• *avoid the loss of good quality soils to development?* • *maintain and enhance soil quality?* • *minimise soil erosion through run-off, wind and tillage?*	Soils
• *maintain levels of abstraction and recharge within the carrying capacity of the region?*	Water resource
• *maintain and enhance ground and surface water ecological and chemical quality?* • *improve the quality of coastal waters?*	Water quality
• *maintain and improve local air quality?*	Air quality
• *reduce greenhouse gas emissions?* • *contribute to the ability to adapt to the impacts of climate change?* • *reduce the use of fossil fuels?* • *maintain and where possible increase the capacity of land to sequester carbon?*	Climate issues
• *reduce or manage flooding?*	Flood risk
• *promote the use of recycled and secondary materials?* • *reduce the production of waste?* • *reduce the proportion of residual waste to landfill?* • *reduce hazardous waste?*	Waste management
• *deliver more sustainable location patterns?* • *reduce car traffic?* • *encourage walking, cycling and use of public transport?*	Transport infrastructure

• *improve access to and encourage the use of ICT?*	

• *improve farm welfare standards?* • *reduce stresses related to long distance transportation?* • *result in decreased risk of animal-animal/animal-human disease transmission?*	Animal welfare/disease transmission
• *provide support to endangered native breeds?*	Endangered breeds
• *reduce imported materials such as timber?* • *add environmental value to agricultural and forestry enterprises?* • *minimise the risk from disease?* • *promote an increase in woodland diversity?*	Forestry and woodland management
• *improve the quality and increase the quantity of publicly accessible open space?* • *improve the management of the impacts of access and recreation?* • *provide opportunities for people to come into contact with and appreciate wildlife and the natural environment?* • *promote tourism linked to wildlife/environment experiences?*	Rural based tourism
• *reduce the need for energy?* • *increase the production and/or use of renewable energy?* • *increase energy efficiency (e.g. energy efficiency in buildings, transport modes, etc)?*	Energy
• *seek to optimise multiple benefits from ecosystem management?* • *ensure sustainable use of raw materials (e.g. timber, fresh water, minerals)?* • *reduce the production/consumption chain?* • *overall reduce the ecological footprint of rural Wales?*	Interactions

3.3.6 The result of this process was the development of a set of high and local level generic objectives, which were distilled into 46 key objectives. In order to reflect the high level of the RDP, these were then aggregated into the 12 objectives against which the RDP was assessed. The key objectives were retained as sub-objectives.

3.3.7 It should also be noted that the objectives are not scored or weighted, since they are interdependent and potentially mutually reinforcing. However, it is recognised that *within* some objectives there is a hierarchy of priority concerns. For example the objective to 'protect and enhance

biodiversity' implies that in some circumstances, *avoidance* must be the only option (in the case of ancient woodlands, say, or of designated habitats and species), whereas in others, *mitigation* and/or *compensation* might be appropriate. In any case, all mitigation and compensation measures must ensure an *enhancement* of the status quo wherever possible, should relate to any development proposal in terms of scale, and should be local to that proposal.

Table 5: SEA objectives and sub-objectives

Population and human health	Improve physical and mental health and reduce health inequalities	Minimise environmental nuisance such as noise pollution, and light pollution Promote access to the countryside Promote learning in, about and for farming and forestry Increase access to locally produced high quality foods
Biodiversity	Protect and enhance biodiversity	Avoid damage to sites of European conservation value and enhance them where possible Protect and enhance rare or endangered species and habitats and provide opportunities for habitat creation/restoration Protect habitats and minimise the fragmentation of nature corridors and networks in accordance with Biodiversity Action Plans, and improve these where possible Avoid damage to sites of geological interest Promote agri-diversity through support for endangered local breeds Promote indigenous woodland species Support biodiversity health through the management of disease and invasive species

Culture, architecture and archaeology	Protect places, landscapes and buildings of historic, cultural and archaeological value	Improve the quality of the local built environment Promote the re-use of previously developed land and buildings Protect village greens and community wildlife areas/ woodlands Promote and market locally sourced products Protect archaeological sites on farmland Protect and improve the stock of listed buildings
Soils	Protect soil quality and quantity	Maintain and enhance soil quality in terms of porosity, biota and structure Minimise soil erosion through run-off, wind and tillage Optimise the capacity of soils to sequester carbon
Water resource	Protect the water resource and ensure its sustainable use	Complete flood and coastal risk plans Promote technology to conserve and recycle water
Water quality	Protect and improve water quality	Protect and enhance the quality of groundwater, rivers, lakes, and coastal waters Comply with 'good' status under the Water Framework Directive (WFD) Protect and enhance salmonid and other fisheries Avoid physical disturbance to the water and water edge environment Reduce diffuse pollution from agriculture and other sources Ensure sustainable drainage systems in development
Air quality	Protect and improve air quality	Reduce atmospheric hazards such as ammonia, methane and carbon dioxide

Climate issues	Limit and adapt to climate change	Reduce emissions of greenhouse gases, especially N_2O and CH_4 Minimise the requirement for energy generation Promote efficient energy use Increase the use of energy from renewable resources including hydro-systems and biomass Promote ICT as an alternative to travel and print
Waste management	Minimise waste increase re-use, recycling and recovery rates	Restrict biodegradable materials going to landfill Promote anaerobic digestion Promote the use of organic waste to agriculture where appropriate
Transport infrastructure	Minimise the need to travel; provide alternatives to car use	Protect and enhance the public transport system Optimise opportunities to work locally Promote non-recreational walking and cycling
Animal welfare/disease transmission	Maintain and enhance animal welfare standards	Improve on-farm animal welfare standards Reduce stresses related to transportation Minimise transportation distances Minimise the risk of animal-animal/animal-human disease transmission
Rural based tourism and access	Optimise opportunities for rural tourism whilst minimising negative impacts	Optimise opportunities for links to wildlife/food production Protect and enhance access to the coastline and countryside Protect rights of way, open space, and commons

3.4 Development of SEA indicators

3.4.1 The indicators were adapted from the review of literature, as shown in Appendix 3, and linked to the 46 key objectives identified above. The indicators and the objectives to which they relate are shown in section 8, on monitoring.

3.4.2 It should be noted that the RDP provides its own indicators, based on Commission core indicators and specific programme indicators[44]. These are separate to the indicators referred to in relation to the SEA, and include, for example, a number of economic indicators that are not relevant to this report[45].

Figure 2: Overview of impact indicators

1	*Agricultural entrepreneurial income*	*EU/MS level*
2	*Agricultural factor income*	*EU/MS level*
3	*Agricultural productivity*	*EU/MS level*
4	*EU commodity price variability*	*EU level*
5	*Consumer price evolution of food products*	*EU/MS level*
6	*Agricultural trade balance*	*EU level*
7	*GHG emissions from agriculture*	*EU/MS level*
8	*Farmland birds index*	*EU/MS level*
9	*HNV Farming and Farmland*	*EU/MS/Regional level*
10	*Water abstraction in agriculture*	*EU/MS/Regional level*
11	*Water quality*	*EU/MS/Regional level*
12	*Soil quality*	*EU/MS/Regional level*
13	*Soil erosion*	*EU/MS/Regional level*
14	*Rural employment rate*	*EU/MS/Regional level*
15	*Degree of rural poverty*	*EU/MS level*
16	*Rural GDP per capita*	*EU/MS level*

3.5 Assessment methodology

3.5.1 The assessment consists of analysing each of the RDP's 18 focus areas (as described in section 2.3.3) against the objectives of the SEA, based on a range of criteria (see section 3.6) derived from the Directive and supporting guidance. The focus areas were assessed in the context

[44] Monitoring and Evaluation for the CAP post 2013. Y. PLees - Agri. L.4. PowerPoint presentation to the 12th Expert Committee on Evaluation of Rural Development Programmes. Brussels 20/09/2012

[45] Monitoring and Evaluation for the CAP post 2013 – impact indicators. Y. PLEES – Agri L.4 PowerPoint presentation (undated). Slide 12

of the proposed interventions. The results of this analysis were aggregated and set out as a basic compatibility test, as illustrated in section 5.1.

3.5.2 Finally, levels of risk were assessed for proposals that appeared to produce a negative effect when matched against the SEA objectives.

3.5.3 Risk was assessed for the *likelihood* of a negative effect occurring, and the *significance* of the effect should it occur as a result of the proposed intervention. This element therefore highlights the need for avoidance through regulation, mitigation or compensation, or a combination of them (Table 8).

3.6 Criteria for analysis

3.6.1 The criteria for the detailed analysis were developed on the basis of advice given in the ODPM guidance document, which refers to *'...scale and permanence and the nature and sensitivity of the receiving environment.'* (p.32) and the advice given by DG Environment[46]

3.6.2 Some proposed interventions may be *irrelevant* to the SEA objective, and we indicate where we judge this to be the case. In some cases this may be not known, in which case it will be indicated as such. Where a proposed intervention may be relevant, this is indicated as having a *direct* effect, an *indirect* effect, and/or an effect that may be *cumulative* or *synergistic.*

3.6.3 Such effects may be *negative* or *positive*, and these may differ in degree, so as to indicate very positive or very negative impacts.

3.6.4 Assessment also needs to be made with reference to *spatial extent*, that is whether the effect is likely to be local, regional, national or international; and to *duration*, that is whether the effect is likely to be short (1-2 years), medium (3-5 years), long (6+ years) term or permanent.

3.6.5 These criteria are described below (Table 6), and were used to carry out the detailed analysis of effects. Appendix 6 tabulates the analysis of effects in detail.

[46] "Implementation of Directive 2001/42 on the Assessment of the Effects of Certain Plans and Programmes on the Environment". DG Environment. Undated.

Table 6: Criteria used for analysis of effects

Reference	Symbol	Description
Irrelevant		An indicative activity is judged not to impact on the SEA objective.
Unclear	**?**	Difficult to envisage an impact, but limited confidence that there will be no impact.
Direct	**Dir**	There will be a discernible change to an aspect of the environment directly resulting from implementing an activity.
Indirect	**Ind**	There will be a discernible 'downstream' or 'parallel' change to another aspect of the environment, as a result of implementing an activity.
Cumulative/synergistic	**CS**	There will be a discernible change to an aspect of the environment arising from a number of anticipated activities.
Negative	**×**	There will be a loss or reduction in the integrity of an aspect of the environment.
Positive	✓	There will be an increase in the integrity of an aspect of the environment.
Short term	**ST**	Any discernible change to an aspect of the environment as a result of an activity is likely to last from 1-2 years
Medium term	**MT**	Any discernible change to an aspect of the environment as a result of an activity is likely to last for 3-5 years
Long term	**LT**	Any discernible change to an aspect of the environment as a result of an activity is likely to last beyond the life of the Programme (6+ years) but will not be permanent
Permanent	**P**	Any discernible change to an aspect of the environment as a result of an activity is likely to be permanent

3.6.6 A risk analysis of potentially negative effects used was tabulated using the symbols and criteria shown here:

Definite	**Def**	The effects will be inevitable unless remediated in some way.
Probable	**Prob**	These effects are likely to occur as a result of the implementation of an indicative action.
Possible	**Poss**	These effects may occur as a result of the implementation of an indicative action.
Unlikely	**Unl**	Effects are unlikely to occur as a result of the implementation of an indicative action alone.

Low	Any effect arising from a proposed intervention is likely to be minimal. No adaptation of the Programme is anticipated.
Moderate	Any effect arising from a proposed intervention is likely to be significant. The Programme may require adaptation.
High	Any effect arising from a proposed intervention is likely to be substantial. The Programme will require adaptation.

3.7 Links to other plans, programmes and policies and other documents

3.7.1 As well as those documents listed above (sections 3.3.2 and 3.3.3) which specifically informed the development of objectives and indicators, a number of other European, UK and Wales-level plans, programmes and policies were reviewed, in order to identify further links between the RDP and other plans, policies and programmes, and to provide information on priorities and environmental issues. A summary of that review can be found in Appendix 2.

3.7.2 Whilst the full list is too lengthy to provide in full, the following key Wales policy documents have informed this report:

- One Wales One Planet
- Wales Spatial Plan
- Environment Strategy
- Tourism strategy
- Transport Strategy
- Waste Strategy
- Energy Policy Statement
- Climate Change Strategy
- Coastal Flood Erosion Strategy
- Historic Environment Strategy
- Sustaining a Living Wales
- Farming, food and countryside: building a secure future
- Woodlands for Wales
- Sustainable Tourism
- Energy Wales: a Low Carbon Transition
- Unlocking the Potential of the Uplands

3.7.3 In addition, a number of Welsh theme-specific SEA's were reviewed to provide further information:

- Environment Agency: Western Wales River Basin District Management Plan SEA.
- Welsh Government. Flood and Coastal Erosion Risk Management: National Strategy. Habitat Regulations Assessment.

- North Wales Regional Waste Group. Strategic Waste Management Options SEA.
- Welsh Assembly Government. National Transport Plan SEA.
- Forestry Commission Wales. Woodlands for Wales Strategy. Voluntary SEA.
- Welsh Assembly Government. Wales Spatial Plan Update. SEA Statement.

4 ENVIRONMENTAL BASELINE AND ISSUES

4.1 Introduction

4.1.1 The scoping process aimed to identify the key environmental issues that will influence the development of the RDP, and to scope in or out those issues that are relevant to the achievement of its objectives. This section describes the current state of the environment in Wales, in order to provide a context for understanding the potential for both positive and negative effects that may arise from the Plan's implementation.

4.1.2 The proposed Plan does not identify particular land allocations, nor does it prioritise the interventions and the focus areas that it proposes. Therefore the baseline is as inclusive as is reasonably possible, since it would be premature to assume that certain environmental aspects will not be influenced, directly or indirectly, by the Plan.

4.2 Sourcing baseline data

4.2.1 The State of the Environment Statistical Bulletin (2012) provides an annual summary on a range of topics reviewing the state of the environment and allocates them a status based on their long term trends[47]. The results for individual indicators are in the 'State of Environment Report' that is published alongside the bulletin. In addition to the report, data is available via the StatsWales website[48]. Some of the statistics in the State of the Environment report correspond to, or are similar to some of the Welsh Government's Sustainable Development Indicators[49].

4.2.2 Of particular interest were the statistical reports on waste[50], population[51], rural Wales[52], and agriculture[53].

[47] See http://wales.gov.uk/topics/statistics/theme/environment/?lang=en (accessed 04/02/2013)

[48] See https://statswales.wales.gov.uk/Catalogue/Environment-and-Countryside (accessed 04/02/2013)

[49] See http://wales.gov.uk/topics/statistics/headlines/sustaindev/120829/?lang=en (accessed 04/02/2013)

[50] Statistics for Wales (First release June 28 2012 - SDR 104/2012)): Local Authority Municipal Waste Management Jan- March 2012. Statswales Cardiff

[51] Welsh Assembly Government (2010): Wales' Population. A demographic overview. Stats Wales Cardiff

[52] Welsh Assembly Government (2008): A Statistical Focus on Rural Wales. 2008 edition. Stats Wales Cardiff

[53] Welsh Government (2010): Welsh Agricultural Statistics 2010. Stats Wales Cardiff

4.2.3 The status of some indicators may differ between the two publications (for example, ecological footprint). This is because the Sustainable Development Indicators look at more recent trends and present progress against an agreed set of indicators from a baseline year of 2003 (or the nearest year for which data are available), whereas the State of the Environment report considers progress over a longer term (in some cases, where data permits, from the 1990s).

4.2.4 As well as these key sources, the literature review included a number of other documents and websites such as the UK National Ecosystem Assessments, Health Statistics, RDP 2007-13 State of Environmental Report, Wales Environment Strategy and Action Plan, and the Wales Sustainable Development Scheme.

4.2.5 Whilst there are no significant contradictions between statistics, some anomalies were identified as a result of different baseline scopes, starting dates, criteria and indicators and perhaps different approaches to aggregating data. Where relevant, these have been indicated.

4.2.6 Whilst a range of data on some topics such as ecological and chemical condition of water, could be taken from single sources such as the Environment Agency, data on other topics such as erosion, carbon sequestration and organic condition of soils is relatively dispersed[54], although the Countryside Survey 2007 and Cranfield University provided much of the underlying data.

4.2.7 Some of the data is based either at a local level (i.e. development plan and below) or in a UK (or even English) context, rather than in a Wales one. For example, Amar et al[55] and Forestry Commission England[56].

[54] For example, a range of papers relate to aspects of soil compaction including Critchley et al 2011; Newell Price et al 2012; and Bhogal et al 2011. Other papers relate to erosion (Exeter University 2003-2005 Defra study); ecosystem management and soil regulation (Smith P et al 2012); and the various studies carried out under the Countryside Survey 2007 including loss of soil carbon; acidification; and soil biodiversity (Carey et al. CEH 2008)

[55] A Amar, C M Hewson, R M Thewlis, K W Smith1, R J Fuller, J A Lindsell, G Conway, S Butler and M A MacDonald (2006): 'What's Happening to Our Woodland Birds?' RSPB Sandy Bedfordshire and BTO Thetford Norfolk

[56] Ray D, et al (2010). Climate Change: Impacts and Adaptation in England's Woodlands.

4.3 Overview

4.3.1 Wales covers an area of about 20,780km^2[57] with a coastline of about 1,296km[58].

4.3.2 It has a population of 3.06 million with an average population density of 143 persons per square kilometre[59]. The rural area (i.e. the nine predominantly rural local authority areas) covers an area of 17,060km^2 (82.1%) with a population of around 1 million people[60].

4.3.3 Whilst a significant population lives in concentrated settlements such as the capital Cardiff (population 341,000), Newport, Flint and Wrexham, Wales is thus predominantly rural[61] with agriculture being the dominant land use[62,63], and settlements are highly dispersed in some areas, where they *'...act as vital service hubs to the Uplands of Wales, keeping the heart of the Uplands pumping. The vitality of these hubs is essential to counteract the fragility of the most isolated areas.'*[64]

4.3.4 Topographically, Wales is predominantly upland, with much of the land being over 150 metres. In the north, Snowdon is the highest mountain in England and Wales, at 1085 metres, and in the south, the Brecon Beacons rise to 885 metres. Between them, the Cambrian Mountains[65] forms an extensive upland tract rising to Pumlumon at 752 metres. Other notable upland areas include the Berwyn and Radnorshire hills.

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[57] CCW's SSSI in Wales Report 'Current State of Knowledge' 2005-2006 gives the area as 2,122,453Ha (21, 225km^2)

[58] The length of the coast varies according to different measurement criteria. The source used here is CCW, 2006, 'Advice to the Welsh Assembly Government - Extending Access to the Coast' which gives the length as 1296km. EUCC: http://www.coastalguide.org/wales/ gives the total length as 1562km. The British Cartographic Society gives the length as 2740km: http://www.cartography.org.uk/default.asp?contentID=749.

[59] National Census 2011

[60] WAG (2008) Statistics for Wales: A Statistical Focus on Rural Wales, 2008 Edition

[61] For a discussion on definitions of 'rural' see Pateman, T. (2011). Rural and Urban areas: comparing lives using rural/urban classifications. Office for National Statistics. See also section 2.1.1 of this report .

[62] UK 2005. The Official Yearbook of the United Kingdom of Great Britain and Northern Ireland.. London: The Stationery Office. 2004. pp. 279. ISBN 0-11-621738-3.

[63] It should be noted however that at 22,900 full-time and 28,000 part-time workers, agriculture is not the dominant occupation in rural Wales (Farming Facts and Figures 2012).

[64] Welsh Uplands Forum (December 2012): Unlocking the Potential of the Uplands'.

[65] Technically this mid-Wales area has been the 'Cambrian Mountains' only since the 1950's

4.3.5 Significant topographic variation occurs over short distances and directly influences the differences not only in climate but in physical conditions such as hydrology and soils. The type of land use and landcover reflects historic human responses to topographic and climatic constraints, resulting in patterns of extensive tracts of open grazed uplands and wooded valleys, with fields defined by walls, hedgerows or post and rail fencing according traditionally available materials. Coastal flats and broad valley bottoms provide opportunities for more productive agriculture.

4.3.6 The rivers drain radially from the upland areas, the Severn being the longest river in England and Wales. Other important rivers include the rivers Dee, Wye, Taff, Tawe, Usk, Teifi, Tywi, Dyfi, Mawddach, Dwyryd and Conwy. There are a number of hydro-electric schemes and reservoirs that supply major settlements in both Wales and England.

4.3.7 Wales has an essentially maritime climate, characterised by weather that is often cloudy, wet and windy but mild. However, the shape of the coastline and the central spine of high ground from Snowdonia southwards to the Brecon Beacons introduce localised differences. Whilst some upland areas can experience harsh weather, the coasts enjoy conditions that are more favourable and areas in east Wales are more sheltered and hence similar to neighbouring English counties.

4.3.8 These topographical and climatic conditions place severe constraints on the ability of agriculture to diversify. In 1984, 80 per cent of agricultural land was designated 'Less Favoured Area' (LFA) to reflect these challenges, approximately 1,370,400Ha[66]. Of this LFA, about 72 per cent is classified as 'Severely Disadvantaged'[67] (986,688Ha) (see map 3).

4.3.9 Some 30% of the land area has protection in special sites for wildlife, scenic beauty or geological value, and it is worth noting that approximately 80 per cent of non-tidal land categorised as SSSI is in the LFA, as are the majority of lakes and rivers with equivalent status. The latter comprise some 1,588 km of main rivers and 264 lakes[68]. According to the Welsh Uplands Forum, 171,127ha of the SDA is designated as

[66] Calculated on the basis of 80% of 1,713,000Ha Farming Facts and Figures Wales 2012

[67] Farmers' Union of Wales's submission to the Rural Development Sub-Committee inquiry into the future of the uplands in Wales (undated). http://www.assemblywales.org/bus-home/bus-committees/bus-committees-third1/bus-committees-third-rd-home/inquiries-3/rdc_3_-the_future_of_the_uplands_in_wales_-_home_page/rdc_3_-fuw8.htm

[68] ibid.

Sites of Special Scientific Interest (SSSI)[69]. This is approximately 66.5 per cent of the total SSSI area[70]

4.3.10 Light pollution within the central landmass of Wales is low because of the lack of large settlements. In contrast, it is high around the settled coastal areas especially in the south and the north east.

4.3.11 Pollution from carbon, nitrous oxide and particulate emissions varies considerably between areas of relatively limited road traffic and the industrialised commuter conurbations. On the other hand, ground level ozone is associated with rural areas.

