Agroforestry Policy Review

Figure 1. Hazel coppice for bioenergy production is planted in rows between alleys of arable and vegetable crops managed on an organic rotation in a silvoarable system at Wakelyns Agroforestry, Suffolk.

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A lack of policy support is seen as one of the main barriers to wider adoption of agroforestry, with the integration of trees at a low density into agricultural land challenging the conventional specialisation of forestry and agricultural policy mechanisms (Dupraz *et al.*, 2004). Within the EU, it is necessary to examine how agroforestry fits into the two pillars of agricultural support; Pillar I - direct aids and market support, and Pillar II - rural development, as well as within forestry policy schemes for farm woodlands.

1. Pillar I: Single Payment Scheme

The 2003 CAP reform that came into effect from 1st January 2005 replaced production-related payments with the Single Payment Scheme. This awards a set amount per hectare of agricultural land on the condition that the farmer complies with EU standards for public, animal and plant health, environmental and animal welfare ('cross-compliance'). Eligibility for support is of primary concern for farmers considering agroforestry, which is not currently recognised as an accepted land-use class within the SPS. SPS cannot be claimed for forest which includes woodland, trees and most Christmas trees, but short rotation coppice, some grazed woodland, and land under some forestry schemes are eligible. Woodland is defined as more than 50 trees per hectare which would classify most agroforestry systems as woodland.

1.1 England

In England, the rules for the Single Farm Payment are set out in the 2010 Handbook (RPA, 2010). This states that woodland should only be included within the SPS application if it meets one or more of the following criteria (page 3; RPA, 2010):

- it is being grazed (including pannage);
- there are less than 50 trees per hectare and it can be grazed;
- it is short rotation coppice; or
- it is in a Rural Development Programme for England (RDPE) scheme (such as English Woodland Grant Scheme, Farm Woodland Premium Scheme or Entry Level Stewardship).

These are all classified as agricultural land, and although they might not