4.4 Population and human health

4.4.1 Migration has a significant impact on the demographics of rural Wales. There is a net outflow of young adults (16 to 25) with net inflows for all other age groups. The largest inflows are for older working age persons (45 to 64) and children (under 16). Overall the population of rural Wales is growing. The number of young persons (under 25) is falling, but less fast in rural Wales than in other parts of Wales. The number of elderly persons (over 64) is growing more rapidly in rural Wales than in other parts of Wales, which is likely to place increased stresses on the delivery of services, especially healthcare[71].

4.4.2 Remoteness is a critical factor when considering social exclusion issues, especially in relation to the provision of key services such as healthcare, support services (e.g. child care, support for the elderly, etc.), education and training, recreational activities and cultural opportunities.

4.4.3 The trend towards the centralisation of public services in order to deliver financial efficiency will need to consider where new development can best be located. Services must be accessible to as many people as possible, and if a low carbon future is to be envisaged, would need to be accessible by public transport. Providing accessible rural services inevitably carries a higher cost, but service provision is also a key employer and income provider in rural communities.

4.4.4 Of equal concern is the fact that those in low income households in remote rural communities are more likely to experience problems with

[69] Welsh Uplands Forum (December 2012): Unlocking the Potential of the Uplands' page 16.

[70] CCW's SSSI Review 2006 gives the total SSSI area as 257,251Ha.

[71] Welsh Assembly Government ' A Statistical Focus on Rural Wales'. 2008

access to basic services such as food shops. Map 4 indicates those areas that are deprived by virtue of limited access to key services, which includes much of rural Wales[72].

4.4.5 Changes in climate leading to more adverse weather conditions may make it impossible to access centralised education/health services for those living anywhere other than in their immediate vicinity, and may also make it difficult for employees to travel to work if there are long journeys involved.

4.4.6 On the other hand, rural Wales enjoys a higher quality environment, where this is defined in terms of air quality and lower risks from flooding (Map 5).

4.4.7 The Welsh Government's Sustainable Development Scheme 'One Wales: One Planet (May 2009) defines wellbeing (p19) as:

'...a positive physical, social and mental state; it is not just the absence of pain, discomfort and incapacity. It requires that basic needs are met, that individuals have a sense of purpose, that they feel able to achieve important personal goals and participate in society. It is enhanced by conditions that include supportive personal relationships, strong and inclusive communities, good health, financial and personal security, rewarding employment and a healthy and attractive environment.'

4.4.8 The State of the Environment Report (July 2012) sets outcomes for health and wellbeing and provides detailed information on progress, based on sets of indicators. Its main findings on the condition of health and well being in Wales are summarised here:

- In 2009/10, 50.3% of respondents found it very easy to access parks or open space and a further 35.6% found access fairly easy, a decrease from 89.9% in 2005 to 85.9% in 2009/10.

- 20% of adults reported currently being treated for high blood pressure, 14% for a respiratory illness, 12% for arthritis, 11% for a mental illness, 9% for a heart condition, and 7% for diabetes.

- 29% of adults reported being physically active on 5 or more days in the past week.

[72] Index of Multiple Deprivation 2005

- 57% of adults were classified as overweight or obese, including 22% obese. 35% of children were classified as overweight or obese, including 19% obese.

- In 1997, 78.2% of people travelled to work by car. In 2011, this had risen to 80.7% (+2.5%). In 1997, 11.2% of people walked to work. In 2011 this had fallen to 10.3% (-0.9%).

- Over the same period people using public transport had fallen from 8.8% to 7.5% (-1.3%), and those travelling by bicycle had fallen from 1.9% to 1.4% (-0.5%).

4.4.9 It should be noted that the farming, forestry and fishing sectors are particularly risky. Whilst just one per cent of the UK population work in agriculture, it accounts for about 20 per cent of all work related fatalities.[73] It is likely that farmers tend not to report illnesses and injuries as frequently as other workers, and the statistics for self-reported injuries and illnesses may not be meaningful. As the farming population ages, there is perhaps increasing concern that this may be reflected in increases in accidents.

4.4.10 In terms of housing stock, although the number of homes has steadily increased since 1986, the rate of unfitness has continued to fall (Welsh House Condition Surveys and Living in Wales Survey 2004). By 2008 the number had reduced from 19.5% of the 1986 total (199,000 dwellings) to 4.1% (52,100).

4.4.11 The 2004 Living in Wales property survey estimated that only 0.8% of all social housing met the Welsh Housing Quality Standard. By 2008 this figure was about 6%. Although the trend continues to be downwards, as building standards are raised, the 'fitness' bar is likely to be raised, especially as 'unfitness' relates to 11 standards including disrepair, dampness and ventilation. A failure to meet any one of the 11 standards will classify the dwelling as unfit for habitation.

4.4.12 Volunteering is seen as an indicator of social cohesion and as a reflection of people's confidence and willingness to participate and to donate time, and may be a valuable indicator of general well-being. The number of environmental volunteers across a sample of 14 Wales Environment Link member organisations was 36,615 in 2009/10 an

[73] Health and Safety Executive: Agriculture: Work related injuries and ill health http://www.hse.gov.uk/statistics/industry/agriculture/index.htm

apparent increase over previous years. However, 2011/12 has seen a significant reduction to 24,315 volunteers.

4.4.13 A variety of health data sources (see Welsh Government 'Key Health Statistics for Wales' 2012; Wales Health Survey 2011) report issues surrounding lifestyle habits including smoking, alcohol use and obesity. While there are potentially many diverse health issues affecting rural Wales in particular, those that are relevant to the RDP and the SEA especially are more limited. In the context of the SEA they are likely to be linked to access to the countryside and recreation, reducing health inequalities and access to quality and nutritious food.

4.5 Biodiversity[74]

4.5.1 Of the 21,000 km^2 land and freshwater surface area of Wales, about 30% is protected in special sites for wildlife, scenic beauty or geological value.

Protected Areas in Wales

3 National Parks
5 Areas of Outstanding Natural Beauty (AONBs)
14 Heritage Coasts
1 Biosphere Reserve
2 Geoparks
92 Special Areas of Conservation (SACs)20 Special Protection Areas (SPAs)
Over 1,000 Sites of Special Scientiific Interest (SSSI) (about 12% of the country's' surface)
72 National Nature Reserves (NNR) (over 25,000 ha of land)
*1 Marine Nature Reserve (over 1,000 ha of sea)**
92% of NNRs by area are also sites of international importance for wildlife
40% of designated habitats and species are considered to be in favourable condition, and over30% are in a process of recovery
11 Royal Society for the Protection of Birds (RSPB) reserves
236 Wildlife Trust reserves
** The Welsh Government is in the process of reviewing the number and size of Welsh Marine Reserves*

[74]Data derived from JNCC http://jncc.defra.gov.uk/page-1399; and from CCW http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape.aspx; unless stated.

4.5.2 The three National Parks and five Areas of Outstanding Natural Beauty are categorised by the International Union for the Conservation of Nature as Protected Landscapes (Category V). These areas occupy 24 per cent of Wales' terrestrial space (5,078 km^2), and are protected in part through an enhanced consideration of environmental matters in the management of development. Within them are many of Wales terrestrial biodiversity sites. Two of the National Parks - Snowdonia/Eryri and the Brecon Beacons - are largely within the Severely Disadvantaged Area agricultural designation.

4.5.3 Wales has one internationally recognised Biosphere Reserve, Dyfi Biosphere, based on the principle of strictly conserving the biodiversity values of a core area, establishing a buffer area where activities are linked to the ecosystem services provided by the core and which support its protection, and a transitional area based managed on sustainability principles. Such places are inscribed by the United Nations Educational Scientific and Cultural Organisation (UNESCO) as 'bio-laboratories', dedicated to finding novel human-nature interactions. Wales has one European geologically important Geopark, part of the Brecon Beacons National Park.

4.5.4 Local Authorities designate Local Nature Reserves (LNR) that have locally important features. They combine conservation with opportunities for quiet enjoyment of nature and for educational purposes. There are 53 in Wales.

4.5.5 136,702 Ha is designated under the European Birds Directive as Special Protection Area (SPA) on 20 sites, and 628,726Ha is currently designated under the Habitats Directive as Special Area of Conservation (SAC) on 92 sites. Much of the SAC is marine and estuarine. The Severn and Dee estuaries were fully declared as in 2009, and a significant proportion of the north, west and south-west coasts are also designated. Important terrestrial SACs include the Berwyn Mountains, parts of the Snowdonia and Cambrian Mountains, and the catchments of the Wye and Dee rivers (see 6).

4.5.6 There are over 1,019 Sites of Special Scientific Interest (SSSIs) in Wales covering an area of over 235,000Ha (see map 7). Seventy three of these are designated National Nature Reserves (NNR). The distribution of these protected sites is variable. For example, Gwynedd and Anglesey account for 25 NNRs, covering 4,891 hectares, over one-third of NNRs by

number and just under one-fifth in area. Gwynedd and Anglesey also account for one third of Wales' SPAs[75].

4.5.7 About 8.4% of Wales is covered by registered common land amounting to around 175,000 hectares. Many small commons are adjoining, making large areas of common land. These small commons may have different owners and different rights holders, and provide grazing for sheep and cattle. In addition, many commons are enjoyed for their leisure and environmental interests[76]. Common land presents a particular challenge in addressing biodiversity loss. According to the UK NEA, common land includes some of the most biologically degraded areas in Wales[77], despite the fact that significant areas are within National Parks and AONBs.

4.5.8 In common with other countries in Europe, Wales missed its international biodiversity targets in 2010. In 2005, 59% of Biodiversity Action Plan habitats in Wales were in declining condition. Priority habitats classed as stable or improving increased from 30% in 2002 to 36% in 2008. Fifty-four per cent of Biodiversity Action Plan species were assessed as being in 'unfavourable condition' in 2008, but with considerable variation between species groups. For example, 80% of marine mammals and birds were in favourable or recovering condition, while 80% of amphibians, butterflies and fish were recorded as being in unfavourable condition.

4.5.9 BAP-related interventions appear to be concentrated in north, south and west Wales. The BARS reporting system[78] has mapped nearly 3,400 actions, and has described nearly 1,700 unmappable actions. These include interventions by trusts to restore heathland habitats for black grouse (RSPB Berwyn), to restore field margins as corridors (Denbighshire Wildlife Trust), or by local authorities and the Environment Agency to remove invasive plant species (upper Severn).

4.5.10 In the case of SAC's, 61 per cent of habitat features and 67 per cent of species features for which they were designated are in unfavourable condition. Distribution in terms of condition status is not known, but it is possible that particular features are more challenging in terms of achieving favourable status, depending for example, on surrounding land

[75] Gwynedd UDP Deposit Plan SEA 2005

[76] http://wales.gov.uk/topics/environmentcountryside/farmingandcountryside/common/documents/;jsessionid=41B731FB5F0CCCC2F62B4390DCCE74AE?lang=en

[77] UK National Ecosystem Assessment (2011). Chapter 20 Wales. p1019

[78] http://ukbars.defra.gov.uk/planning/actionmap

uses, interactions with other activities and species, and the general biodiversity condition of surrounding areas.

Biodiversity Action Reporting System (BARS 2011)
Condition of habitats since 1945

Decline across 60% of marine habitats
Decline across 8% of terrestrial habitats*
Decline across 33% of freshwater habitats
Improvement or stability in 80% of terrestrial habitats*
Improvements or stability in 66% of freshwater habitats
Improvement in 83% of Woodland, upland & Enclosed Farmland habitats
Same or accelerated decline in 25% of wetlands and coastal habitats
Apparent slowing decline in lowland grassland and heathland

UK NEA 2011
'Status & Changes in the UK's Ecosystems and their Services to Society':
Chapter 20 Wales
Key Findings

** About 12% are fluctuating/reveal no clear trend*

4.5.11 Coastal and marine habitats are under particular pressure, with the majority in stable or declining condition. Specifically, saltmarsh and coastal lagoons are equivocal or stable, whilst cliffs, dunes and shingle show a weak decline in condition[79]. Marine habitats are mostly stable[80], and there has been a downward trend in some polluting substances in the marine environment[81] .

4.5.12 Other indicators present a mixed picture, particularly in the case of birds, with some farmland[82] and woodland birds showing marked declines (some species showing a 42.7% decrease in range) and others (16.9%) an increase in populations[83].

[79]UK NEA 2010 Chapter 20

[80]UK MAAS 2010

[81]State of the Environment Report 2012

[82] RSPB has pointed out that a distinction should be drawn between birds associated with upland farms and those associated with lowland farms, and that appropriate monitoring should be based on these separate indicators

[83]Ibid.

4.5.13 The National Assembly Sustainability Committee's 2010 report into biodiversity loss[84] lists 19 recommendations for addressing the challenge, including:

- Driving the ecosystem approach into policy and across all government departments in Wales
- Focusing more on biodiversity in the wider landscape rather than dependence on protected sites alone
- Involving the private sector in biodiversity management through the use of incentives and payments for ecosystem services

4.5.14 Invasive species, such as the signal crayfish (*Pacifastacus leniusculus*), 'killer shrimp' (*Dikerogammarus villosus*)[85], Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*), parrot's feather (*Myriophyllum aqauaticum*), floating pennywort (*Hydrocotyle ranunculoides*), and Water fern (*Azolla filiculoides*) are giving rise to concern since they threaten a number of native species, choke waterways and banks, and in some cases damage infrastructure. In coastal waters, Japanese wireweed (*Sargassum muticum*), New Zealand barnacle (Elminius*/Austrominius modestus*) and algae such as *Heterosiphonia japonica* are also becoming problematic.

4.5.15 A new set of biodiversity targets for 2015 and 2020 was set by the 10th Conference of Parties to the Convention on Biological Diversity (CBD) at its meeting in Nagoya Japan in 2010. The targets are based on protecting and enhancing ecosystem functioning. In response, the EU has produced a biodiversity strategy[86] that promotes six targets, aimed at:

- enforcing EU laws protecting birds and habitats
- maintaining and improving ecosystems - restoring at least 15% of areas that have been damaged
- getting farming and forestry to help improve biodiversity
- ensuring sustainable use of fisheries resources by reducing catches to scientifically determined limits by 2015 - 88% of the EU's fish stocks are currently over-exploited or are significantly depleted
- combating alien species that invade habitats - and currently threaten 22% of the EU's indigenous species
- stepping up the EU's contribution to preventing global biodiversity loss

[84] Sustainability Committee National Assembly for Wales 'Inquiry into Biodiversity in Wales' 2011

[85] http://www.environment-agency.gov.uk/homeandleisure/wildlife/31350.aspx

[86] Our life insurance, our natural capital: an EU biodiversity strategy to 2020. European Commission 2011

4.5.16 The UK Biodiversity Action Plan process was replaced on 1 April 2012 with a commitment by the four administrations in the UK to work towards the prevention of biodiversity loss and meet our international obligations through the establishment of a UK Biodiversity Framework that outlines the UK level objectives of biodiversity policy[87].

4.5.17 Unsurprisingly, the strong spatial link between protected areas (both UK and international) and the Less Favoured Areas provides a powerful incentive to link agricultural productivity with environmental measures. Some 31,000Ha of designated SAC is under management agreements[88], as is 18,500Ha of SPA and 1,150 of Ramsar.

4.6 Landscape

4.6.1 The landscapes of Wales are remarkably varied for such a small nation. The underlying geology, and the variety of land use and land cover result in a number of distinctive landscapes that can be identified at both an extensive and at a local level.

4.6.2 Some areas, such as Snowdonia/Eryri, the Clwydian Hills, the Gower Peninsula, the Brecon Beacons and the Wye Valley, are well-known for certain characteristics, and have been named, written about, appreciated and visited for centuries, and it is perhaps no surprise that each of these areas is a protected landscape. Others, such as the Dovey and Tanat Valleys or the Radnorshire Hills are less widely known but are nonetheless well-known and appreciated locally.

4.6.3 These distinctive landscapes can be identified and described in some detail, reflecting their glacial history, their topography, the underlying geology and hydrology and their historic land uses and cultural associations.

4.6.4 These areas have been broadly mapped, and are known as 'landscape character areas'[89]. Forty-eight such areas have been identified in the case

[87] JNCC and Defra (on behalf of the Four Countries' Biodiversity Group). 2012. UK Post-2010 Biodiversity Framework. July 2012 http://jncc.defra.gov.uk/page-6189.

[88] Section 15 of the Countryside Act (1968) , or Section 16 of the National Parks and Access to the Countryside Act (1949), provide for agreements to be set up between CCW and landowners, whereby the owner may be offered payment towards conservation work, such as changing grazing practice, raising water levels or removing scrub where appropriate.

[89] See Landscape Character Assessment Guidelines, Natural England and Scottish Natural Heritage (2002) http://publications.naturalengland.org.uk/publication/2671754?category=31019

of Wales[90] (map 8). The purpose of mapping these areas is to enable a description of each area's distinctive character, rather than to attempt to identify one landscape as being 'superior' to another.

4.6.5 The Countryside Council's LANDMAP programme[91] has developed a system for assessing the condition and quality of Wales' landscape from five dimensions, known as 'aspect areas'. These are cultural, geological, historic, landscape habitat and visual and sensory.

4.6.6 What the LANDMAP programme reveals is the extent of outstanding landscape attributes beyond the protected landscapes of Wales (maps 9-13) . The red areas on these maps indicate outstanding landscape attributes, and the amber areas are of high quality.

4.6.7 Whilst such an assessment has a degree of subjectivity, it has been rigorously tested among landscape professionals and the public and has a high degree of consensus and quality control.

4.6.8 Section 4.5.2 referred to three National Parks and five AONBs. When they were first established the purposes of these areas were to preserve and enhance their 'natural beauty', and in the case of National Parks, to promote their enjoyment by the public[92].

4.6.9 These designations might be seen as essentially landscape designations, not least because 'due regard' was to be had to the needs of agriculture and forestry. 'Natural beauty' was not defined, but the provisions for national parks and AONBs were set out separately to those for nature reserves, and the intention was perhaps to sustain traditional rural practices in order to protect the outstanding character of these areas.

4.6.10 Snowdonia National Park covers the mountains of the Snowdonia range, including the Carneddau and Glyderau mountain ranges. The park contains a wide diversity of landscapes encompassing 37km of coastline with coastal cliffs, beaches, sand dunes and estuaries to ancient semi-natural oak woodland to the open mountaintops. Glacial valleys, lakes and enclosed farming on the lower foothills and coastal plain also reflect the diverse character of this Park.

4.6.11 Brecon Beacons National Park begins close to Llandeilo in the West and runs as far as Abergavenny in the East. The most Northerly point falls

[90] See www.ccw.gov.uk/idoc.ashx?docid=dc3096a3-4149...1

[91] See http://www.ccgc.gov.uk/landscape--wildlife/protecting-our-landscape/landmap.aspx

[92] National Parks and Access to the Countryside Act 1949. Part II s5 Part VI s87/88

in the Wye Valley. The landscape has upland moorland ranging in type from acid heaths through to species rich limestone grasslands that support a huge range of plants and insects and 14% of the area is covered in woodland. Of particular importance are the rivers and lakes, which are home to many important fish and animals, in particular the otter. In 2005, the Upper Swansea Valley within the Park was declared Wales' first Geopark, one of just forty eight sites in Europe.

4.6.12 Pembrokeshire Coast National Park is predominantly a lowland landscape covering the coastal area of Pembrokeshire and all the offshore islands. The waters around the islands form one of three UK Marine Nature Reserves with populations of grey seals and dolphins. The Pembrokeshire Coast Path National Trail covers 299km (186 miles) of the most spectacular coastal scenery in Britain, the majority of which falls within the National Park.

4.6.13 The five areas Areas of Outstanding Natural Beauty are the Clwydian Range, Llŷn, Wye Valley, Ynys Môn and Gower.

4.6.14 Landscape character is likely to be an important factor in influencing the environmental effects of schemes under the RDP. Topographical and geographical variations within Wales all provide varying contexts for landscape and the historic and cultural environmental effects of the RDP, for example:

- mountainous areas, coastal, agricultural landscapes, both open and closed, each with its own specific issues and designations;
- certain areas may be defined as "urban", but with many "rural" characteristics;
- cross-border and peri-urban issues, with many farms in the East of Wales having holdings that reach across the border (to England) and to the fringes of urban areas.

4.6.15 The role of 'landscape' as a discrete Glastir targeted element is not clearly established. There are six Glastir targeted elements for enhanced payment for works that support its objectives. However, as map 14 indicates, this appears to be based on the protected landscapes referred to above, which by implication excludes areas that are not designated but which may have outstanding landscape qualities as defined by LANDMAP. Such areas might include the Berwyn and Cambrian Mountains and the Radnorshire Hills.

4.6.16 Neither the Welsh Assembly Government's document 'Glastir: New Sustainable Land Management Scheme for Wales' (February 2010) nor the National Assembly's 'Introduction to Glastir and other UK Agri-

environment Schemes (February 2011) refers to landscape as a discrete targeted element, although the Farmers' Union of Wales identifies landscape and access as an element[93].

4.6.17 In any case, a key aspect of landscape relates to features that may be of outstanding significance historically and culturally, and the conservation of these features is an important objective of the Glastir scheme[94].

4.7 Cultural, architectural and archaeological issues

4.7.1 The Welsh language is a member of the Brythonic branch of Celtic languages, and is the oldest spoken language in Europe. In 2001, the number of Welsh speakers was over 582,000 (21 per cent of the total population) [95]. The 2011 Census results on the Welsh language in Wales were published by the Office for National Statistics on 11 December 2012. These initial results include data at a Wales and local authority level. The number of people who speak Welsh has fallen in the past 10 years, according to the 2011 census. Despite an increase in population the number of Welsh speakers has fallen overall from 582,000 in 2001 to 562,000 in 2011 a two percentage point drop in Welsh speakers - from 21% to 19%.

4.7.2 Gwynedd and Anglesey are the only areas where over half the population now speak Welsh. Gwynedd now has 65% (down from 69%) while 57% of the population (down from 60%) speak Welsh on Anglesey. Welsh is now a minority language in two of its traditional strongholds: Ceredigion at 43% (down from 52%) and in Carmarthenshire at 44% (down from 50%). The local authorities with the lowest percentage of Welsh speakers are in South East Wales. Blaenau Gwent reported the lowest percentage of people who could speak Welsh at 7.8%. Overall, 19% of the Welsh population aged over three said they were able to speak the language[96].

4.7.3 It has been thought that migration trends and education might lead to an increase in speakers in less traditional Welsh-speaking areas. But the census suggests otherwise, with just two areas, Monmouthshire and Cardiff, seeing a percentage increase.

[93] http://www.fuw.org.uk/glastir-faq-advanced-element.html

[94] Welsh Assembly Government (2010). 'Glastir: New Sustainable Land Management Scheme for Wales' WAG Cardiff (February 2010)

[95] WAG 2010: Wale's Population – a Demographic Overview. Cardiff 2010

[96] Census 2011/ONS

4.7.4 There has been a significant decline in the number of Welsh speakers in the rural areas. Natural Resources Wales, the single body which will replace the Environment Agency, Countryside Council for Wales and the Forestry Commission on 1st April 2013 has been consulting on its Draft Welsh language scheme[97]. Part of this new body's vision is to

"Promote an understanding that the Welsh language, as a part of Welsh culture, is integral to the ecosystem approach to managing the environment in Wales"

4.7.5 Wales contains a rich heritage of historic buildings, including vernacular and agricultural buildings, as well as industrial, ecclesiastical and historic military structures and sites. The historic works at Blaenavon are a UNESCO Cultural World Heritage Site, as are the Edwardian castles at Harlech, Beaumaris, Caernarfon, and Conwy. Wales has reputedly the highest concentration of medieval castles in the World[98].

4.7.6 It is important that Wales' historic building stock and its character is maintained to a high standard, and this includes wherever possible its setting. Retro-fitting historic buildings to an adequate environmental standard is likely to prove highly costly, not least the need to ensure that hardware and insulation does not conflict with the integrity if such buildings.

4.7.7 In 2007, Cadw commissioned a baseline report on listed Buildings at Risk in Wales. This brought together data from most of the local authority registers. The 2009 summary report[99] estimated that of the 29,896 listed buildings in Wales, 2,882 are 'at risk', and 5,145 are 'vulnerable', owing to the rate of decline of their fabric and character. The report indicates that North West and Central Wales have a particularly high number of 'at risk' buildings.

4.7.8 There are four Landscape Partnership schemes in Wales: Llŷn, Tywi Valley the Clwydian Hills and Blaenavon. These schemes aim to support the conservation and enhancement of these special landscapes. In the 1990's, Cadw commissioned a rapid archaeological survey of the entire Welsh coast, resulting in the identification of over 3,000 sites and

[97] http://www.ccw.gov.uk/about-ccw/consultations/draft-welsh-language-scheme.aspx

[98] Wales Tourist Board http://www.studyinbritain.com/info/walestourist.asp [accessed 03/03/2013].

[99] Buildings at Risk in Wales". Handley Page partnership for Cadw. (2009).

monuments of archaeological and historic interest. Of these over 2,000 were recorded for the first time.[100]

4.7.9 Of particular relevance to the RDP, traditional farm buildings, and the structures associated with them, represent the distinctive character of local architecture. They reflect the historic availability of local materials, and reflect local vernacular building styles that tell the story of Wales' farming and domestic history. The protection of such structures, and the revival of traditional skills associated with their construction and maintenance, is an important heritage objective. Apprenticeships in traditional building skills, such as the opportunities offered at the Traditional Building Skills Centre, Dinefwr[101], are central to this endeavour.

4.7.10 Fifty-eight areas of Wales have been identified for placing on the historic landscapes register maintained by Cadw, CCW, and the International Council of Monuments and Sites (ICOMOS). There are also over 100,000 archaeological sites listed by the four Welsh Archaeological Trusts, some of which are impressively set[102] [103].

4.7.11 The role of museums, archives and libraries is significant in preserving and promoting the culture of Wales. With over 400 service points spread across Wales they provide an important network delivering mostly free public access to resources reflecting all aspects of Welsh culture[104]. However, the Wales Rural Observatory Report into rural services (2010) stated that 78% of the responding rural communities did not have a permanent library, and 36% had no mobile library service[105]. Bearing in mind the issues raised in paragraphs 4.4.3-4.4.5, easy access to these facilities by small rural communities is likely to be limited.

4.7.12 The Welsh Government is currently undertaking a review of the historic environment of Wales to help shape the context of a Heritage Protection Bill for Wales which is due to be introduced in 2014-15.

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[100] CADW Caring for Coastal Heritage p3

[101] TheTraditional Building Skills Centre (Tywi Afon yr Oesoedd) is based at Dynefwr Home Farm and managed by Carmarthenshire Council and CCW with the support of the National Trust.

[102] See www.archwilio.org.uk

[103] www.ccgc. gov.uk/landscape/wildlife/protecting-our-landscape/ historic-landscapes/wales-historic-landscapes.aspx

[104] Socio-economic analysis of Wales. WEFO February 2013

[105] Wales Rural Observatory (2010) Report of Survey into Rural Services. Aberystwyth University. Cardiff University. Welsh Government. p23

Cultural, Architectural & Archaeological Heritage Facts

- In both 1996 and 2003, nearly 80% of scheduled ancient monuments were reported to be stable, and about 10% are improved or greatly improved
- There was an increase in superficial disturbance, generally from invasive vegetation and scrub encroachment, probably due to the less intensive agri-environmental schemes. This was offset by the reduction in the disturbance sometimes caused by intensive agriculture.

Cadw: Position Statement 2007

Listed buildings at risk, 2007 and 2008

- The percentage of the sample of listed buildings in Wales that were classed as 'at risk' has fallen slightly from 10.2% in 2007 to 9.6% in 2008.
- The percentage of the sample of listed buildings that were classed as 'vulnerable' has fallen slightly from 17.5% in 2007 to 17.3% in 2008.
- The percentage of the sample of listed buildings that were classed as 'not at risk' has increased slightly, from 72.4% in 2007 to 73.2% in 2008.

Handley Partnership/Cadw

4.7.13 Cadw is seeking how to facilitate public engagement, access and appreciation for the historic environment, supporting regeneration through conservation, maximising the value of the historic environment to the Welsh economy and encouraging local communities to value and protect their local heritage – rural communities are an important part of this discussion.

4.8 Soils

4.8.1 Soil type and categorisation is well recorded. Avery (1980) classified the soils of England and Wales, describing 10 major groups with 43 groups and about 120 subgroups[106] that reflect variants on the basic definition and include texture or parentage as criteria for refining the type. In some cases the name of the subgroup relates to a geographical location suggesting where they were first mapped. Unfortunately some of

[106] Avery BW (1980). Soil classification for England and Wales [Higher Categories]. Survey Technical Monograph No. 14, pp67. Harpenden, UK.

the Welsh series names have been lost due to rationalisation, though many important soils retain their original Welsh names[107].

4.8.2 There is a wide variety of different soil types within Wales, providing a diverse range of soil fertility levels. Regional differences in agricultural practices are emphasised by the presence of either good quality, fertile soil or poor quality, shallow, infertile or waterlogged soils. Of the ten major groups present in Wales, three occupy about 30% of the land:

- Brown soils are relatively common below 300 m, where slopes are gentler and rainfall is lower than in the Uplands. They form mainly on permeable materials and are typically deep and often well drained. Where gradient and climate is favourable, brown soils can be agriculturally productive.

- Gley Soils are quite extensive and suffer from varying degrees of seasonal water logging. This can limit agricultural potential, especially where the subsoil is slowly permeable and rainfall is high. Gley soils are divided into two types: Surface-water gley soils are most extensive. These are waterlogged due to permeable layers restricting downward drainage of water through the soil. Ground-water gley soils are less extensive, associated with fluctuating water tables, for example river floodplains.

- Podzolic Soils are essentially acid upland soils. They mainly occur above 200 - 300m above sea level, where rainfall is in excess of 1,000 mm per year and sometimes occur on steep slopes. Podzolic soils can be inherently well drained. However, they normally occur in areas of prolonged high rainfall. Peaty/organic rich topsoils can occur in colder high rainfall areas. Most of the land is permanent pasture, leys or rough grazing, partly due to terrain and climate limitations.

4.8.3 Peat soils are predominantly found in mountain areas. High rainfall and cool temperatures limit the decay of vegetation, creating a build up of carbon rich organic material. The high rainfall, cold temperatures and acid nature of these soils severely restricts agricultural use. Upland Welsh peats support semi-natural habitats, often of conservation importance. In addition, peat soils play an important role in climate change regulation.

[107] See Conway J (2006). Soils in the Welsh Landscape. http://jscnwy.wordpress.com/soils-of-wales/soil-classification/

4.8.4 Whilst soil types are well understood and have been categorised, there are still gaps in understanding its structure and function. The rate at which the soil carbon store is changing in Wales is the subject of some debate, with apparently contradictory results from two major UK surveys; the National Soil Inventory[108] and the Countryside Survey 2007[109]. Issues such as carbon storage, soil compaction[110] and erosion[111] are, and have been, subject to research.

4.8.9 Globally, twice as much carbon is stored in soils as in the atmosphere with peatlands contributing a third of this. Therefore, even small changes in soil carbon stocks might contribute significantly to global climate change, for example, due to a positive feedback as a result of global warming. Whereas above ground carbon cycling is well understood, there are great uncertainties in climate impacts on soil carbon cycling[112].

4.8.10 There is currently a general lack of reliable information on rates of soil loss from agricultural land in the UK. Environment Agency figures estimate the annual costs of soil erosion to the UK economy to be £202 million but actual extent and rates of soil erosion are poorly understood making cost estimates unreliable.[113]

4.8.11 Most studies focus on erosion by water - few studies have monitored soil erosion by wind, tillage or soil loss through co-extraction on root crops or farm machinery at the national scale[114].

4.8.12 The effect of soil erosion can be significant. As well as loss of productive material, eroded soil can contaminate water courses, resulting in loss of

[108] Bellamy et al 2005

[109] Emmett et al. 2010

[110] Research Study BD5001: Characterisation of Soil Structural Degradation under Grassland and Development of Measures to Ameliorate its Impact on Biodiversity and Other Soil Functions. Newell Price et al 2012. Literature Review. Critchley and Kirkham 2011.

[111] See Bellamy and Rickson (2011) Monitoring Soil Erosion in England and Wales. Cranfield University.

[112] see for example Baldock et al (2012). Soils and climate change: potential impacts on carbon stocks and greenhouse gas emissions, and future research for Australian agriculture http://www.publish.csiro.au/paper/CP11170.htm, accessed 07/02/2013; Davidson and Janssens (2006). Temperature sensitivity of soil carbon decomposition and feedbacks to climate change. http://www.nature.com/nature/journal/v440/n7081/abs/nature04514.html. accessed 07/02/2013

[113] NRSI 'Monitoring Soil Erosion in England and Wales'. Cranfield University 2011

[114] ibid.

spawning grounds; eutrophication and pollution; siltation; and damage to roads and footpaths.

4.8.13 Newell-Price et al (2012) indicate that severe soil compaction and poor soil condition (for the main body of grassland fields) is a reasonably common issue in the grasslands of England and Wales (around 1 in 10 fields), and that moderate soil conditions are widespread. Notably, it was also clear that poor soil condition was not restricted to 'improved' grasslands; there was a higher percentage of 'semi-improved' grassland soils in poor condition than 'improved' grasslands[115]. The potential for alleviation of compaction through the use of certain plant species[116], and by mechanical soil loosening[117], has also been the subject of research.

4.8.14 The properties, activities of, and interactions between soil biota are critical requirements for the provision of most soil functions through their role in the provision of 'ecological services', in particular food and fibre production, environmental interactions, and support of habitats and biodiversity. A number of soil-dwelling invertebrates and some fungi are covered by biodiversity action plans (BAPs), but since our knowledge of soil biodiversity is sparse it is not known how climate change, land management and above ground vegetation, amongst other factors, affect their diversity[118].

4.8.15 Concern also revolves around the potential impact of climate change. As the Welsh Government has put it,

'Climate change is also expected to lead to changes in soil composition. A reduction in the carbon content of soil will lead to a reduction in the capacity of the soil to absorb rainfall.[119]'

[115] WP1 Characterisation of soil compaction under grassland. BD5001: Characterisation of Soil Structural Degradation Under Grassland and Development of Measures to Ameliorate its Impact on Biodiversity and Other Soil Functions

[116] C N R Critchley & F W Kirkham (2011): Use of Plant Species for Remediation of Soil Compaction

[117] A Bhogal, C Bentley, P Newell Price and B Chambers (2011): The alleviation of grassland compaction by mechanical soil loosening

[118] Brussard (1997). Biodiversity and Ecosystem Functioning in Soil. Ambio Vol. 26, No. 8, Dec., 1997. (pp. 563-570); Brussard et al (2007). Soil biodiversity for agricultural sustainability. Agriculture, Ecosystems & Environment. Volume 121, Issue 3, July 2007, Pages 233–244

[119] Welsh Government National Strategy for Flood and Coastal Erosion Risk Management in Wales. Nov 2011:14

4.8.16 While other measures promoted soil protection, there was no distinctive measure within Europe that aimed specifically to protect the quality and productivity of the soil. The European Commission published a proposal for a framework directive on the protection of the soil in 2006[120], and more recently has published a report on the implementation of the Soil Thematic Strategy[121], which was an output of the Sixth European Environmental Action Programme[122].

4.8.17 The Common Agricultural Policy requires all farmers in receipt of the single payment to take measures to protect their soil from erosion, organic matter decline and structural damage. Preventing soil erosion is an important aspect of maintaining Good Agriculture and Environmental Condition (GAEC) under Cross Compliance[123].

4.8.18 The Welsh Government 'State of the Environment Report' sets outcomes for soil management and provides detailed information on progress based on sets of indicators. The main findings on the condition of soil in Wales in the most recent report (July 2012) are summarised below.

- Estimates of methane and nitrous oxide emissions due to land use and land use change and forestry activities remain small
- The results from the Wales report showed that the mean soil (0-15cm) carbon stock in 2007 was highest under 'dwarf shrub heath' habitat, and lowest in arable soils. Too few samples were available for analysis of the other peat-dominated broad habitats, bog and fen, marsh and swamp

4.8.19 Globally, soil is under stress from a number of factors, including erosion, loss of organic matter, salination, compaction, contamination, loss of biodiversity, eutrophication and acidification. In Wales, development, agricultural intensification, erosion, pollution and loss of carbon are all potential challenges, with potential impacts on human health, food productivity, biodiversity, ecosystem functions and the economy.

[120] COM(2006) 232 final. Proposal for a directive establishing a framework for the protection of soil and amending Directive 2004/35/EC

[121] COM(2012) 46 final. Report on implementation of the Soil Thematic Strategy and ongoing activities. 2012

[122] EU 6th Environmental Action Programme. http://ec.europa.eu/environment/newprg/index.htm. accessed 21/02/2013

[123] GAEC 1 - Soil Protection Review
ihttp://rpa.defra.gov.uk/rpa/index.nsf/293a8949ec0ba26d80256f65003bc4f7/e5b20880d03465a3802573aa0050128c!OpenDocument. accessed 14/02/2013

4.8.20 The need to understand the properties and functions of soil is critical in assessing soil-vegetation relationships, SSSI citations, habitat restoration, water quality and climate change impacts, as well as regulating waste management.

4.9 Water - resource and quality

4.9.1 The Welsh Government 'State of the Environment Report' (2012) sets outcomes for water resources and provides detailed information on progress that is based on sets of indicators.

4.9.2 Generally, there has been a downward trend in water leakage, from 249 megalitres per day in 2000-02, to 202 megalitres per day in 2010-11. However, this represents 23.5% of total water supplied[124].

4.9.3 Overall, average per capita consumption in Wales has remained fairly stable: having risen from 148 litres/day in 2001 to 152 litres/day in 2008-09, in 2010-11 it was 149 litres/day. Where households were metered, consumption was significantly less.

4.9.4 Not all of the water abstracted in Wales is for home consumption, as there are considerable transfers to English regions. Significant reservoirs, such as the Elan Valley and Vyrnwy supply the English Midlands. According to the Environment Agency (2010)[125], abstractions in Wales were 40% greater in 2007 than in 1995. The major reasons for abstraction related to electricity supply and represented 75% of total Welsh abstractions. It needs to be recognised that most of the water abstracted for this purpose is returned to the environment.

4.9.5 In terms of quality, the picture appears mixed. Bathing waters have achieved a high level of compliance with EC standards since 2002. For five of the last ten years, compliance has been 100%. It is not clear to what extent this success has been weather related –when there is heavy rainfall in summer, sewage discharges to sea mean that the EC standards are not met. This raises the question as to what will be the impact of increased climate change-induced extreme weather events might be.

4.9.6 For chemical quality, the percentage of river length of good quality has been consistently high at about 95%. However, ecological and biological water quality indicates some areas of concern.

[124] Welsh Government State of Environment Report 2012; UK NEA 2011

[125] the figures shown in this section are cited in the Wales State of the Environment Report. See http://wales.gov.uk/topics/statistics/headlines/environment2010/100722/?lang=en

4.9.7 Whilst 67% of coastal waters have been assessed as being of 'good' or 'high' ecological quality, this implies that 33% (i.e. one third of the coastal zone) is *not* of good ecological quality. The picture for overall river length of good biological quality is positive at approximately 87%. However, the ecological status for specific water body types is mixed: 36% of transitional water bodies, 34% of rivers, 56% of canals and 21% of lakes assessed were given 'good' or 'high' ecological status in 2011.

4.9.8 In 2002, Environment Agency Wales identified 1,300 mine sites where discharges to water are known to occur (EAW 2002)[126]. This continues to be a significant source of pollution, accounting in 2012 for 130 or 10% of water bodies failing to meet WFD standards[127]. Other major sources of WFD failures in water bodies are:

- agricultural pollution (155 failing water bodies)
- artificial barriers to fish migration (150 failing water bodies)
- impoundments (reservoirs) and regulated flows (101 failing water bodies)
- sewage discharges (82 failing water bodies).

4.9.9 The Welsh Government's green paper 'Sustaining a Living Wales' (2012) highlights some of the challenges to water resources in Wales (p8):

'Even though Wales receives more annual rainfall than many other parts of the UK this does not mean that we can take a continuous and endless supply of water for granted. In Wales rainfall travels quickly to our rivers and during dry periods our river levels can also drop quickly in response. In addition to causing stresses to the water environment and aquatic habitats and species in these rivers, this also creates challenges to ensuring security of public water supply and supporting other water abstractions. Currently the Environment Agency estimate that, in approximately 38% of river water bodies in Wales, water is no longer reliably available for new water abstractions.'

4.9.10 Freshwater ecosystems in Wales are subject to a variety of human pressures including pollution, sedimentation, extractive fisheries, invasive/non-native species, and over abstraction. Trends such as population growth, combined with climate-related trends, may significantly impact on the availability of good quality water.

[126] See Metal mines strategy (2002). Chapter 2 Drivers and Background. See also Science Report SC0301 136/SR4 (2008) Assessment of metal mining-contaminated river sediments in England and Wales.

[127] Living Waters for Wales, Fifth Water Framework Directive Newsletter, Spring 2012, Environment Agency Wales.

4.9.11 The overall statistics conceal pockets where there may be significant problems due to over-abstraction, high levels of diffuse pollution, leakages, domestic over-consumption and low ecological/biological quality. Some areas within the region may require high demands where settlements or industry are concentrated, and pressures may increase as a result of the programme.

4.9.12 Water management has been identified as a key delivery aspect of the Glastir Advanced Scheme which intends to improve water quality and reduce flood risks on agricultural holdings that fall within the GIS specified targeted geographical areas[128]. The management actions offered in Glastir Advanced aim to reduce water pollution, soil compaction, increase the use of buffer zones and improve water permeability of catchment surfaces.

4.9.13 Full water management reports and nutrient management plans are offered to farmers who participate in the scheme and are based in priority geographical regions. The objective of the management plans is to reduce diffuse pollution caused by fertiliser use and assist farmers to become more strategic and efficient in their management of their farms.

4.9.14 The scheme's objective is to improve water quality and quantity management on agricultural holdings that have been identified as priority water management areas.

4.9.15 The revised Bathing Water Directive 2006/7/EC, comes into effect in 2015, and has updated the way in which water quality is measured, focusing on fewer microbiological indicators and setting different standards for inland and coastal bathing sites, namely:

- tighter microbiological standards - to be met by 2015
- two microbiological parameters - Intestinal enterococci and *Escherichia coli* (a faecal coliform)
- water quality classification based on 3 or 4 years monitoring data
- four new classification categories:
- *excellent - approximately twice as stringent as the current guideline standard*
- *good - similar to the current guideline standard*
- *sufficient - stricter than the current mandatory standard*
- *poor - normally non-compliant waters*

[128] Welsh Assembly Government, Glastir: New Sustainable Land Management Scheme for Wales, February 2010

4.9.16 The Water Framework Directive (2006/60/EC) (WFD) aims to take a holistic approach to managing the water environment and ensure that we balance ecological, social and economic values in decision-making. Under the WFD, three River Basin Districts have been established in Wales, two of which extend into England.

4.9.17 In Wales, the first River Basin Management Plans show that in 2009 only 33% of water bodies were at 'Good' standard, and that by 2015 this would improve to 41%. The ambition is to achieve 50% of water bodies at 'Good' standard, and work towards the delivery of objectives for Protected Areas such as Natura 2000 sites and Bathing Waters.

4.9.18 Whilst farming is not the sole cause of water pollution, it contributes 60% of nitrates, 25% of phosphorus and 75% of sediments to the nation's waters[129]. In May 2012 EA Reasons for Failure data identified agricultural pollution as the top issue in Wales[130].Over 150 Water Bodies currently fail because of agricultural activities, including poor slurry management, livestock poaching, erosion of river banks and fields, and run-off from grasslands, arable fields, tracks and farmyards[131]. The RDP will benefit from supporting specific measures that minimise the impact of rural land use on the aquatic environment[132].

4.9.19 The Environment Agency Wales is currently preparing a diffuse pollution action plan. This plan, along with the Welsh septic tank registration scheme will help to reduce diffuse pollution from rural sources. This will help to protect and improve the water environment and deliver the targets established in the River Basin Management Plans.

4.10 Air quality

4.10.1 Given the diversity of landscape and land cover, the geology, density of settlements, quality of housing, employment patterns, traffic flow and densities of traffic, there are considerable variations in air quality across Wales.

[129] Welsh Government (2011) Consultation on the compulsory Good Agricultural Environmental Condition (GAEC) to introduce buffer zones alongside water courses to tackle water pollution from agriculture

[130] Environment Agency Wales (2012) Living Waters for Wales – communicating our approach

[131] Ex0ante RDP situation analysis February 2013

[132] RDP 2014-2020 Agri-environment, Climate and Forestry Working Group Thematic Report – Water(Kyle Young, Simon Neale & David Letellier, EAW) 14 November 2012

4.10.2 Air quality relates to a number of variables, including carbon monoxide and dioxide, nitrous oxide, particulates, methane, ozone and radon.

4.10.3 In the previous century much of the air pollution problem was associated with the burning of fossil fuels such as coal for heating and industrial purposes, leading to smoke emissions containing high levels of sulphur dioxide. The major threat to clean air is now posed by traffic emissions. Petrol and diesel engines emit a wide variety of pollutants, principally carbon monoxide, oxides of nitrogen, volatile organic compounds and particulates, which are having an increasing impact on air quality, particularly in urban areas[133] (see map 15).

4.10.4 Air quality in some parts of Wales is relatively poor in EU terms[134]. In the past, Wales' weather systems have helped to ameliorate the effects of air pollution, but with increasingly unpredictable patterns of weather there is a possibility of deteriorating quality. A few councils, such as Powys have declared Air Quality Management Areas (AQMA) where air quality consistently exceeded thresholds[135], but these are associated with urban areas and therefore beyond the scope of this report.

4.10.5 In contrast to the urban environment, ozone, which is a greenhouse gas, can be a health hazard at ground level, and is more likely to occur in rural environments (map 15)[136]. The different levels of ground level ozone are directly linked to different weather patterns[137].

4.10.6 Significant areas in Wales are designated as radon affected areas. Areas where more than 1% of homes exceed the Government Action Level for radon include eastern Powys and the north east, particularly in Flintshire, as well as parts of Conwy[138]. In parts of north Pembrokeshire, Anglesey and Gwynedd, the number of homes exceeding the action level may be as

[133] For example, Newport local development plan SEA refers to this issue. In the Vale of Glamorgan LDP SEA, the eastern Vale is referred to in this context

[134] http://www.businessgreen.com/bg/news/2187762/exclusive-eu-prepares-legal-action-uks-pollution. accessed 12/02/2013

[135] For example Newtown town centre.

[136] Air Quality Forum: http://www.welshairquality.co.uk/trend.php?t=4

[137] Welsh Government (2012): Sustainable Development Indicators for Wales 2012. Cardiff

[138] Conwy LDP SEA 2011

high as 30%[139]. This will need to be considered in the design and refurbishment of buildings, and particularly homes.

4.10.7 It is worth referring to the potential of atmospheric pollutants such as NO_2 and SO_2 as sources of acid deposition on upland areas closest to the English Midlands and Merseyside, which may create environmental stress for upland soils, resulting in the potential for cumulative effects linked to agricultural and other activities.

4.11 Climate issues

4.11.1 Climate change relates to several of the baseline themes discussed here, including flood risk, water resources and quality, air quality and biodiversity. It is a critical Welsh Government policy issue:

'Tackling climate change is a fundamental part of delivering sustainable development. Climate change is one of the most important challenges facing the world and the Assembly Government has made a commitment to tackling climate change, resolving that the Government and people of Wales will play the fullest possible part in reducing its carbon footprint. Our commitment to action on climate change is based on a scientific imperative to act and to act urgently to reduce greenhouse gas emissions and deal with the consequences of climate change.' [140]

4.11.2 The same document states that:

'The Assembly Government has set out to achieve annual carbon reduction-equivalent emissions reductions of 3 per cent per year by 2011 in areas of devolved competence, which include land use planning. We are also committed to achieving at least a 40% reduction in all greenhouse gas emissions in Wales by 2020 against a 1990 baseline. This will assist in making a significant contribution to the UK Carbon Budgets'

4.11.3 The State of Environment Report defines outcomes for minimising the effects of climate change and provides information on progress. The main findings on the progress of climate change mitigation measures in Wales are summarised below:

[139] Indicative Atlas of Radon in England and Wales. Miles JCH et al Health Protection Agency Didcot and British Geological Survey Nottingham. 2007

[140] Planning Policy Wales Feb 2011 p44

- The estimated emissions in million tonnes of CO_2 equivalent from transport in Wales in 2010 was 6.1. Wales transport emissions accounted for 5% of the UK total in 2010

- The land use and land use change and forestry' (LULUCF) sector can have both negative and positive impacts on greenhouse gas emissions. In Wales the sector is generally a small net sink of carbon dioxide, and this sink has slightly increased between 1990 and 2009.

- The indication is that there has been a clear improvement in Wales' resilience to the impacts of climate change.

4.11.4 Based on the Welsh Government's Climate Change Adaptation Strategy and consultation (2007, Chapter 4), it is likely that the continuing trends in climate change are likely to lead to more extreme weather events with an increase in temperatures, resulting in hotter, drier spring and summer conditions, which may impact particularly in the East of Wales and across the border in England placing significant pressure on already stressed water resources.

4.11.5 Later research by Jennifer Francis of Rutgers University and Stephen Vavrus of the University of Wisconsin-Madison[141], suggests that rapid Arctic climate change is directly linked to amplification of the jet stream movements resulting in the high-impact, extreme weather events already experienced in the U.S. and Europe. This may result in warmer winter conditions, and increases in flooding, landslips and soil erosion.

4.11.6 Extreme cold weather may also result from the warming Arctic Ocean and all of these extremes of weather may result in disruptions to productivity, travel to work and access to public services such as schools and hospitals as well as disruptions to the transport infrastructure adversely impacting industry, which will have implications for investment and for economic sustainability.

4.11.7 Wales' coastal climate is moist and mild with certain sheltered areas being comparatively sunny and dry. Local variations in climate are fundamentally controlled by altitude and distance from the sea which means that coastal areas experience cooler summers and milder winters. In contrast, the inland upland areas are regions where these two controlling factors are minimised so creating severe climatic conditions.

[141]http://www.climatecentral.org/news/arctic-warming-is-altering-weather-patterns-study-shows/.accessed 14/02/2013

The high altitude of the mountains causes these areas to be predominantly cloudy and to suffer low temperatures, high rainfall and a high degree of exposure.

4.11.8 Snow can persist on the mountains for long periods during the winter months, causing problems for hill farmers. The combination of these climatic factors with the dramatic relief creates a harsh environment.

4.11.9 Agriculture and land use are particularly relevant to climate change issues. Not only do they have the potential to sequester carbon through appropriate soil and crop management, they are particularly vulnerable to climate change, and therefore they have the incentive and the potential capacity to contribute significantly to mitigate the effects.

4.11.10 Unlike other sectors where the dominant emission is carbon dioxide (CO_2), two other greenhouse gases (GHGs), methane (CH_4) and nitrous oxide (N_2O) – respectively 21 and 310 times more powerful in terms of global warming potential than CO_2 - are strongly linked to the agriculture sector.

4.11.11 The latest evidence[142] indicates that agriculture emitted 5.3 mega tonnes (Mt) of Carbon Dioxide equivalent (CO_2e), while 'Land Use, Land Use Change and Forestry' (LULUCF) sequestered 0.3 Mt CO_2e than it emitted.

4.11.12 The amalgamated emissions of both sectors at 5.0 Mt CO_2e represent 11.7% of the total Wales emissions of 42.6 Mt CO_2e. However, agriculture is the most significant source sector for CH_4 and N_2O, accounting for 54% and 87% of the total Welsh emissions of these two gases respectively. The Welsh Government is committed to a target of reducing overall GHG emissions by 3% per annum in areas of devolved competence from 2011, and the agriculture and land use sectors have a key role to play in achieving this target[143].

4.11.13 Most of the methane emission comes from digestive processes in ruminants and from the degradation of animal wastes, whilst nitrous oxide emissions come from the use of inorganic and organic fertilisers. Whilst an obvious conclusion is that a reduction of both livestock and fertiliser would result in reductions of these gases, this would be practically unfeasible, although some reductions have occurred as a result of other

[142] Greenhouse Gas Inventory for 2009

[143] See National Assembly for Wales (2013). Greenhouse Gas Emissions in Wales. Research paper. February 2013.

drivers. Other options relating to feeds, breeding, transportation, and anaerobic digestion may provide viable solutions.

4.11.14 The release of ammonia can have a significant impact on biodiversity and ecosystems. A compound of nitrogen and hydrogen, it reacts with other compounds in the atmosphere and is readily soluble in water, causing an imbalance in habitat structure and eutrophication. It can also increase acidity in soils through oxidation with nitrates, and therefore in water bodies. Livestock manure and urine accounted for 89% of the UK's ammonia emissions[144] in 2010.

4.11.15 The Gothenburg protocol (originally agreed in 1999) has recently been revised and an updated version was agreed in June 2012. The Protocol also sets out a number of requirements signatories must undertake in order to reduce emissions of ammonia including providing guidance and advice to the agricultural sector to manage both nitrogen use and ammonia emissions. Both the National Emissions Ceilings Directive (NECD) and the Integrated Pollution Prevention and Control (IPPC) Directive have established targets for emissions including ammonia.

4.12 Flood Risk

4.12.1 According to the UK National Ecosystem Assessment Wales chapter (2011), it is estimated that one in six properties in Wales (600,000 people in 357,000 properties, of which 150,000 are residential) is at risk of flooding. The economic risk from flooding to properties and contents was £200 million per annum in 2008. UK climate impact projections quoted in the NEA suggest that average annual natural river flows could reduce by 10–15% in Wales by 2050, and natural summer river flows could reduce by 50% or more, with implications for flood hazard regulation and water supply.

Flooding issues

- 28% of the Welsh coastline has some form of artificial sea defence works
- In downstream and at-risk areas uptake of the Sustainable Drainage Systems (SuDS) schemes is at a relatively early stage and has so far been patchy across local authority areas in Wales

(UK NEA 2011)

- Over 150,000 residential properties, many commercial and industrial

[144] National Atmospheric Emissions Inventory 2012. http://naei.defra.gov.uk/ http://naei.defra.gov.uk/ accessed 19/02/2013

developments, other key infrastructure like power supplies, transport links and schools and colleges, as well as important environmental and historic sites are on land at risk of flooding

- Around half a million people live and work on land designated as flood plain in Wales and the asset value invested on flood plain land is estimated at over £8 billion of assets

- Increased frequency of flooding will have an impact on livestock and could damage crops

Welsh Government:
Climate Change Adaptation Strategy -
consultation document Feb 2007

4.12.2 The Welsh Government's own estimate (WAG 2007) is that around half a million people live and work on land designated as flood plain in Wales and the asset value invested on flood plain land is estimated at over £8 billion[145].

4.12.3 Since 2005-6, 5,700 properties have benefitted from Environment Agency flood alleviation schemes[146]. The role of the planning system in considering the likely impact of climate change on development locations is obvious, and projects or developments brought forward in response to the proposed funding programme need to be assessed in this light.

4.12.4 Whilst flood risk is an important issue in relation to future climate scenarios, there is no reference to it in relation to the management of land in the uplands. However, the maintenance of soil quality, including its ability to hold moisture, together with schemes that include the management of water courses, increases in woodland and field boundaries, and the restoration of peatlands all have a role to play in water management. Reference might be made to the well-known Pontbren initiative in this regard[147].

4.13 Waste management

4.13.1 The State of the Environment Report's latest findings on waste management (July 2012) are summarised below:

[145] Welsh Assembly Government.' Climate Change Adaptation Strategy' - consultation Feb 2007. p26

[146] Environment Agency response to the ERDF Scoping Report

[147] See http://www.pontbrenfarmers.co.uk/ accessed 14/02/2013

- The total amount of household waste produced per person in Wales has fallen to 467kg in 2010/11
- In 2005-06, the estimated amount of construction and demolition waste produced in Wales was 12.2 million tonnes
- 191,000 tonnes of waste was produced by the public sector in Wales in 2007, of which 46% was recycled off-site or re-used off site; 41% of public sector waste was landfilled in 2007
- The percentage of local authority municipal waste (excluding abandoned vehicles) reused, recycled or composted in Wales increased to 45%
- The percentage of industrial and commercial waste recycled, composted or re-used in Wales decreased from 64% in 2002/03 to 49% in 2007
- 39% of industrial and commercial waste was sent to landfill in 2007 (3.6 million tonnes), increasing from 28% in 2002/03.
- 51% of municipal waste (excluding abandoned vehicles) was sent to landfill in 2010/11 - a decrease from 93% in 2000/01
- 338 companies are Green Dragon certified in 2012; 21 companies achieved the highest rating (Level 5), an increase from 17 in 2011
- 48% of local authority municipal waste was recycled March 2011-12
- The residual household waste produced per person in Wales fell to 56 kilograms per person in January to March 2012, from 65 kilograms per person in January to March 2011

4.13.2 There is a clear upward trend in the amount of waste reused, recycled or composted, and this has boosted employment in this sector. Some of the figures may be open to interpretation, since they may have been gathered and aggregated in different ways, and may be out of date.

4.13.3 Whilst there are no references to farm waste in the agricultural statistics, this is of particular relevance to the RDP. Farm waste can emanate from a wide range of agricultural activity, including pesticide containers, silage wrap, tyres, batteries and oil. What constitutes agricultural waste, and how it is disposed, is a fairly complex issue.

4.13.4 Agricultural waste was excluded from the UK waste management control by section 75(7)(c) of the Environment Act 1990. The introduction of the Waste Framework, Hazardous Waste and Landfill Directives required the introduction of the 2006 Waste Management Regulations to include agricultural waste.

4.13.5 Prior to the introduction of the regulations, it was customary for much of the waste to be burned or dumped or buried at a specific location on farm. The regulations require appropriate storage, and disposal off-farm. Under

the Glastir entry-level scheme, farmers are required, as part of the GAEC standards, to

"keep the farm clear of rubbish and avoid dumping rubbish such as derelict vehicles and disused domestic appliances, in the fields or curtilage of the farmstead."

Farmers who wish to continue to use an on-farm dump have to apply for a licence under the Landfill Directive, although waste can be stored for up to 12 months without the need for a licence.

4.13.6 Livestock urine, manure and slurry is not regarded as waste where it is used for agricultural purposes, although an exemption to the Environment Permitting Regulations (2010) has to be obtained[148]. Organic waste and anaerobic digestate can also be used on farm without contravention of the regulations.

4.13.7 Farmers are also able to use road planings for repairing tracks, without notification up to 150 tonnes[149].

4.13.8 Fallen stock cannot be buried, but must either be incinerated in an approved system, or disposed of off-farm. Where incinerated, the ash cannot be spread but must be disposed of at a landfill site (with the exception of ash from pig or poultry carcasses).

4.13.9 Farm waste also comes in the form of leached fertilisers entering watercourses from fields, and in the form of gases such as CH_4 emissions from digestive processes in ruminants

4.14 Transport infrastructure

'Rising concentrations of greenhouse gases are recognised to be causing global climate change. Transport, through the use of fossil fuels, is one of several key activities that produce greenhouse gases, and accounts for around 16% of CO_2 emissions (around 14% of greenhouse gas emissions) in Wales.[150]'

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[148] The Environment Permitting Regulations (2010) are currently subject to review. Proposed amendments can be found at http://www.defra.gov.uk/consult/2013/02/07/env-permitting-1302/

[149] The exemption under paragraph 19 of the previous Waste Licensing Regulations has been replaced by a new exemption U1. The Environment Agency's position is that farmers will not be required to register a U1 exemption provided they remain within the 150 tonne limit (see EA Regulatory Position Statement 2010), though this may be subject to review.

[150] 'One Wales - Connecting the Nation' -The Wales Transport Strategy April 2008 (p5)

4.14.1 Although greenhouse gas emissions relating to transport fell by over 5% between 2008 and 2010[151], transport is nonetheless one of the key factors in measuring Wales' ecological footprint, which is currently unsustainable.

4.14.2 There has been little change in the main modes of travel to work since 1997 in both Wales and the UK. In 2011 the situation was as follows:

- 81% of the population travelled to work by car, van, minibus or works van
- 12% by walking or cycling and
- 8% used other modes of transport in Wales.
- Almost as many children travel to school by car (33.6%) as by walking (36.4%),
- the numbers travelling to school by bus or coach have reduced since 2002/3, with 23.9% travelling in this way[152]
- bus passenger numbers have fallen from about 118 million in 2009/10 to 113 million in 2010/11,
- rail passenger numbers (for journeys either beginning or ending in Wales) have increased from some 25 million 2008/09 to 27 million in 2010/11.
- Sixty-nine per cent of these journeys were entirely within Wales,
- For 39% of these, Cardiff was the destination of rail passenger journeys[153]

4.14.3 An efficient and sustainable bus network is of key importance to certain groups, such as young families, retired people, and people living in rural communities. Bus services in rural Wales are typically less frequent than services in urban areas, where a denser population and more passengers are able to support a more comprehensive network. This is especially so in the evenings and at weekends. The lack of competition and the high costs of running services is likely to result in isolation and limited access to services by public transport, a situation likely to be exacerbated by the recent funding cuts as a result of the economic downturn. Map 16 demonstrates the length of time typically taken to access key centres,

[151] National Atmospheric Emissions Inventory: http://naei.defra.gov.uk/

[152] SoE Report 2012

[153] Statistical Bulletin. Rail transport October 30 2012

where the majority of employment opportunities and services are likely to be located.[154]

4.14.4 It is likely that RDP funding will become an increasingly important alternative source of investment in capital projects and in running bus and community transport services[155].

4.14.5 Rail provision is relatively poor in rural Wales. Main line services exist along the North Wales coast and through Mid Wales from Shrewsbury to Aberystwyth, and from the South Wales main line northwards through to Shrewsbury. These main routes are supplemented by more local services along the west coast from Aberystwyth to Pwllhelli, from Swansea via Llandrindod Wells to Shrewsbury and from Llandudno to Blaenau Ffestiniog.

4.14.6 Welsh Government and Network Rail have undertaken infrastructure improvements on the Aberystwyth - Shrewsbury Main Line to increase the frequency of services. Network Rail, which owns and maintains the rail infrastructure network, can fund some improvements but its funding decisions generally favour more commercial routes. Arriva Trains Wales provide services on the lines throughout Wales, but few in the region are commercially viable and as a result rely heavily on subsidy from Central Government.

4.15 Energy

4.15.1 Climate change adaptation is closely linked to the use of energy - its generation, delivery and consumption patterns, and critically its conservation. The Welsh Government's 'Renewable Energy Route Map' (2008) provides indicative data on energy demand, supply and emissions.

4.15.2 The SoE Report (2012) considers energy use and environmental standards in new buildings in Wales. In the case of energy savings from public sector buildings, it says that there has been little overall change in energy consumption since 2005. In 2008, gas accounted for 60% of public sector energy use, electricity accounted for 36%, whilst oil and coal combined accounted for 4% of public sector energy use.

4.15.3 The report points out that estimates of public sector energy use in Wales have been back-calculated from greenhouse gas emissions (GHG)

[154] RDP Annex 2 situation analysis p137 accessed 01/02/2103

[155] See ex-ante RDP situation analysis 18 February 2013. Paragraph 592, p147

inventory analysis and UK energy statistics. It indicates that these data are experimental estimates and very uncertain, especially as they do not take into account fluctuating conditions.

4.15.4 'A Low Carbon Revolution' - the Welsh Government's Energy Policy Statement (2010) provides some general information about energy consumption in Wales (p9):

'Currently, in the UK the average person's daily energy consumption (excluding energy related to food and imported goods) is around 125 kilowatt hours per day per person (kWh/d/p).

Of this 125 kWh/d/p, after taking into account conversion losses, we use a third for heating, a third for transport and a third for electrical power. The average electrical power consumption per person per day in Wales is approximately 22 kWh/d/p, (slightly higher than the UK average of 18 kWh/d/p. To put this into context this is equivalent to every person in Wales leaving twenty-two 40-watt light bulbs on for 24 hours every day.'

4.15.5 The rural community has a key role to play in contributing to the wider Wales renewable energy market, as well as reducing the carbon footprint of Wales through energy efficiency. This contribution can include:

- Production of biomass feedstock e.g. woodfuel, energy crops
- Utilisation of natural resources for power generation such as wind, solar and hydro – for supply to the National Grid or for use on-site
- Energy efficiency within rural businesses

4.15.6 The Welsh Government is currently providing support through a number of mechanisms within the scope of the current RDP:

- Farming Connect – funded through the current Rural Development Plan, this mechanism provides a range of support to farmers on renewable energy opportunities, including one-to-one mentoring, events and clinics, discussion groups and factsheets, as well as planning surgeries to consider the planning implications of renewable energy proposals.

- Glastir – Efficiency Grants - A capital grant scheme available to farmers and land managers who hold a Glastir Entry contract within the Glastir land management scheme, aimed at improving business and resource efficiency, including energy efficiency, and reducing carbon emissions of agricultural and horticultural holdings.

- Wood Energy Business Scheme 2 - originally launched in 2004, this is the current four-year project running between 2009 and 2013, managed by Forestry Commission Wales. The scheme provided capital grant support to businesses for wood fuel heating systems and processing equipment to develop the sustainable and renewable wood heat market across Wales. The scheme currently offers grants for woodfuel processing businesses, consultancy, advice and training.

- Woodfuel Supply Chain Development – funded through the Supply Chain Efficiency scheme. This 3 yr project seeks to establish a quality assurance scheme and a reliable log supply chain from producers to customers.

- Research and Development – Welsh Government has contributed to a range of research projects including the commercial production of crops such as willow and other novel energy crops.

4.15.7 The UK Renewable Energy Roadmap (2011) identifies biomass electricity and biomass heat as two of the eight technologies with the greatest potential to help the UK meet its 15% target for renewable energy generation by 2020. DECC makes the following projections for UK biomass by 2020:

- installed biomass electricity generation capacity of between 4 to 6GW, providing an annual generation capacity of between 32 and 48TWh.

- a similar annual generation of between 35 and 50TWh of biomass heat by 2020.

4.15.8 The volume of wood going into biomass for fuel has grown significantly over the last 10 years. It has grown from less than 100,000 tonnes a year of logfuel for domestic homes to becoming an industrial fuel in power stations as well as a raw material for pellet and chip production of at least 300,000 tonnes a year[156].

4.15.9 Europe is already facing a biomass shortage with demand for biomass expected to increase by 50% over the next 10 years[157]. Production of

[156] For a discussion on biomass in Wales, see Parliamentary Welsh Affairs Select Committee 3rd Report Section 9. Biomass http://www.publications.parliament.uk/pa/cm200506/cmselect/cmwelaf/876/87611.htm accessed 02/03/2013

[157] http://www.ifpta.org/content/market-analysis/EU-faces-biomass-shortage-without-new-sources accessed 02/03/2013

biomass within Welsh woodlands has increased significantly over the past decade. For example, in 2004 the Welsh Government Estate sold less than 1000 cubic metres of wood as fuel wood. In 2011, the quantity had increased to over 100,000 cubic metres[158]. Within the UK alone, the total amount of biomass burnt each year will increase 10 fold from 5 million tonnes to 50 million tonnes once all of the existing and currently proposed biomass power stations come into operation. This sudden and increased demand is causing a surge in imported biomass fuels from 13% to 68%, with imports being 3 times greater than the UK's current wood production alone.[159]

4.15.10 The Glastir-Woodlands Creation and Glastir-Woodlands Management schemes promote the planting and active management of small scale farm woodland. Much of the material from the undermanaged woodlands is likely to be of little interest to large scale biomass generators because of a weak supply chain, species and form. It is however, well suited to storage, drying and use for local heat as pellet, chip or log, hence the use of wood for fuel offers a new market for those owners managing their woodlands.

4.15.11 Renewable Energy and Energy Efficiency is one of the four ERDF 2014-2020 priorities. The Welsh European Funding Office has put in place measures to ensure that the ERDF, RDP and indeed ESF programmes complement each other with regard to renewable energy and energy efficiency.

4.15.12 Wales has a significant potential to generate energy using its natural resources - wind, tide, hydro and crops. All these schemes have the potential for significant cumulative and indirect effects, through changes to landscape and seascape, and terrestrial and marine biodiversity and ecosystems.

4.16 Agriculture

4.16.1 Agriculture employs about 59,500 people[160] (including seasonal and part-time workers) and contributed in excess of £400 million to the Welsh

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[158] RDP 2014-2020 Agri-environment, Climate and Forestry Working Group Thematic Report: Forestry (Bill MacDonald with David Lloyd-Thomas, Sara Hetherington, Dewi Jones, Kevin Taylor) October 2012

[159] http://www.rspb.org.uk/news/288724-study-exposes-green-failings-of-wood-fuel-power-plants- accessed 02/03/2013

[160] Welsh Government: Survey of Agriculture, June 2011

economy in 2003[161] in provisioning services only. The industry contributes significantly to the economic, social, environmental and cultural cohesion of rural Wales.

4.16.2 60% of the land of Wales is more than 150 m above sea level, and 27% is more than 300 m above sea level. Soil and climatic conditions suitable for cultivation and sufficiently fertile to support arable crops are described as falling within Agricultural Land Classes Grade 1–3. Less than 5% of Welsh farmland land is currently under crops, the majority under grass.

4.16.3 Geology and climate have contributed to the generally low agricultural fertility of Wales's soils, and there are large expanses of substrate with high organic/carbon content, including major deposits of peat (see section 4.8). Of the 2.1 million Ha of land in Wales, 1.6 million Ha is classed as Less Favoured Area (LFA), of which 1.1 million ha is used for agriculture (69%). The LFA boundary is currently under review across all European Member States, and whilst changes to the current boundary are likely to occur, the revised boundary for Wales is not yet final[162].

4.16.4 In these unenclosed uplands the inherently low productivity puts an ecological and economic constraint on the extent to which habitats can be improved so that improved grassland and arable and horticulture are rare in these areas[163]

4.16.5 It was estimated in 2007[164] that improved grassland occupied 34% of the total agricultural land in Wales. The most improved grasslands tend to be in the lowlands where they dominate the landscape. Smaller areas of less productive habitats and landscape features are largely scattered in this intensively managed landscape. Although such intensive management has the potential to negatively impact on these remnant biologically valuable habitats, there is also potential for these patches to act as sources for re-colonisation when management intensity is reduced.

4.16.6 The area of agricultural land increased in the first half of the 20th century, with a slow decline in the second half. The area of permanent pasture has expanded at the expense of rough grazing, which is likely to

[161] National Ecosystem Assessment. Chapter 20 Wales. p981

[162] Welsh Government. RDP Annex 2. Situation Analysis. Accessed 01/02/2013

[163] Countryside Survey 2008

[164] Ibid.

have had a significant impact on biodiversity associated with semi-natural grassland. The area under cereals and crops has decreased significantly, with the majority of arable currently under improved grassland[165].

4.16.7 The total area of agricultural land has continued to decrease since 1994, with a significant reduction of 45-50,000Ha occurring in 1999. Within this total area of agricultural land, the proportion of different types of farmland has changed:

- Permanent grassland increased steadily from 55% in 1994 to 62% in 2008.
- Rough grazing decreased steadily from 29% in 1994 to 23% in 2008.
- Temporary grassland decreased steadily from 9% in 1994 to 5% in 2008.
- Total tillage mostly remained stable at around 4%.
- Woodland was stable at around 2% from 1994 to 2003, but increased thereafter to 3% by 2006 (the latest date for which data has been made available)[166]

4.16.8 Sheep numbers increased relatively slowly until the 1950s, since when the numbers increased rapidly, with nearly a three-fold increase from immediate post-war numbers until the late 1990's, when they began to decline again, prior to the outbreak of Foot and Mouth disease in 2001. Sheep numbers currently stand at about 8.6 million[167].

4.16.9 Between 2000 and 2010, the number of dairy holdings reduced by 1,537 i.e. 44%. However, the decline in numbers of holdings and cows has not resulted in a decline in milk production[168]

4.16.10 Farming is nowadays dominated by sheep and beef production and the dairy sector with the arable sector accounting for some 10.0% of agricultural output. Average farm size is some 35Ha, relatively small compared to the rest of the UK, and dominated by family run farm enterprises.

[165] Blackstock et al (2010): 'Habitat Survey of Wales'

[166] Welsh Assembly Government (2008). Welsh Agricultural Statistics. Stats Wales.

[167] Welsh Government StatsWales (2012). Farming Facts and Figures 2012.

[168] See http://milk.withclarity.co.uk/ accessed 07/02/2013; see also Hawkins (2011). House of Commons library statistics: Dairy Industry in the UK

4.16.11 The farming industry is economically disadvantaged because of distances from major processors and markets and the scale of production at farm level which is smaller than UK competitors. Also, there are very few sustained co-operation activities amongst farmers[169].

4.16.12 About 8% of farmland in Wales is under organic management, higher than the UK average. Organic production is supported through the RDP in Wales and Welsh Government's aim is to enhance market opportunities for producers and consumers. Supporting the organic food market presents additional environmental benefits and contributes to wider Welsh Government objectives in relation to climate change mitigation and environmental protection[170].

4.16.13 Animal welfare is a key concern for the industry, especially in the context of climate change. Bluetongue, which affects, cattle, sheep and goats, infected large areas of mainland Northern Europe, including Great Britain, for the first time in 2007/8. Schmallenberg virus (SBV), a new virus of cattle, sheep and goats, was detected for the first time in Wales in September 2012 and could potentially inflict immense damage on the Welsh livestock sector.

4.16.14 Past incidents such as the BSE crisis and the resulting global ban on beef exports, and the Foot and Mouth Disease epidemic in 2001, illustrate the impact that animal disease can have on the rural community.

4.16.15 A key challenge facing Welsh Government and industry is addressing the issue of bovine TB. The Welsh Government has set up a comprehensive TB Eradication Programme aimed at tackling all sources of the infection.

4.16.16 As well as these obvious examples, there are a number of non- notifiable diseases that are costly in time and money, and therefore undermine the agriculture industry's potential to deliver on production and environmental services. Bio-safety and risk management are clear priority areas for the RDP.

4.16.17 Nitrate Vulnerable Zones (NVZs) are areas designated under the EU Nitrates Directive (91/676/EEC), which aims to reduce water pollution caused by nitrates from agricultural sources. Currently 2.3% of the land

[169] ibid.

[170] [170] RDP 2014-2020 Agri-environment, Climate and Forestry Working Group Thematic Report – Organic farming (Kevin Taylor, Adriana Kiss and Frances Dixon) Undated

area of Wales as NVZs and introduced a strengthened range of measures in the Nitrates Action Programme that farms located within NVZs must implement to comply with the Directive. New designations came into force in January 2013, following the statutory four-yearly review of the NVZ boundaries.

4.16.18 The Environment Agency Wales (EAW) is currently responsible for enforcement of the Nitrates Directive in Wales, including Action Programme measures. The Action Programme requirements also fall under the scope of the Single Payment Scheme (SPS) cross-compliance measures. Accordingly, where relevant, inspections assess compliance with the NVZ Action Programme, measures and penalties can be applied to SPS payments where breaches are found.

4.17 Forestry and woodland

4.17.1 Wales has 304,000 hectares of woodland, of which 167,000 hectares (55.0%) is conifer forest and 137,000 hectares (45.0%) is broadleaved woodland. In comparison to most European countries Wales has a very low level of woodland cover with approximately 15.0% of the country being woodland compared to 29.0% in France, 32.0% in Germany and an average of 37.0% in the European Union[171]

4.17.2 The Welsh Government owns 114,000 hectares or 37.5% of the woodland in Wales and this is managed by Natural Resources Wales, the new single body in Wales. The remaining 190,000 hectares or 62.5% of woodland is privately owned by a mixture of forestry companies, charitable bodies or private individuals, including many farmers[172].

Area of woodland by ownership and forest type at 31 March 2012[173]

Wales 000s hectares	**Owner**	**Conifers**	**Broadleaves**	**Total**
	FCW	98	16	**114**
	Non-FCW	96	121	**190**
	Total	**167**	**137**	**304**

[171] See House of Lords EU Committee (2010). Adapting to climate change: EU agriculture and forestry http://www.publications.parliament.uk/pa/ld200910/ldselect/ldeucom/91/10011306.htm accessed 20/02/2013

[172] National Forest Inventory 2011

[173] Forestry Commission, Forestry Statistics 2011 using 2010 National Forest Inventory data. Broadleaves include coppice and coppice with standards.

4.17.3 Responsibility for forestry in Wales was devolved to the Welsh Government in 1999 and the subsequent publication and revision of the Welsh Government's Strategy for trees and woodlands, *Woodlands for Wales*, sets out its long term vision for forestry. The Strategy encourages the use of access to woodland for education and improving the health of the public through outdoor recreation. It describes the Government's role in supporting the Welsh forest and tourist industries and in safeguarding the forest environment and its biodiversity through the management of the many habitats within the forest.

4.17.4 The Government's stated intention is to move away from extensive areas of clear felling and towards other management systems in Welsh woodlands, and to increase the area of native broadleaved trees through the restoration of ancient woodland and the planting of new woodlands. It seeks to better adapt Welsh woodlands to the impact of climate change through the use of a greater diversity of tree species and it seeks to mitigate the impacts of climate change through increasing the area of woodland, bringing woodland into active management and using woodlands and trees in the management of water and provision of urban shade. One of the most important mechanisms to achieving this is through support from grant aid.

4.17.5 Around half of the total area of Welsh Woodland can be said to be managed – based on the fact that it has a recognised plan or is receiving grant aid for management. It is this half that produces nearly all the timber product and the majority of the formal public access and benefits. The majority of this managed woodland is conifer woodland established between 1945 and 1980.

4.17.6 Many of the unmanaged woodlands in Wales are fragments of broadleaved woodland, frequently remnants of old estate woodland which have received little management since the break-up of the large estates in Wales after the first and second World Wars. The economic drivers which sustained the management of these woodlands (production of tools and household implements) have long since ceased. Access to the woodland is often highly restricted, having been designed originally for horses and carts.

4.17.7 Although these woodlands can be biologically highly diverse, the fact of their fragmented nature limits their current values as wildlife refuges and corridors. Although the area of woodland has increased since the 1940's, much of this has been via coniferous plantation, whilst the broadleaved fragments remain under pressure from grazing and a lack of management to permit regeneration and spreading. On the other hand, some

woodlands benefit from grazing, and a failure to maintain such a system can result in a reduction in biodiversity[174].

4.17.8 Woodland has an important role in sequestering carbon and as a sink for carbon historically sequestered. Maintaining woodland cover, and managing existing woodland so as to prevent loss of woodland is important to preserve this carbon sink.

4.17.9 Timber processing is a low margin, heavily regulated sector, that operates in an international market. Its raw material comes from rural locations, often using a rural road network that was not designed to carry large timber lorries. The transportation of timber is a key challenge: Welsh haulage costs compare poorly with those of international producers and are very sensitive to increases in the price of fuel. Locally, the environmental impacts of timber haulage can be considerable.

4.17.10 As well as their traditional role of growing timber for the wood processing industries, the forests of Wales also now have an increasing role to play in supporting renewable energy technologies, either directly as logs, chips or pellets, or indirectly as sites for wind and hydro-electricity.

4.7.11 In 2010, *Phytophthora ramorum* (Pr), a fungus-like pathogen, was found to be infecting large numbers of Japanese larch trees especially in South Wales. By June 2012, the area of infected larch woodland stood at 1100ha, approximately 10% of the Welsh crop[175]. Where Pr is discovered in woodlands, a Statutory Plant Health Notice (SPHN) is issued, requiring the mandatory felling of all infected trees and any in close proximity that could yet harbour the pathogen.

4.7.12 Where woodlands are felled under the terms of a SPHN, unlike a conditional felling licence, there is no requirement to re-stock the area with trees, which could lead to a severe loss of woodland cover, thwarting Wales' target to create a net additional 100,000ha of new woodland by 2030[176].

4.7.13 In October 2012 a new disease in the native European Ash (*Fraxinus excelsior*) was notified - *Chalara fraxiniae* which causes the disease

[174] CCW communication – Article 17 reporting for Wildlife and Countryside Act, Annex 1 Woodlands

[175] See http://www.forestry.gov.uk/newsrele.nsf/WebPressReleases/11FB60906B36B2C68025773D005CD276 accessed 20/02/2013

[176] See IWA Conference, Cardiff 9 July 2012 Growing our woodlands in Wales. Institute for Welsh Affairs

known as Ash Dieback. This disease has wiped out nearly all the Ash trees across large swathes of Northern Europe and if this pattern is confirmed in the UK would have a significant environmental and social impact. The disease was confirmed in Wales in October 2012[177].The incidence of new pathogens impacting on UK forestry has dramatically increased in the last decade. Climate change may lead to increased threats from pathogens not currently present in Wales.

4.7.14 The move towards more diverse woodlands with a mixture of species and more uneven age structure should result in woodland that is better able to withstand these damaging threats.

4.18 Rural-based tourism

4.18.1 Rural tourism is generally understood to include tourism activities that take place outside urban areas in the countryside or along the rural coast. It is difficult to define statistically because it does not comply easily with administrative boundaries that are used to collect statistical data, and it is highly dispersed in terms of activities and providers at many levels.

4.18.2 In the context of rural Wales, both inland and coastal tourism form part of an economically important sector. Based upon the exceptional quality of its landscape, natural environment and rich biodiversity, together with its strong sense of culture and heritage it attracts large numbers of visitors. The total tourism spend in Wales in 2011 was £2.026 billion, based on an estimate of 10.5 million visits[178]. It was estimated that about 50% of visits were to small town and rural locations, with approximately 46% of the total spend. Of these numbers, the nine predominantly rural counties accounted for 68% of all trips and 69% of all spend (£1,052 million).

4.18.3 Tourism is a significant employer. According to the Business Register and Employment Survey, rural Wales is highly dependent on tourism employment with an average of 12% compared to an all Wales total of 10%. In Conwy and Pembrokeshire tourism employment accounts for almost 1 in 5 jobs.

4.18.4 Rural tourism cannot be relocated away from rural areas - that is its nature and the root of its potential. It has a significant environmental potential as well as an economic and social one, which can be positive as well as negative.

[177] (http://www.forestry.gov.uk/forestry/INFD-8Z6J87).

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[178] Great Britain Tourism Survey

4.18.5 Rural tourism is closely tied into the environment, whether it is activity based, such as walking, climbing, fishing, boating, caving or cycling, or based on the rural heritage of Wales, involving visits to museums, castles, archaeology, great houses or villages. Some areas and sites are more sensitive to certain activities such as motor sport or power boating, and such activities should be located in robust sites that can withstand the impacts.

4.18.6 The tourism industry generally recognises that many of the above activities depend on high quality environments to sustain themselves, and that it is in its interest to protect and enhance them. Coarse, game and sea fishing, for example, rely on high quality freshwater and marine ecosystems.

4.18.7 Wildlife tourism relies heavily on high quality ecosystems. Visits to see red kites, and more recently ospreys, are important locally in terms of jobs, and also of local support for conservation measures. In some cases re-introduction of species such as European beaver have been controversial, but where appropriately managed, may be of significant tourism interest.

4.18.8 Perhaps not widely recognised is the increasing role played by 'faith tourism' that links churches and chapels in rural communities. This is of particular interest to groups and individuals who have emigrated and who have a particular interest in genealogy, as well as architecture and social history. Interestingly, these initiatives seek to promote walking as an element of pilgrimage experiences, which may support health and well-being objectives. Furthermore, churches and chapels may also be linked to sites of significant biodiversity interest.

4.18.9 There is increasing evidence of a link between exercise and contact with nature and mental and physical health[179].

4.18.10 Perhaps the most significant environmental factor has to do with transport. It is estimated that 88% of visitors travel by car to reach rural Wales and most of these continue to use the car to travel around Wales. Most visitors drive over 300 miles to and from their holiday and a further 300 miles or more a week while in Wales[180].

[179] Pretty J et al. The mental and physical health outcomes of green exercise. International Journal of Environmental Health Research Volume 15, Issue 5, 2005

[180] Brecon Beacons National Park Visitor Transport Report.

4.18.11 The 2009 Wales Rural Observatory report into deep rural communities highlights some of the diifculties faced by rural communities in accessing public transport[181], and this is reinforced by the Observatory's 2010 rural services survey[182] which indicated that peak hour bus services were fairly limited for large parts of rural Wales. Many respondents cited inconvenience and expense as critical issues.

4.18.12 Continuing rises in fuel prices, increasing concern for environmental issues may result in either increased visits as more choose to holiday locally, or fewer visits as a result of fewer international visitors. However, it presents an opportunity in that once arrived, tourists may be incentivised to use public transport as a cheaper alternative to the car, especially if this could be packaged with reduced entry fees and other incentives. Destination packaging will also reduce the need to travel more widely.

4.19 Ecological footprint

4.19.1 Ecological footprint is an indicator of the total environmental demand that is made on the planet. It is presented in terms of global hectares (gHa), which represents the amount of land required both to deliver the demands of a population in terms of food, water, fibre and fuel, natural resources and spiritual and recreational opportunities, and to absorb the impacts of that population in terms of pollution and waste. It is associated with the concept of 'ecosystem services'. Housing, travel and food are the main criteria used in the calculation, and both direct and indirect consumer impacts are assessed.

4.19.2 Wales' ecological footprint had risen at a rate of about 1.3% between 1990 and 2003, in line with a growth in Gross Added Value (GVA)[183]. Had this trend continued, it would have been likely that by 2020 Wales ecological footprint would have been 20% higher than it was in 1990. The current footprint is under review[184], but in the light of the economic downturn, this may have been reversed since 2008.

[181] Wales Rural Observatory (2009). Deep Rural Communities. p114

[182] Wales Rural Observatory (2010). Rural Services Survey. pp34-37

[183] E. Dawkins, A. Paul, J. Barrett, J. Minx and K. Scott (2008). Wales' Ecological Footprint: Scenarios to 2020. Stockholm Environment Institute

[184] http://www.government-online.net/calculating-wales-ecological-footprint/

4.19.3 The most recent calculation (2006)[185] is that Wales' ecological footprint is about 4.4 gha, which is a significant reduction from the 2003 average figure of 5.16 gha.

4.19.4 Rural Wales appears to have higher than average footprints (map 17). This is likely to be a reflection of energy demands, travel needs and the dispersed delivery of services including shops[186].

4.19.5 The intention of the Welsh Government is to reduce the national ecological footprint to 1.88 gha per person within the lifetime of a generation[187].

4.20 Interactions

4.20.1 These issues cannot be considered in isolation from each other, or from the wider social and economic contexts in which they are set. Impacts on any of these themes will have adverse or positive effects on others to a greater or lesser extent, and such impacts are almost entirely anthropogenic. Decisions that affect the landscape, biodiversity or historic and cultural heritage of rural Wales will impact on its economy through losses in tourism income or a reluctance to relocate to or invest in degraded, unattractive regions. Conversely, a failure to invest in, say sympathetic economic development will result in losses in income or the inability to increase income, and may result in a lack of funds for conservation and for social purposes.

4.20.2 Climate dynamics indicate that there will be changes to biodiversity, with (some would argue) gains and some losses, but this is unpredictable as is the overall net impact. Habitat and species gains and losses relate to wider ecosystems that may become stressed as a result. A change in composition of plant or tree species to ones which are more resilient to change may lead to a change in invertebrate numbers and types; new predatory or invasive bird and mammal species from the Continent or Mediterranean may impact on other more vulnerable species.

4.20.3 If current climate trends continue, there will be habitat change, with wetter habitats in some areas and perhaps drier conditions elsewhere. It is possible that changes will occur in the uplands, with some

[185] One Wales One Planet. Annual Sustainable Development Report 2009-10

[186] See http://www.resource-accounting.org.uk/downloads/wales/wales

[187] ibid.

abandonment or reductions in agricultural productivity[188]. There may be changes in woodland, hedgerow and river bankside management systems to mitigate the effects of runoff.

4.20.4 Climate change may also have significant effects on settlement patterns, agricultural productivity and other activities in the longer term and the planning system will increasingly need to take this into account.

4.21 Summary of issues

4.21.1 This section summarises the key issues that relate to the environmental baseline. These issues have implications for the proposed RDP, which are discussed in section 5.2 and in Appendix 6.

Population and human health	Some areas lack easily accessible **open space**. Stress related illnesses from **poor living and working conditions**, as well as **unemployment**; heat and **fuel poverty**; poor diets leading to **obesity**; illnesses and injuries at work; and poor social/private rented **housing standards** are contributory factors in health problems in Wales. In some areas, **poor air quality** may be a contributory factor.
Biodiversity	About **60% of SACs**, and a number of Biodiversity Action Plan species and habitats are in **unfavourable condition**, especially on the coast. Pressures can come from **visitor numbers** on some sites, changes in weather patterns, development, **over- or undergrazing**, pollution, nutrient enrichment and eutrophication, sediment deposits, **invasive species,** inappropriate planting, **over abstraction** and overfishing. In some areas **coastal squeeze** resulting in significant saltmarsh and other marginal habitats.
Landscape	Landscapes that are not formally designated may be **vulnerable to inappropriate development** that erodes their character. Agricultural development, forestry and road schemes, as well as buildings in rural areas need to be sensitive to their settings. At the same time, some parts of protected landscapes suffer from **tourism impacts**.
Culture, architecture and	**Over 25% of Wales' listed buildings are**

[188] *This in turn may result in a higher demand for imported food. In this document however we do not offer a detailed analysis of how much food produced in Wales is consumed in Wales – in future we may consume more indigenously grown food and export less. Lamb, for example is currently both imported and exported in large quantities*.

archaeology	**either 'at risk' or 'vulnerable'**. Whilst nearly all of Wales' ancient monuments are stable or improving, climate change and changes in agricultural us may create new challenges. **Historic buildings and their settings, and the wider landscape, are under pressure from development.** The number of people who can speak Welsh has **decreased slightly** since 2001, although the number who can understand but not speak Welsh has increased slightly.
Soil quality and structure	Development, changes in agriculture (especially intensification) and climate change contribute to a **loss in soil carbon and structure**. There have been **changes in hydrology** and **erosion** due to changes in rainfall patterns and agriculture. The need to maintain best quality agricultural land in the face of development pressure may result in losses of less productive land which may be valuable for carbon sequestration.
Water resource	About **23.5% of water supply is lost to leakages**; there has been a **significant increase in abstracted water**, mainly for electricity supply. About **38% of river waters are not reliable for new abstractions** - there may be an increased demand due to population growth.
Water quality	Pollution from flooded mines continues to present a challenge. Diffuse pollution from other sources including agriculture is exacerbated by changing weather patterns with sudden flooding. There is a potential threat to coastal water quality as a result of increases in storm events. Livestock bank poaching reduces water quality. Currently, about 33% of coastal waters are not of 'good' ecological quality, and the pattern for terrestrial water bodies is mixed.
Air quality	Radon gas presents a significant health hazard in parts of rural Wales. Under certain weather conditions, ozone can also present a hazard to health locally.
Climate	A number of changes in weather patterns are predicted, including summer water shortages; increases in amounts and intensity of winter rainfall, with milder winters; hotter, drier summers; increases in sudden storms. These will result in rapid build up of river and drainage systems; increases in storm induced coastal erosion and subsidence; ecosystem changes

	with some species and habitat losses and gains.
Flood risk	28% of the Welsh coastline has sea defence infrastructure; about 1 in 6 properties is at risk from flooding - this will be significantly higher locally - the economic cost of flooding is estimated at more than £200 million per annum. River flows are predicted to reduce overall, but with sudden rapid flows related to turbulent weather. In some areas, natural flood systems have been restored, but in many places such systems have been lost through development or artificial drainage for agriculture. Loss of coastal margins could increase likelihood of flood risk.
Waste	The amount of municipal waste recycled, reused or composted has increased from 18% in 2003/4 to 48% in 2011/12. Having peaked in 2005/6, the total amount of waste generated has decreased since 2000 by about 95,000 tonnes per annum.
Transport	81% of the population travels to work by motor vehicle, and 12% by walking or cycling. There has been a fall of about 5 million bus passengers (2010/11) since 2009/10, and an increase of about 2 million rail passengers in the same period. There are conflicting statistics on transport related emissions.
Energy consumption	Gas accounts for 60% of public sector energy use. About 33% of domestic energy use is for heating and about 33% for lighting/installations. A target has been set by Welsh Government to reduce average per person carbon emissions by 33% by 2020.
Agriculture	Farming introduces 60% of the nitrates, 25% of the phosphorus and 75% of sediments to the nation's waters189,190. Livestock bank poaching has a significant impact on water quality, increases erosion and impacts on aquatic ecosystems. Also increases risk of farm to farm diseases, and of downstream flooding and sedimentation. Inadequate slurry storage can increase diffuse pollution and damage the quality of water, driving up remediation costs.

[189] Welsh Government (2011) Consultation on the compulsory Good Agricultural Environmental Condition to introduce buffer zones alongside water courses to tackle water pollution from agriculture

[190] Environment Agency Wales (2012) Living Waters for Wales – communicating our approach

	Emissions from livestock contribute to increases in GHG levels.
Forestry and woodland management	About 43% of all woodland is coniferous plantation, mainly owned by Welsh Government. There is a significant amount of unmanaged woodland, which has potential biodiversity values, but is currently fragmented. There will be a significant demand for imported biomass fuel and also for good quality building timber. There are opportunities to create woodland corridors.
Rural based tourism	Unplanned tourism can result in negative impacts on sensitive sites. There is a need to develop new and appropriate forms that reflect the character and quality of destinations.
Ecological footprint	Rural Wales has a higher than average ecological footprint, although this has been reducing largely as a result of the economic downturn. As the economy becomes more buoyant it is possible that Wales' ecological footprint will rise.

5 ASSESSMENT OF THE RDP INTERVENTIONS

5.1 Testing the compatibility of the SEA objectives and RDP focus areas

5.1.1 As explained in section 2.3.3, the proposed Rural Development Regulation identifies the following six priorities:

- **Fostering knowledge transfer and innovation** in agriculture, forestry, and rural areas.
- **Enhancing competitiveness** of all types of agriculture and enhancing farm viability.
- **Promoting food chain organisation** and risk management in agriculture
- **Restoring, preserving and enhancing ecosystems** dependent on agriculture and forestry
- **Promoting resource efficiency** and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors.
- **Promoting social inclusion, poverty reduction and economic development** in rural areas

5.1.2 The RDP proposal does not include any explicit overarching objectives, but its proposed interventions are based on the above priorities, linked to the 18 focus areas emerging from them. These focus areas form the basis of the compatibility analysis.

5.1.3 Table 7 provides a summary of the analytical process. A fuller presentation of the assessment is shown in Appendix 6. Table 8 provides a comment for the basis on which each intervention was marked.

Table 7: Presentation of compatibility matrices

	Improve physical & mental health and reduce health inequalities	Protect & enhance biodiversity	Protect places, landscapes & buildings of historic, cultural & archaeological value	Protect soil quality & quantity	Protect the water resource & ensure its sustainable use	Protect & improve water quality	Protect & improve air quality	Limit & adapt to climate change	Minimise waste increase re-use, recycling & recovery rates	Minimise the need to travel; provide alternatives to car use	Maintain & enhance animal welfare standards	Optimise opportunities for rural tourism whilst minimising negative impacts
Innovation and knowledge base	O	?	?	?	?	?	O	✓	✓	O	✓	O
Links between agriculture/food production/ forestry and research/ innovation	O	?✗	?	?	?	?✓	O✓	?✗	✓	O	?✓	O
Lifelong learning/ vocational training in agriculture and forestry	O✓	?✓	?	?	?✓	?	O	?✓	?✓	O	?✓	?✓
Restructuring of farms	✓	?	?	?✓	?✓	?✓	O	O	?✓	O	?✓	✓
Entry into the farming sector	O✓	O	O	O	O	O	O	O	O	O	O	O
Integrating primary producers into the food chain	O	O	O✓	O✓	?✗	?✗	O	✓	?	O	✓	✓

	Improve physical & mental health & reduce health inequalities	Protect & enhance biodiversity	Protect places, landscapes & buildings of historic, cultural & archaeological value	Protect soil quality & quantity	Protect the water resource & ensure its sustainable use	Protect & improve water quality	Protect & improve air quality	Limit & adapt to climate change	Minimise waste increase re-use, recycling & recovery rates	Minimise the need to travel; provide alternatives to car use	Maintain & enhance animal welfare standards	Optimise opportunities for rural tourism whilst minimising negative impacts
Farm risk management	O	?	?	?	?	O	O	O	O	O	?	O
Restoring, preserving and enhancing biodiversity	✓	✓✓	?✓	✓	✓	✓	✓	✓	O	O	?✓	✓
Improving water and land management/ meeting WFD	O	✓✓	✓	✓	✓	✓✓	O	✓	O	O	?✓	✓
Improving soil, erosion, fertiliser and pesticide management	O	✓	✓	✓✓	✓	✓	✓	O	O	O	?✓	?✓
Efficiency in water use by agriculture	O	✓	O	✓	✓✓	✓	O	O	✓	O	O	O
Efficiency in energy use in agriculture and food processing	O	O	O	O	?✓	O	O	✓	✓	✓	O✓	O

	Improve physical and mental health & reduce health inequalities	Protect and enhance biodiversity	Protect places, landscapes & buildings of historic, cultural & archaeological value	Protect soil quality & quantity	Protect the water resource & ensure its sustainable use	Protect & improve water quality	Protect & improve air quality	Limit & adapt to climate change	Minimise waste increase re-use, recycling & recovery rates	Minimise the need to travel; provide alternatives to car use	Maintain & enhance animal welfare standards	Optimise opportunities for rural tourism whilst minimising negative impacts
Supply and use of renewable sources of energy, of by-products, wastes, residues and other non food raw material	O	✓✗	✓✗	?	O	?✓	✓	?✓	✓	O	?✓	O
Reducing green house gas and ammonia emissions from agriculture and improving air quality	O✓	✓	O	✓	✓	✓	✓✓	✓✓	✓	O	?✓	O
Carbon sequestration in agriculture and forestry	✓	?✓	?✓	?✓	✓	✓	O	✓	O	O	✓	✓

	Improve physical & mental health and reduce health inequalities	Protect & enhance biodiversity	Protect places, landscapes & buildings of historic, cultural & archaeological value	Protect soil quality & quantity	Protect the water resource & ensure its sustainable use	Protect & improve water quality	Protect & improve air quality	Limit & adapt to climate change	Minimise waste increase re-use, recycling & recovery rates	Minimise the need to travel; provide alternatives to car use	Maintain & enhance animal welfare standards	Optimise opportunities for rural tourism whilst minimising negative impacts
Diversification, creation and development of small enterprises and job creation	✓	✓	?✓	o	o	o	o	o✓	o	o✓	o	✓
Local development	✓	o✓	✓	o	o✓	o✓	o	✓	✓	✓	o	✓
Accessibility to, use and quality of information and communication technologies (ICT)	✓✗	o	o	o	o	o	o	o	?✗	✓	✓	✓

Table 8: Commentary on the basis for marking

Innovation and knowledge base		
Improve physical and mental health and reduce health inequalities	O	Improving communication and advice may have a small positive effect, but probably not significant effect on physical and mental health.
Protect and enhance biodiversity	?	Depends on FAS priorities, as directed by WG. Some opportunities for collaboration could be positive for biodiversity, but promoting production over conservation may create tensions.
Protect places, landscapes and buildings of historic, cultural and archaeological value	?	As above. Depends on knowledge and motivation of FAS, and the advice it provides.
Protect soil quality and quantity	?	Promoting soil conservation as part of FAS agenda might be positive, especially as GEAC cross-compliance.
Protect the water resource and ensure its sustainable use	?	As above. Depends on positive promotion by advisory and business services, beyond basic mandatory requirements.
Protect and improve water quality	?	Depends on FAS motivation.
Protect and improve air quality	O	An important theme for R&D, but may not be an advice priority. Depends on nature of enhanced FAS role.
Limit and adapt to climate change	✓	An important R&D priority. Advice on energy conservation, local chains etc is likely to have some positive outcomes.
Minimise waste increase re-use, recycling and recovery rates	✓	Advice on waste management is integral to farm management advice. Some small positive beyond the regulatory requirement.
Minimise the need to travel; provide alternatives to car/lorry use	O	Not likely to have a significant effect.
Maintain and enhance animal welfare standards	✓	This should be an advice priority as part of farm management planning/risk analysis, and good economically.
Optimise opportunities for rural tourism whilst minimising negative impacts	O	Where relevant, farm tourism is an optional business opportunity that might be promoted alongside quality brand.

Links between agriculture/food production/ forestry and research/ innovation		
Improve physical and mental health and reduce health inequalities	O	No obvious significant effect likely.
Protect and enhance biodiversity	?✕	Emphasis on production may create tension with the biodiversity objective. R&D needs to

		optimise production AND biodiversity objectives.
Protect places, landscapes and buildings of historic, cultural and archaeological value	?	Emphasis on production may create tension with the landscape and historic heritage objective, and may undermine culture as improved productivity may attract investors in land and undermine small, family farms.
Protect soil quality and quantity	?	Depending on the emphasis on productivity, there are potential tensions with the need to protect soils.
Protect the water resource and ensure its sustainable use	?	As above. Conversion to water hungry crops will stress water resources. Potential exists for innovative water conservation techniques depending on R&D.
Protect and improve water quality	?✓	Potential for impacts on water quality. Opportunities for collaborative approaches to water management.
Protect and improve air quality	O✓	Depending on the type of support, R&D etc, potential for improvement. R& D into diet and stocking systems to reduce emissions.
Limit and adapt to climate change	?✗	As above, but increased stocking rates may increase emissions.
Minimise waste increase re-use, recycling and recovery rates	✓	R&D likely to focus on production efficiencies. Likely to be promoted as part of cross compliance, and relatively easily observable.
Minimise the need to travel; provide alternatives to car/lorry use	O	Not likely to have a significant effect.
Maintain and enhance animal welfare standards	?✓	Animal welfare likely to be a focus of R&D and support. Depends on the productivity balance & potential for intensive systems in some areas.
Optimise opportunities for rural tourism whilst minimising negative impacts	O	Some potential but unlikely to be significant. Depends on the support priorities.

Lifelong learning/ vocational training in agriculture and forestry		
Improve physical and mental health and reduce health inequalities	O✓	Should provide some opportunities for improving skills and confidence, and reducing isolation, depending on levels of funding.
Protect and enhance biodiversity	?✓	Depends on the kind of training and FAS support. If the focus is on productivity only, could have negative consequences. Opportunity to promote this objective.
Protect places, landscapes and buildings of historic, cultural and archaeological	?	As above.

value		
Protect soil quality and quantity	?	As above.
Protect the water resource and ensure its sustainable use	?✓	Training in water conservation should be an explicit training element.
Protect and improve water quality	?	As above.
Protect and improve air quality	O	Not likely to have a significant effect. Depends on the scope of training.
Limit and adapt to climate change	?✓	All training should aim to promote actions to limit and adapt to climate change.
Minimise waste increase re-use, recycling and recovery rates	?✓	Waste management minimum standards are regulated. Should be an explicit training element.
Minimise the need to travel; provide alternatives to car/lorry use	O	Not likely to have a significant effect.
Maintain and enhance animal welfare standards	?✓	Animal welfare minimum standards are regulated. Should be an explicit training element.
Optimise opportunities for rural tourism whilst minimising negative impacts	?✓	Potential to promote farm-based tourism.

Minimise waste increase re-use, recycling and recovery rates	?✓	Opportunity for reduction in farm waste. Promotion of on-farm timber where possible?
Restructuring of farms		
Improve physical and mental health and reduce health inequalities	✓	In terms of the EAFRD this relates to smaller units. Likely to have a positive effect on isolated marginal farms.
Minimise the need to travel; provide alternatives to car/lorry use	O	Not likely to be significant.
Protect and enhance biodiversity	?	Depending on the kind of restructuring.
Maintain and enhance animal welfare standards	?✓	Opportunity to improve stock management. Potential for diversification into ecosystem management, tourism etc could be positive.
Optimise opportunities for rural tourism whilst minimising negative impacts	?	Depends on resources available. Potential to promote farm based tourism.
Protect places, landscapes and buildings of historic, cultural and archaeological value	✓	As above, opportunity to reinforce cultural aspects.
Protect soil quality and quantity	?✓	Could have a positive effect if restructuring results in diversification towards low input/ output quality production, woodland planting, semi-natural grassland management.
Protect the water resource and ensure its sustainable use	?✓	As above.
Protect and improve water quality	?✓	As above
Protect and improve air quality	O	Not likely to be significant. Depending on stock management/levels resulting from restructuring.
Limit and adapt to climate change	O	Not likely to be significant. Depending on stock management/levels resulting from restructuring.

Entry into the farming sector		
Improve physical and mental health and reduce health inequalities	O✓	Opportunities to promote sustainable futures for the industry, and to provide work opportunities. Would benefit socially isolated young people.
Protect and enhance biodiversity	O	Would not necessarily promote this objective without parallel measures such as advice, training and funding. Legal requirements as minimum.
Protect places, landscapes and buildings of historic, cultural and archaeological	O	As above.
Protect soil quality and quantity	O	As above.
Protect the water resource and ensure its sustainable use	O	As above.
Protect and improve water quality	O	As above.
Protect and improve air quality	O	As above.
Limit and adapt to climate change	O	As above.
Minimise waste increase re-use, recycling and recovery rates	O	As above.
Minimise the need to travel; provide alternatives to car/lorry use	O	No obvious significant effect.
Maintain and enhance animal welfare standards	O	Would not necessarily promote this objective without parallel measures such as advice, training and funding. Legal requirements as minimum.
Optimise opportunities for rural tourism whilst minimising negative impacts	O	No obvious significant effect, although new entrants likely to be receptive to diversification and new opportunities - less risk averse?

Integrating primary producers into the food chain		
Improve physical and mental health and reduce health inequalities	O	No obvious significant effect.
Protect and enhance biodiversity	O	Quality product branding SHOULD be linked to high quality environment, but not unless parallel measures are used. Not likely to be significant.
Protect places, landscapes and buildings of historic, cultural and archaeological	O✓	Cultural landscape often promoted as a marketing tool. Opportunity to reinforce landscape and cultural features.

value		
Protect soil quality and quantity	O✓	High quality product likely to be associated with organic and extensive systems. Could have a positive effect.
Protect the water resource and ensure its sustainable use	?✗	Local processing likely to increase water demand. Change to water-hungry crops could increase demand.
Protect and improve water quality	?✗	Increase of discharge from local food processing? Possibility of stress on quality.
Protect and improve air quality	O	No obvious significant effect.
Limit and adapt to climate change	✓	Reduced producer to consumer supply chain could reduce the length of journeys and positively impact on emissions.
Minimise waste increase re-use, recycling and recovery rates	?	More local processing might result in an increase in waste by-products.
Minimise the need to travel; provide alternatives to car/lorry use	O	No obvious significant effect.
Maintain and enhance animal welfare standards	✓	Animal welfare likely to improve - quality standards and reduction in transportation will reduce stress and likelihood of cross contamination/
Optimise opportunities for rural tourism whilst minimising negative impacts	✓	Opportunity to promote local brands, on-farm tourism linked to quality production.

Farm risk management		
Improve physical and mental health and reduce health inequalities	O	No obvious significant effect.
Protect and enhance biodiversity	?	Depends on the risk envisaged. If linked to competition/production/business development, could be negative.
Protect places, landscapes and buildings of historic, cultural and archaeological value	?	As above.
Protect soil quality and quantity	?	As above.
Protect the water resource and ensure its sustainable use	?	As above.
Protect and improve water quality	O	No obvious significant effect.
Protect and improve air quality	O	No obvious significant effect.
Limit and adapt to climate change	O	No obvious significant effect.
Minimise waste increase re-	O	No obvious significant effect.

use, recycling and recovery rates		
Minimise the need to travel; provide alternatives to car/lorry use	**O**	No obvious significant effect.
Maintain and enhance animal welfare standards	**?**	Animal welfare should be an explicit element of farm risk management, but depends on the context.
Optimise opportunities for rural tourism whilst minimising negative impacts	**O**	No obvious significant effect.

Restoring, preserving and enhancing biodiversity		
Improve physical and mental health and reduce health inequalities	✓	Opportunities for volunteering, for exercise, sense of empowerment by being involved. Learning new skills. Wildlife encounters.
Protect and enhance biodiversity	✓✓	Should be a significant effect. This intervention is in line with the objective. Need to manage tensions between priority habitats and species.
Protect places, landscapes and buildings of historic, cultural and archaeological value	**?**✓	Potential to restore landscape features - hedges, walls, ponds, woodland etc. Reinforces landscape character. Potential tension between building restoration and bat/ bird habitat.
Protect soil quality and quantity	✓	Woodland planting, semi-natural grassland/scrub and peatland conservation will promote this objective.
Protect the water resource and ensure its sustainable use	✓	Opportunity to promote water retention through peatland, pond, woodland and bank management.
Protect and improve water quality	✓	Opportunity to promote water quality through filtering via wetland, pond, woodland and bank management.
Protect and improve air quality	✓	Potential to absorb ammonia, methane, carbon.
Limit and adapt to climate change	✓	Improved capacity to sequester carbon.
Minimise waste increase re-use, recycling and recovery rates	**O**	No obvious significant effect.
Minimise the need to travel; provide alternatives to car/lorry use	**O**	No obvious significant effect.
Maintain and enhance animal welfare standards	**?**✓	Increase in protection from the elements. Enhanced disease barriers. Potential for habitats to harbour disease carrying wildlife. Could be exacerbated by climate change.

Optimise opportunities for rural tourism whilst minimising negative impacts	✓	Provides opportunities for rural tourism to encounter and experience wildlife and landscape character.

Improving water and land management/ meeting WFD		
Improve physical and mental health and reduce health inequalities	**O**	No obvious significant effect.
Protect and enhance biodiversity	✓✓	Could be a significant positive effect, Promotion of watercourse management = important corridor. Managing mine pollution will improve water ecosystems.
Protect places, landscapes and buildings of historic, cultural and archaeological	✓	Flood mitigation will help to protect historic buildings and archaeology.
Protect soil quality and quantity	✓	Bank, hedgerow, and watercourse management will have a positive effect on soil retention.
Protect the water resource and ensure its sustainable use	✓	Mitigating flood impacts, retaining water in soils.
Protect and improve water quality	✓✓	Reducing mine pollution will have a significant effect. The filtering effect of wetlands, woodlands, hedgerows etc will be positive. Improved resilience against run-off.
Protect and improve air quality	**O**	No obvious significant effect.
Limit and adapt to climate change	✓	Woodland and hedgerow planting, wetland creation will have a positive effect.
Minimise waste increase re-use, recycling and recovery rates	**O**	No obvious significant effect.
Minimise the need to travel; provide alternatives to car/lorry use	**O**	No obvious significant effect.
Maintain and enhance animal welfare standards	**?**✓	Increase in protection from the elements. Enhanced disease barriers. Potential for wetlands to harbour disease carrying insects.
Optimise opportunities for rural tourism whilst minimising negative impacts	✓	Provides opportunities for rural tourism to encounter and experience wildlife and landscape character. Freshwater fishing, bathing water quality.

Improving soil, erosion, fertiliser and pesticide management		
Improve physical and mental health and reduce health inequalities	**O**	No obvious significant effect.
Protect and enhance biodiversity	✓	Retention of soils, reduction in diffuse pollution from chemicals and reduction of chemicals on land will have a positive effect.

Protect places, landscapes and buildings of historic, cultural and archaeological	✓	Soil management is an important aspect of archaeological and historic building conservation.
Protect soil quality and quantity	✓✓	Interventions to manage soil erosion and chemical quality are central to this objective.
Protect the water resource and ensure its sustainable use	✓	Reductions in soil erosion will minimise build up of silts and potential flooding effects downstream.
Protect and improve water quality	✓	Interventions should result in improved chemical and ecological quality, and will also improve the condition of estuarine and marine waters.
Protect and improve air quality	✓	Improved management of fertilisers (including animal wastes) and pesticides will improve local air quality.
Limit and adapt to climate change	**O**	No obvious significant effect.
Minimise waste increase re-use, recycling and recovery rates	**O**	No obvious significant effect.
Minimise the need to travel; provide alternatives to car/lorry use	**O**	No obvious significant effect.
Maintain and enhance animal welfare standards	**?**✓	Improved soil condition and a reduction in chemicals could have a positive effect on animal welfare.
Optimise opportunities for rural tourism whilst minimising negative impacts	**?**✓	General condition of the rural environment is a factor on people's willingness to visit. A less industrialised rural landscape is more attractive. Eutrophication is unattractive and potentially dangerous.

Efficiency in water use by agriculture		
Improve physical and mental health and reduce health inequalities	**O**	No obvious significant effect.
Protect and enhance biodiversity	✓	Reductions in abstraction will reduce water stress in dry periods, and will also reduce discharge. Promotion of farm-based water capture and storage/recycling will be positive.
Protect places, landscapes and buildings of historic, cultural and archaeological	**O**	No obvious significant effect.
Protect soil quality and quantity	✓	Reduced abstraction will allow better retention in soils, and will also reduce inappropriate enriched discharges to soils, lessening potential for run-off and erosion.
Protect the water resource and ensure its sustainable use	✓✓	Central to the objective.

Protect and improve water quality	✓	Efficient water use will reduce discharges and the likely impact of diffuse pollution.
Protect and improve air quality	**O**	No obvious significant effect.
Limit and adapt to climate change	**O**	No obvious significant effect.
Minimise waste increase re-use, recycling and recovery rates	✓	Water recycling and recovery should be central to the initiative, and will have a positive effect.
Minimise the need to travel; provide alternatives to car/lorry use	**O**	No obvious significant effect.
Maintain and enhance animal welfare standards	**O**	No obvious significant effect.
Optimise opportunities for rural tourism whilst minimising negative impacts	**O**	No obvious significant effect.

Efficiency in energy use in agriculture and food processing		
Improve physical and mental health and reduce health inequalities	**O**	No obvious significant effect.
Protect and enhance biodiversity	**O**	No obvious significant effect.
Protect places, landscapes and buildings of historic, cultural and archaeological	**O**	No obvious significant effect.
Protect soil quality and quantity	**O**	No obvious significant effect.
Protect the water resource and ensure its sustainable use	**?**✓	More efficient energy and processing systems may reduce the demand for water.
Protect and improve water quality	**O**	No obvious significant effect.
Protect and improve air quality	**O**	No obvious significant effect.
Limit and adapt to climate change	✓	Efficient use of energy will reduce demand for production, especially if sourced from local renewables.
Minimise waste increase re-use, recycling and recovery rates	✓	Should lead to a reduction in packaging, more efficient use of agricultural produce and recycling of wastes to energy.
Minimise the need to travel; provide alternatives to car/lorry use	✓	Reducing producer chains should reduce transportation.
Maintain and enhance animal welfare standards	**O**✓	Local supply chains should reduce stress through reduced travel.
Optimise opportunities for rural tourism whilst minimising negative impacts	**O**	No obvious significant effect.

Supply and use of renewable sources of energy, of by-products, wastes, residues and other non food raw material		
Improve physical and mental health and reduce health inequalities	O	No obvious significant effect.
Protect and enhance biodiversity	✓✗	Any renewable scheme may have positive and negative outcomes for biodiversity.
Protect places, landscapes and buildings of historic, cultural and archaeological value	?O	Potential for visual impact from terrestrial wind turbines. Design issues. Potential for landscape enhancement through planting for biomass.
Protect soil quality and quantity	?	Depends on type of biomass and what it is replacing. Might retain quantity at the cost of quality in terms of carbon capture potential?
Protect the water resource and ensure its sustainable use	O	No obvious significant effect.
Protect and improve water quality	?✓	Potential for reduced farm waste runoff.
Protect and improve air quality	✓	Air quality should improve where farm waste is anaerobically digested. Reduction in stored farm manure.
Limit and adapt to climate change	?✓	Significant contribution to this objective. Possible increased transportation to 'hubs' for digestion?
Minimise waste increase re-use, recycling and recovery rates	✓	Farm waste to anaerobic digestion will have a significant positive effect.
Minimise the need to travel; provide alternatives to car/lorry use	O	No obvious significant effect.
Maintain and enhance animal welfare standards	?✓	Efficient management of animal wastes could have a positive effect.
Optimise opportunities for rural tourism whilst minimising negative impacts	O	No obvious significant effect.

Reducing green house gas and ammonia emissions from agriculture and improving air quality		
Improve physical and mental health and reduce health inequalities	O✓	Positive effects locally.
Protect and enhance biodiversity	✓	Removal of ammonia from run-off will have a positive effect.
Protect places, landscapes and buildings of historic, cultural and archaeological	O	No obvious significant effect.
Protect soil quality and	✓	Reducing ammonia to soil will have a positive

quantity		outcome on soil quality.
Protect the water resource and ensure its sustainable use	✓	Reduced remediation costs.
Protect and improve water quality	✓	Reducing ammonia to watercourses will have a positive outcome on water quality.
Protect and improve air quality	✓✓	This intervention is in line with the objective.
Limit and adapt to climate change	✓✓	An important intervention in relation to the objective.
Minimise waste increase re-use, recycling and recovery rates	✓	Farm waste to anaerobic digestion will have a significant positive effect.
Minimise the need to travel; provide alternatives to car/lorry use	**O**	No obvious significant effect.
Maintain and enhance animal welfare standards	**?**✓	Efficient management of animal wastes could have a positive effect.
Optimise opportunities for rural tourism whilst minimising negative impacts	**O**	No obvious significant effect.

Carbon sequestration in agriculture and forestry		
Improve physical and mental health and reduce health inequalities	✓	Opportunities for volunteering, for exercise, sense of empowerment by being involved. Learning new skills. Encounters with woodland provide a mental health benefit.
Protect and enhance biodiversity	**?**✓	Should be a positive effect, but there is a need to ensure that woodland is appropriately located so as not to impact on other biodiversity priorities.
Protect places, landscapes and buildings of historic, cultural and archaeological value	**?**✓	Should be a positive effect, but there is a need to ensure that woodland is appropriately located.
Protect soil quality and quantity	**?**✓	Should be a positive effect, but there is a need to ensure that woodland is appropriately located to ensure optimal soil carbon sequestration.
Protect the water resource and ensure its sustainable use	✓	Woodland creation should improve retention and promote water management.
Protect and improve water quality	✓	The filtering effect of woodlands and shelterbelts will be positive. Improved resilience against run-off.
Protect and improve air quality	**O**	No obvious significant effect.
Limit and adapt to climate change	✓	Depending on appropriate woodland creation, there should be a strong positive effect. Other habitats may be equally if not more effective.
Minimise waste increase re-use, recycling and recovery	**O**	No obvious significant effect.

rates		
Minimise the need to travel; provide alternatives to car/lorry use	O	No obvious significant effect.
Maintain and enhance animal welfare standards	✓	Increase in protection from the elements. Enhanced disease barriers. Potential for woodlands to harbour disease carrying insects?
Optimise opportunities for rural tourism whilst minimising negative impacts	✓	Potential for significant opportunities for woodland based tourism activity.

Diversification, creation and development of small enterprises and job creation		
Improve physical and mental health and reduce health inequalities	✓	Opportunities for volunteering, for exercise, sense of empowerment by being involved in community enterprises. Learning new skills. Job opportunities.
Protect and enhance biodiversity	✓	Opportunity to promote local biodiversity and to provide corridors and habitat links.
Protect places, landscapes and buildings of historic, cultural and archaeological value	?✓	Opportunity to promote fruit trees of local provenance; reinforce local distinctiveness. Ensure appropriate design of community enterprises and renewables.
Protect soil quality and quantity	O	No obvious significant effect.
Protect the water resource and ensure its sustainable use	O	No obvious significant effect.
Protect and improve water quality	O	No obvious significant effect.
Protect and improve air quality	O	No obvious significant effect.
Limit and adapt to climate change	O✓	Some potential for positive local effects from renewables/community transport initiatives.
Minimise waste increase re-use, recycling and recovery rates	O	No obvious significant effect. Potential for local recycling enterprises?
Minimise the need to travel; provide alternatives to car/lorry use	O✓	Some potential for positive local effects from community transport initiatives.
Maintain and enhance animal welfare standards	O	No obvious significant effect.
Optimise opportunities for rural tourism whilst minimising negative impacts	✓	Community based enterprises such as shops, crafts, refreshments, accommodation could contribute significantly.

Local development		
Improve physical and mental health and reduce health	✓	Access to services. Local enterprise will develop skills. Opportunities to volunteer for

inequalities		community projects. Job opportunities.
Protect and enhance biodiversity	O✓	Some potential for positive local effects from community biodiversity initiatives.
Protect places, landscapes and buildings of historic, cultural and archaeological value	✓	Potential to reinforce local distinctiveness and maintain sense of place and cohesion. Re-using redundant buildings will maintain their fabric. Opportunity for communities to market places of heritage interest.
Protect soil quality and quantity	O	No obvious significant effect. Re-using redundant buildings/brown field land will reduce need for green field development.
Protect the water resource and ensure its sustainable use	O✓	Community/public buildings should ensure high quality water management systems.
Protect and improve water quality	O✓	Community/public buildings should ensure SUDS as part of improvement schemes.
Protect and improve air quality	O	No obvious significant effect.
Limit and adapt to climate change	✓	Community/public buildings should ensure use of renewables, energy efficiency and sustainable buildings. Refer to ERDF?
Minimise waste increase re-use, recycling and recovery rates	✓	Community/public enterprises should ensure water and waste recycling. ERDF co-funded requirements?
Minimise the need to travel; provide alternatives to car/lorry use	✓	Improving access to services locally will reduce the need to travel. Community transport could reduce the need to use cars?
Maintain and enhance animal welfare standards	O	No obvious significant effect.
Optimise opportunities for rural tourism whilst minimising negative impacts	✓	Community based enterprises such as shops, crafts, refreshments, accommodation could contribute significantly. Access to doctors, dentists etc important.

Accessibility to, use and quality of information and communication technologies (ICT)		
Improve physical and mental health and reduce health inequalities	✓✕	Opportunity to develop skills will improve self-esteem. Improved wider access to information for isolated community, but potential for reduced exercise?
Protect and enhance biodiversity	O	No obvious significant effect. Access to data is an opportunity to understand and contribute.
Protect places, landscapes and buildings of historic,	O	No obvious significant effect. Access to data is an opportunity to understand and

cultural and archaeological		contribute.
Protect soil quality and quantity	O	No obvious significant effect.
Protect the water resource and ensure its sustainable use	O	No obvious significant effect.
Protect and improve water quality	O	No obvious significant effect.
Protect and improve air quality	O	No obvious significant effect.
Limit and adapt to climate change	O	No obvious significant effect.
Minimise waste increase re-use, recycling and recovery rates	?✕	Evidence that ICT necessarily reduces paper? Potential for increased WEEE. Need to ensure appropriate management.
Minimise the need to travel; provide alternatives to car/lorry use	✓	High speed internet/conferencing will reduce the need to travel to meetings.
Maintain and enhance animal welfare standards	✓	Opportunity to maintain records, access data and create knowledge networks.
Optimise opportunities for rural tourism whilst minimising negative impacts	✓	Opportunity to access destination information and to use digital media for orientation and interpretation.

5.2 Limitations of the assessment process at this stage

5.2.1 At this stage it is difficult to assess the interventions with complete confidence. There are more question marks than would be the case if there was a set of objectives and if the interventions were more specific. A key issue is whether the advice and support provided, and the training and restructuring are prioritised towards soil, air, water and biodiversity conservation beyond cross compliance, alongside the development of skills, or whether they are prioritised towards land improvement and productivity.

5.2.2 Although only 8 of the 216 elements compared are thought to have a potentially negative effect, this is therefore highly speculative, and depends on the adequacy of measures, funding, monitoring and enforcement where necessary. Regulations on standards for waste and recycling, water, emissions and air quality will apply, as will regulations linked to avoidance, mitigation, compensation and enhancement for biodiversity effects. Appropriate assessment and environmental impact assessment will still apply.

Table 9: Potential negative effects of interventions

	Likelihood	Significance	Comment

Links between agriculture/food production/forestry and research/ innovation	Limit and adapt to climate change/ Protect and enhance biodiversity	**Probable**	**High**	Depending on the type of support, R&D etc, potential for land improvement which might impact on carbon soil. There may be a need to promote R&D into diet and stocking systems to reduce emissions.[191] Breeding for productivity on the uplands may improve efficiency. There is a call to improve the grass swards of upland areas with little nature conservation or carbon storage value. This may be open to interpretation, and may reduce opportunities for habitat restoration/creation of corridors.
		Likelihood	**Significance**	**Comment**
Integrating primary producers into the food chain	Protect the water resource and ensure its sustainable use	**Probable**	**Moderate/ locally high**	Whilst reducing the food supply chain is a positive proposal, there may be more demand locally for water for processing purposes.

		Likelihood	**Significance**	**Comment**

[191] Welsh Government ex-ante situation analysis. Final document. February 2013. paragraphs 406 & 413

Integrating primary producers into the food chain	Protect and improve the region's water quality	**Possible**	**Moderate**	Any increase in abstraction for local food production will result in increases in discharge. Without appropriate measures there is the potential for contaminated discharges to enter watercourses.
		Likelihood	**Significance**	**Comment**
Supply and use of renewable sources of energy, of by-products, wastes, residues and other non food raw material	Protect and enhance biodiversity	**Probable**	**Moderate/ high**	All renewable schemes have positive and negative implications. Possibility of hydro-schemes diverting water from critical micro habitats and rare bryophytes; visual impact of onshore and offshore development; conversion of land to biomass may have impacts on biodiversity priorities, as well as loss of deadwood as invertebrate habitat.
		Likelihood	**Significance**	**Comment**
Supply and use of renewable sources of energy, of by-products, wastes, residues and other non food raw material	**Protect places, landscapes & buildings of historic, cultural & archaeological value**	**Probable**	**Moderate/ high**	Potential for visual impact from terrestrial wind turbines. Design issues. Potential for landscape enhancement through planting for biomass, in appropriate places. May be subject to planning policy. Reference should be made to LANDMAP evaluation aspects and landscape character assessment.

		Likelihood	Significance	Comment
Accessibility to, use and quality of information and communication technologies (ICT)	Improve physical and mental health and reduce health inequalities	**Possible**	**Low**	An effect of increased access to ICT is more sedentary living. There is a significant possibility that people will spend long periods of time at the desk, with consequent health implications. There may be a cumulative effect over a longer period of time that will impact on local health services.
		Likelihood	**Significance**	**Comment**
Accessibility to, use and quality of information and communication technologies (ICT)	Minimise waste increase re-use, recycling and recovery rates	**Probable**	**Moderate**	A significant increase in the use of ICT is likely to result in increases in waste electrical and electronic material, especially at set-up stage with conversions and upgrades.

6 ALTERNATIVES

6.1 Selection and discussion of alternatives to the proposed programme

6.1.1 In discussing alternatives, it might be possible in theory to consider a variety of high level policy scenarios, such as an 'economic growth first' scenario or, say, an 'environment first' or a 'food security first' scenario, as is common in many policy forecasting studies, but that would be inappropriate, since the EU and the Welsh Government have both ` indicated that the scenario they seek is a 'sustainable development' scenario in which social, environmental and economic priorities are balanced as a matter of principle. There is thus no definitive 'first', since it is not the intention to seek 'trade-offs' at a policy level.

6.1.2 The SEA Directive requires a discussion of reasonable alternatives to the proposed Programme, and why they are not considered to be the best option. The Directive does not specify what is 'reasonable' but does state (in paragraph 5.12) that a discussion of alternatives should include *'...the likely evolution of the current state of the environment without the implementation of the alternative'.* The Directive does not specify whether 'alternatives' means alternative programmes, or different alternatives *within* the proposed programme.

6.1.2 The Wales SEA Regulations state that the environmental report must identify, describe and evaluate the likely significant effects of implementing the plan and reasonable alternatives, taking into account the objectives and the geographical scope of the plan[192]. In the case of the RDP, the key objectives referred to are those described in the EAFRD Regulation, within the framework of the CAP, based on three headline objectives and nine sub-objectives, namely:

(1) viable food production
- to contribute to farm incomes
- to improve competitiveness
- to compensate for production difficulties in areas with specific natural constraints

(2) the sustainable management of natural resources, and climate action
- to guarantee sustainable production practices and secure the enhanced provision of environmental public goods
- to foster green growth through innovation

[192] section 12 (2)

- to pursue climate change mitigation and adaptation actions

(3) a balanced territorial development of rural areas

- to support rural employment and maintaining the social fabric of rural areas
- to improve the rural economy and promote diversification
- to allow for structural diversity in the farming systems, improve the conditions for small farms and develop local markets[193]

6.1.2 The purpose of analysing alternatives is to determine whether the proposals offer the optimal option in terms of *'the likely evolution of the current state of the environment*' in the context of sustainable development[194]. Although it is beyond such an analysis to consider the economic or social dimensions in detail, the reality is that these dimensions have a significant influence on the state of the environment, because its condition relies on the support of economically and socially viable communities.

6.1.3 Any discussion of alternatives must therefore be based on what is considered reasonable, and must take into account the objectives of the plan.

6.1.4 The EAFRD contains a number of constraints and a degree of flexibility. It would not be reasonable to select and discuss alternatives that will be illegal or cannot be implemented within the constraints set by the EAFRD.

6.1.5 Other factors include:

- Time - the plan is subject to a seven year timescale. Recommending alternatives that require interventions after this period would not be reasonable, nor realistic since it would not be possible to predict the situation beyond 2020.

[193] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee of the Regions. The CAP Towards 2020 Meeting the food, natural resources and territorial challenges of the future page 7

[194] The EU's position on sustainable development is presented in its 2009 review of the EU Sustainable Development Strategy, which makes the following points: "A number of unsustainable trends require urgent action. Significant additional efforts are needed to curb and adapt to climate change, to decrease high energy consumption in the transport sector and to reverse the current loss of biodiversity and natural resources... It is crucial that measures to support the real economy and reduce the social impact of the current crisis are compatible with long-term sustainability goals."

- Funding - this has yet to be finalised and allocated. Although negotiations have yet to be completed, the indications at the time of this report are that the budget is likely to be reduced, perhaps significantly[195,196]. It would therefore not be reasonable to discuss alternatives in terms of any likely increase in funding.

- Deployment of funds - there is a degree of flexibility, currently allowing a small percentage of shift of direct payments from Pillar I to Pillar II to allow for a reinforcement of rural policy[197]. A minimum allocation of 5% of the total EAFRD contribution has been proposed for the LEADER programme, implying that funding could be increased[198].

- Policy - it would not be reasonable to consider alternatives that are not consistent with EU, UK and Wales policies.

6.1.6 There are a number of 'unknowns', including the final budget, the proportions to be allotted to different elements of the plan, and the relationship between Pillars I and II, especially in the context of the 'greening' requirement linked to Pillar I.

6.1.8 The European Parliament Committee on Agriculture and Rural Development (COMAGRI) met on 23-24 of January to vote on amendments to proposals on CAP reform, including amendments to transfers of funds across the Pillars. The allowable transfer from Pillar I to II has been increased to 15%, with 10% allowed in the opposite direction for those Member States receiving less than the EU average for direct support payments, including the UK.

6.1.9 The meeting also voted in favour of the following:

- 30% 'greening' element for the basic payment in Pillar I, but have decoupled the link between that payment and the basic payment, effectively making the greening element optional in the view of some[199].

[195] http://www.bbc.co.uk/news/world-europe-21377378, accessed 08/02/2013

[196] http://wales.gov.uk/newsroom/businessandeconomy/2013/130125eu/?lag=en&skip=1&lang=en, accessed 08/02/2013

[197] EAFRD Regulation p9

[198] EAFRD Regulation. Article 65(5)

[199] See http://cap2020.ieep.eu/news/topic/7

- extending the definition of 'green farming by definition' to include farmers receiving agri-environment-climate payments, alongside organic farmers and those within a Natura 2000 area, as well as farmers who have introduced an approved environmental or biodiversity plan, raising questions of double funding.

- earmarking 25% of EAFRD towards agri-environment-climate and land management payments.

- permitting EAFRD funding to be used to support agri-environment actions that are also funded via the Pillar 1 greening measures. This is justified on the basis that the 'greening' measures should not be viewed as a baseline for Pillar 2 environmental measures, confirming concerns about the potential for double funding in certain areas.

- proposing to delete the new standard of Good Agricultural and Environmental Condition (GAEC) to protect carbon rich soils and wetlands.

6.1.10 Although these amendments are still subject to finalisation, they are seen as retrogressive in terms of delivering for the environment, since they would act as a disincentive to farmers towards proactive management for biodiversity and climate management under the RDP, and they would represent a loss of funds away from environmental management[200,201]

6.1.11 This has considerable ramifications for in discussing reasonable alternatives, since the Welsh Government's proposals will be constrained by the requirements of the final iteration of the EAFRD.

[200] According to the European Environment Bureau this could amount to €3 billion a year.

[201] Under the EAFRD Regulation proposals, the allocation of the fund was €317.2bn in Pillar I and €101.2bn in Pillar II. By implication the 'greening' element would be about €105bn, approximately €17.5bn annually.

6.1.12 In summary the COMAGRI amendments to the Commission proposals are as presented in table 10:

Table 10: Commission proposals and COMAGRI proposed amendments

Commission proposal	COMAGRI amendments
Pillar I 'greening' element 30%, coupled and subject to cross-compliance	Pillar I 'greening' element 30%, decoupled and not subject to cross-compliance
Definition of 'green farming'	Definition of 'green farming' by default
5-10% vire from Pillar I to Pillar II and vice versa	15% vire from Pillar I to Pillar II, 10% from Pillar II to Pillar I
GAEC includes soil and wetland protection	Proposes to remove GAEC standards for soil and wetland protection
	25% EAFRD funding to agri-environment climate and land management

6.1.13 Given the current budgetary constraints, the COMAGRI proposals are a lost opportunity to optimise environmental benefits, since it represents as reduction in regulated compliance requirements. Shifting funds from Pillar II to Pillar I is problematic in this context, given the current financial constraints, although the increase from 10% to 15% in the opposite direction is seen as beneficial. The definition of 'green farming by default' is also seen as problematic in the context of the above proposals. The Committee also proposed to permit production on buffer strips and ecological focus areas, provided no fertilisers or pesticides are used, which is seen as regressive, since it reduces the potential for developing corridors and refuges. The removal of soil and wetland conservation is seen as a negative option.

6.1.14 For the reasons outlined above, **the Commission's proposal is the preferred alternative**, although it perhaps fails to go far enough, given the likely reduction in CAP budget in the future and the need to ensure a robust environmental management system linked to multi-annual payments in Pillar I. The COMAGRI proposals are unlikely to address the EU's objective to reverse biodiversity losses and to progress efforts in terms of climate change mitigation.

6.1.15 The final settlement will not be known until the plenary sessions on the COMAGRI proposals are concluded.

6.1.16 Bearing in mind the concerns raised by the current overall position, this discussion on alternatives will consider the effects of prioritising

interventions in different ways. There are a number of approaches to considering alternatives, including a 'do nothing' option. The proposed RDP identifies 18 focus areas, and these are linked to the 6 priorities listed in the EAFRD Regulation (see section 2.3.3). These are not prioritised in any way, presumably because the underlying rationale is that they are mutually reinforcing and therefore equally critical for achieving the overall programme objectives. However, by emphasising particular clusters of focus areas, it is possible to arrive at different outcomes.

6.1.17 **Option 1**, a focus on building capacity to compete on market share might emphasise marketing, productivity, efficiency, food security, animal welfare alongside support to enterprises by way of advice and training. This might shift production towards the most productive, cost efficient areas.

6.1.18 **Option 2**, a focus on promoting social cohesion, supporting services and public transport, with an emphasis on community based enterprises, access to ICT. Interventions would be targeted thematically and spatially to ensure maximum effectiveness and efficiency. This option might target local supply chains in line with option 1.

6.1.19 **Option 3** would focus on optimising opportunities for environmental benefit, subject to alternative environmental priorities. **Option 3a** would seek to support the climate change agenda as much as possible within available funds. This would entail focusing support for carbon soil management; for addressing farm based emissions through bio-digestion; promoting appropriate habitat (woodland, scrub, semi-natural grassland) restoration and management for sequestration; promoting public transport, alternatives to long-distance haulage, reducing production to consumption chains. **Option 3b** would seek to gain maximum benefits for biodiversity and for ecology, by promoting co-operative approaches to managing land at a 'landscape scale' e.g. commons, watercourses, catchments; by supporting alternative land uses and management to develop buffer zones, corridors, hedgerow, scrub and woodland planting, setting aside land, winter feeding crops; bankside management; pesticide, herbicide and fertiliser management.

6.1.20 Whilst none of these is seen as exclusive, different focuses entail different funding strategies. Some elements will require significant financial support, e.g. training costs and farm improvement schemes in option 1, local transport and infrastructure or set-up costs in option 2, interventions such as anaerobic digestion and transport in option 3a, which would divert funds away from other interventions.

6.1.21 The effect of focusing too strongly on **option 1** might be over intensification in productive areas, with impacts on already fragmented adjacent conservation sites. There would be a reluctance to use buffer zones or build corridors on productive land. The selection of productive grasses may increase soil compaction and reduce water and soil carbon, potentially increasing carbon and methane emissions, and the use of herbicides will reduce plant, bird and invertebrate diversity. Climate factors may exacerbate the likelihood of flooding events on land that has been drained and which offers few buffers and water containment measures. Conversely, such land is likely to be more susceptible to drought conditions, with impacts on crop and stock resilience. Diverting funds towards productivity will also have a negative impact on marginal areas which will not be able to sustain agri-environment systems in ways to sufficiently address biodiversity losses.

6.1.22 The effect of overemphasising **option 2** might be a commitment of funds to social and community programmes that might be met from other resources, or that might be incapable of being sustained without continuing funding support. This may divert funds from important and ultimately self-sustaining environmental projects that might in the future be able to support social programmes through income generation. Some social and community programmes might focus on enhancing ecosystem services through the development of collaborative initiatives. The promotion of access to high speed ICT may reduce the need to travel, but this may not affect significant numbers of people to impact on car use.

6.1.23 Whilst options 3a and 3b are seen as complementary, it is likely that **option 3a** is more costly, since it will require support to develop a considerable number of anaerobic digesters, farm-scale renewables, and supporting public transport and local product delivery systems through re-establishing more local-level abattoirs for example. Whilst **option 3b** may be less costly in terms of 'hard' such as those in option 3a, there will be costs in terms of training, developing collaborative management systems, monitoring and regulating, as well as the costs of appropriate plant for land management. The benefit of focusing on ecosystem and biodiversity protection and enhancement is the development of a resilient environment that will be responsive to climate change, and will offer economic opportunities in the future, providing that appropriate value systems for ecosystem services are established. On the other hand, there is a danger of over-regulation and resentment that cannot be sustained. In some cases there may be a loss of production systems that benefit some species over others.

6.1.24 Any plan or project should seek to optimise benefits across environmental, economic and social interests, and minimise disbenefits. For this reason, the options discussed above are not exclusive. However, it is critical that environmental limits are respected, and wherever possible made more robust, and therefore **the funding emphasis in Pillar II is rightly on the agri-environmental aspect.** It is indicated that between 60% and 70% of the funding should be directed towards this[202].

6.1.24 It is not clear whether a 'do nothing' option means 'continue the current programme' or 'have no programme at all'. In the first case, the question is whether the current programme is a preferred option to the proposed one. The current programme was designed under different circumstances. The economy had not taken a downturn, and the likely failure to halt and reverse biodiversity loss by 2010 was perhaps less apparent at the time. Climate change was a major concern, but the Welsh Government had yet to clarify its position fully on its priorities. Certain directives on water, climate and waste had not been fully implemented, and fuel costs were not as high as they at present. The proposed programme is based on addressing these concerns[203]. By removing the axes and by allowing for complementary approaches with Structural Funds, the proposals aim to promote flexible approaches that reflect the needs of the regions.

6.1.26 Glastir's different elements were progressing at different rates by June 2012, with demand described as “mixed” with some elements such as the Common Land element experiencing good, and sometimes very good, demand with other elements such as the All Wales Element having not yet achieved the objectives of the scheme by that time, for various reasons such as design and communication[204].

6.1.27 If 'do nothing' literally implies the withdrawal of any rural development programme, the obvious implication is that there will be insufficient funds to address environmental priorities, including the need to protect sites of European conservation interest. The environmental implications might include (not exhaustive):

- loss of small extensive units and abandonment of some important upland areas;

[202] 'Next Steps' consultation on interventions p4. Ministerial Statement May 2012.

[203] 'Against the background of the economic crisis and the pressure on public finances, to which the EU has responded with the Europe 2020 strategy and the MFF proposal' - EARDF Regulation proposal. p4

[204] Glastir Stocktake June 2012. Report of findings.

- intensification of potentially productive areas in the lowlands, with a loss of fragmented adjacent habitats, resulting in species losses, and CO_2 releases;
- degradation of peat and organic soils with increased CO_2 emissions;
- increases in chemical use with resultant impacts on water bodies;
- reduced ability to manage risk in relation to animal welfare and disease;
- loss of potential for woodland creation and restoration, resulting in a lost opportunity to sequester carbon, manage water and provide a natural resource;
- loss of support to key rural services, with the likelihood of a spiral of social decline, the abandonment of property to second homes, the loss of vibrant culture, and increases in car use;
- lack of capacity to protect, restore and enhance important heritage sites and vernacular buildings

6.1.28 None of the above takes into account external factors such as global food markets, retail sector attitudes, policy on, for example, the environmental costs of transportation, support to production, other consumer costs affecting their choice of product or climate change. Furthermore, natural systems are neither stable nor static. Key future considerations include the need to:

- ensure resilience by protecting and enhancing the environmental resource;
- ensure that messages are clear and that there are sufficient resources to monitor and to enforce high environmental standards;
- allow for some flexibility to be able to respond to changes in economic and environmental circumstances.

6.1.29 In conclusion, at this time it is not possible to compare the proposed interventions with the 2007-2013 plan with complete confidence, since the proposals have yet to be fully formulated and agreed. However, the proposed interventions aim to address a range of circumstances not envisaged in 2006, and therefore it is anticipated that they will be more 'fit for purpose' than, say, a continuation of the current programme without change.

7 ASSESSMENT OF THE PROPOSED PROGRAMME

7.1 Summary of findings

7.1.1 The introduction to the RDP indicates that the one of its key aims is to *"...improve the competitiveness of the farming sector. Welsh farmers operate in a highly competitive global market while also having to respect the high standards relating to environmental, food safety, quality and animal welfare objectives that are requested by domestic and export customers[205]."*

7.1.2 Elsewhere[206] it is stated that *"using the new RDP ...through the suggested measures will improve the economic competitiveness of Welsh agriculture (e.g. by protecting soil, reducing the risk of spreading livestock disease between farms, reducing fertilizer inputs and fuel use), deliver ecosystem services (e.g. by reducing flood risk, providing clean drinking water, enhancing fisheries, protecting biodiversity and providing clean bathing waters), and contribute to energy efficiency (e.g. by increasing carbon storage, providing renewable energy, reducing energy use by the agricultural and water industry sectors)."*

7.1.3 The RDP has to reflect the priorities of the EAFRD, which, as currently proposed, are:

- Fostering knowledge transfer and innovation in agriculture, forestry, and rural areas.
- Enhancing competitiveness of all types of agriculture and enhancing farm viability.
- Promoting food chain organisation and risk management in agriculture
- Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry
- Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in agriculture, food and forestry sectors.
- Promoting social inclusion, poverty reduction and economic development in rural areas

7.1.5 The RDP clearly has the potential to protect and enhance ecosystem services and biodiversity values, culture and heritage and climate issues. However, much will depend on the funding that will become available and on ensuring that in seeking a productively

[205] Next Steps Wales RDP consultation. Introduction p3.

[206] Agri-environment, Climate and Forestry Working Group Thematic Report. Water. Kyle Young, Simon Neale & David Letellier, EAW. November 2012

competitive agriculture, rural Wales can also compete on the basis of the resilience of its ecosystems.

7.1.6 There is some convergence between the interventions promoted by the proposed RDP and those promoted by the Welsh Government's own programmes, based as they are on furthering sustainable development. Without the RDP it is arguable that significant and urgent interventions would not take place, and some of these aim to address the Welsh Government's targets to reduce carbon emissions, to improve air quality and to reduce Wales' ecological footprint.

7.1.7 Currently, the RDP is still at a formative stage, and it is not possible to be conclusive about effects. However, the following points have emerged from this assessment (in no particular order):

- In any scheme there is a need to specify what the added value for biodiversity will be. Different schemes are likely to have different biodiversity outcomes and it will be important to consider this when designing the schemes. There is therefore a need for clarity in terms of biodiversity objectives, in order to communicate clearly what the desired outcome will be.

- As the RDP develops, it should seek opportunities to co-ordinate with the ERDF and ESF to deliver environmental benefits by harmonising funding and by supporting projects that the RDP itself cannot deliver.

- Some aspects of the current Glastir scheme, such as the Common Land Element, have been well received, largely because of the work of the support officers[207]. Other aspects such as the Woodland Elements have been less well supported for a variety of reasons, including but not only logistical ones.

- It is essential to provide adequate training for staff involved in delivering the Farm Advisory Service and agri-environment schemes to ensure that environmental priorities are highlighted. The service should work closely with the statutory environmental bodies and the NGOs to provide high quality advice.

- There are some concerns about double funding linked to the greening element in Pillar I, and the implications of this for the future of Glastir. There are also concerns about the extent to which certain requirements under GAEC cross compliance will continue to be supported.

[207] Glastir Stocktake. 2012

- Some of the effects, both positive and negative, may not become immediately apparent. Monitoring is therefore critical. There is a need to fund follow up monitoring, to train individuals and to co-ordinate results, some of which are not easily accessible.

- It is critical that funds are available to ensure the protection and enhancement of Natura 2000 sites, and to meet the obligations of the Water Framework Directive. ERDF funding may provide opportunities in areas that cannot be funded by the RDP.

- Whilst mention is made of high value markets in the current RDP proposals, none is made of the concept of 'High Nature Value Farming', a concept proposed by the European Environmental Agency[208], under which funding might be directed for supporting ecosystem services.

  This was referred to in the proposed EAFRD:
  "the conservation of genetic resources in agriculture and the additional needs of farming systems that are of high nature value should be given specific attention."[209]

- Some reference should be made to the need to protect veteran trees, and trees that might offer amenity benefits within and around rural settlements as an opportunity to communities. This might be done, for instance, by extending woodland schemes to interests beyond landowners.

[208] 'High Nature Value Farmland: Characteristics, trends and policy challenges', European Environment Agency, EEA Report No.1, 2004.

[209] Proposed EAFRD Regulation para 26

8 MONITORING

8.1.1 The SEA Guidance defines significant effects as positive, adverse, foreseen and unforeseen. The methods and scope for gathering information either directly or indirectly are not defined. There is no requirement, for instance, to aggregate or collate potentially relevant data from other monitoring sources under other laws or programmes[210].

8.1.2 There are three key challenges related to monitoring the environmental effects of the RDP. Firstly, the data is dispersed across a number of statutory and non-statutory bodies. The bringing together of three statutory bodies into Natural Resources Wales will help to bring together a significant amount of environmental data related to the plan's implementation. Nonetheless, it would be helpful for Welsh Government to ensure some co-ordination between collating the data needed to address the RDP objectives and that needed to address the environmental objectives in this report.

8.1.3 The second issue is that it in some cases environmental effects may be impossible to attribute directly to the RDP. The Welsh Government has a legal duty to promote sustainable development, and its Programme for Government is based on sustainable development principles. A wide range of parallel actions are likely to deliver on these objectives were the funding to be available to do so. It is impossible at this level to determine the synergies and tensions between the RDP and other government interventions that might determine particular environmental outcomes.

8.1.4 For example, whilst it is possible to calculate an output, such as biodiversity increases from a particular project, the overall *outcome* in terms of overall biodiversity gains in a particular area is likely to be influenced by other factors, not least climate-related phenological changes. This makes it difficult to report genuine environmental gains (or losses) in a way that can be confidently attributed solely to the RDP.

8.1.5 The third challenge is a logistical one. Different measures are needed for different environmental targets, and they often require different timescales incorporating different skills in capturing and analysing data. The costs entailed are significant, and therefore adequate monitoring may be influenced by economic constraints. Some degree of self reporting might be possible, but this would still require sampling for ground truthing purposes.

[210] (COWI/AS Denmark 2009 p133).

8.1.6 Monitoring, and especially programme evaluation, should therefore be approached with these challenges in mind.

8.1.7 Table 9 summarises the key monitoring bodies for the SEA objectives identified above. Welsh Government and its departments, including WEFO, will monitor a number of outputs and outcomes related to the objectives of the RDP, as indicated in paragraph 3.4.2. University departments are also commissioned to carry out monitoring on behalf of the statutory bodies and the Welsh Government. Organisations such as the Health and Safety Executive are responsible for monitoring workplace safety issues. The Forestry Commission monitors the state of Wales' woodlands and the condition of tree species, including threats from diseases. Local councils undertake monitoring of the effects of their spatial planning policies as required by the Planning and Compensation Act 2004, as well as a number of environmental and health topics including air quality and waste.

Table 11: Monitoring against SEA objectives

SEA Objectives	Monitoring implications
Improve physical and mental health and reduce health inequalities	The Public Health Observatory monitors health and wellbeing issues and maintains databases
Protect and enhance biodiversity	Countryside Council for Wales/NRW monitor condition of sensitive sites/species; Appropriate Assessment case studies/invasive species/data on landscape character Wildlife NGOs monitor condition of BAP species and habitats; maintain databases Local authorities hold ecological data
Protect places, landscapes and buildings of historic, cultural and archaeological value	Cadw - monitors condition of historic buildings; archaeological trusts - monitor condition of sites; Royal Commission on Historic and Ancient Monuments - maintains database Local planning authorities - monitor building standards; conservation areas; development management; listed buildings; maintain EIA databases

	Archaeological Trusts maintain relevant data and carry out research
Protect soil quality and quantity	A wide range of institutions carry data, including CEH; NSRI; Countryside Survey; UK ECN. BGS. Forestry Commission maintain soil databases for planting.
Protect the water resource and ensure its sustainable use	Water companies/EA monitor abstraction and discharges of water; losses. Flood risk databases. Will be NRW in April 2013.
Protect and improve water quality	Environment Agency monitors ecological and chemical condition of river systems; bathing water quality; maintains databases. Water companies monitor chemical quality
Protect and improve air quality	EA and local authorities issue permits and monitor air quality; maintain databases
Limit and adapt to climate change	WG - Estimated decrease in GHG
Minimise waste increase re-use, recycling and recovery rates	Local authorities monitor municipal waste including recycled waste; on farm monitoring for farm waste
Minimise the need to travel; provide alternatives to car use	WEFO - Public transport services created or improved WEFO - Total length of new railway line (including TEN-T) WEFO - Total length of reconstructed or upgraded railway line (including TEN-T)
Maintain and enhance animal welfare standards	Farm Animal Welfare Committee provides advice and collects data; NFU/FUW; RSPCA collects data; Welsh Government Office of the Chief Veterinary Officer; Defra gathers statistics
Optimise opportunities for rural tourism whilst minimising negative impacts	National parks and AONBs monitor visitor statistics; Visit Wales and Regional Tourism forums maintain records.

8.1.8 It is not possible to monitor everything. Environmental indicators are a 'proxy' of the state of the environment, and where carefully selected will provide a picture of its condition. It is critical that indicators are sufficient in number to be comprehensive, but do not duplicate unnecessarily. It is important when aggregating data to higher levels, to ensure that critical

factors are not lost, such as cumulative effects over periods of time that in themselves are not significant. It is also critical to capture *quality* as much as quantity. Simply quantifying the number of schemes entered into, or the amount of fencing or planting, does not in itself confirm that there has been an increase in quality environments. The indicators below have been selected to reflect the objectives, and aim to be sufficient enough to be reasonably attributable to the Welsh Government's rural programme.

Table 12: Objectives and indicators

Population and human health	Improve physical and mental health and reduce health inequalities	Minimise environmental nuisance noise and light pollution Promote access to the countryside Promote learning in, about and for farming and forestry Increase access to locally produced high quality foods	Change in number and extent of tranquil areas Percentage of dark sky at night by area Numbers of farm education visits Availability and type of locally available produce

Biodiversity	Protect and enhance biodiversity	Avoid damage to sites of European conservation value and enhance them where possible Protect and enhance rare or endangered species and habitats and provide opportunities for habitat creation/restoration Protect habitats and minimise the fragmentation of nature corridors and networks in accordance with Biodiversity Action Plans, and improve these where possible Avoid damage to sites of geological interest	Conservation status of SAC/SPA features dependent on/impacted on by agriculture Conservation status of target species/habitats dependent on/impacted on by agriculture Conservation status of NNR/SSSI features dependent on/impacted on by agriculture Presence & condition of unfarmed features - hedges, scrub, fallow areas, buffers, trees, ditches & ponds Percentage area of independently certified woodland (such as FSC)

Biodiversity (continued)	Protect and enhance biodiversity	Promote agri-diversity through support for endangered local breeds Promote indigenous woodland species Support biodiversity health through the management of disease and invasive species	Lowland/upland farm birds - target species, presence, numbers - overwintering, breeding, spring feeding Woodland birds - target species, presence, numbers - overwintering, breeding, spring feeding Presence/location of invasive species Condition of Geological Conservation Review (GCR) sites that are SSSI's Common land in management agreements

Culture, architecture and archaeology	Protect places, landscapes and buildings of historic, cultural and archaeological value	Improve the quality of the local built environment Promote the re-use of previously developed land and buildings Protect village greens and community wildlife areas/ woodlands Promote and market locally sourced products Protect archaeological sites on farmland Protect and improve the stock of listed buildings	Condition of sites on agricultural land Number and condition of listed farm buildings LANDMAP culture aspects - condition Number of community-owned or managed biodiversity/amenity assets Register of SAMs - condition status Number and location of farmers' markets/ community local product market stalls
Soils	Protect soil quality and quantity	Maintain and enhance soil quality in terms of porosity, biota and structure Minimise soil erosion through run-off, wind and tillage Optimise the capacity of soils to sequester carbon	Change in soil organic carbon, acidity, nitrogen, biology Water capture Changes in compaction, erosion Changes in area of grassland and woodland
Water resource	Protect the water resource and ensure its sustainable use	Complete flood and coastal risk plans Promote technology to conserve and recycle water	Water abstracted for agriculture (licensed) Water abstracted for agriculture (unlicensed) Agricultural discharge to water courses Change in crop type Number and cost of flooding incidents

Water quality	Protect and improve water quality	Protect and enhance the quality of groundwater, rivers, lakes, and coastal waters Comply with 'good' status under the Water Framework Directive (WFD) Protect and enhance the salmonid and other fisheries Avoid physical disturbance to the water and water edge environment Reduce diffuse pollution from agriculture and other sources Ensure sustainable drainage systems in development	Bank erosion remediated (length) Chemical/ecological quality of rivers Number of agriculture-related pollution incidents Eutrophication statistics Estuary water condition Bathing water quality Area designated as Nitrate Vulnerable Zone Number of water pollution incidents, category 1 & 2
Air quality	Protect and improve air quality	Reduce atmospheric hazards such as ammonia, methane and carbon dioxide Reduce the risk from radon	Change in ammonia,CH_4, N_2O, ozone Air quality incidents Radon remediation programmes Percentage of sensitive habitat area exceeding critical loads for acidification and eutrophication

Climate issues	Limit and adapt to climate change	Reduce emissions of greenhouse gases, especially N_2O and CH_4 Minimise the requirement for energy generation Promote efficient energy use Increase the use of energy from renewable resources including hydro-systems and biomass Promote ICT as an alternative to travel and print	CH_4 emissions from livestock Number of micro-generation schemes established Change in rural ecological footprint
Waste management	Minimise waste increase re-use, recycling and recovery rates	Restrict biodegradable materials going to landfill Promote anaerobic digestion Promote the use of organic waste to agriculture where appropriate	Amount of biodegradable material going to landfill Amount of biodegradable material going to anaerobic digestion Amount of organic waste to agriculture
Transport infrastructure	Minimise the need to travel; provide alternatives to car use	Protect and enhance the public transport system Optimise opportunities to work locally Promote non-recreational walking and cycling	Availability of public transport (bus and rail) - national, National Park/county, local buses; taxis; community schemes Promotion of public transport associated with tourism

Animal welfare/disease transmission	Maintain and enhance animal welfare standards	Improve on-farm animal welfare standards Reduce stresses related to transportation Minimise the risk of animal-animal/animal-human disease transmission	Number of Farm Health & Welfare Plans based on risk assessments Number of farms with separation / quarantine facilities Number of farms with contingency plans in place Sales of Welsh higher welfare products
Rural based tourism and access	Optimise opportunities for rural tourism whilst minimising negative impacts	Optimise opportunities for engagements with wildlife/food production Protect and enhance access to the coastline and countryside Protect rights of way, open space, and commons	Hectares of Open Country and Common Land Length and condition of PROWs Amount and condition of accessible land in agri-environment schemes

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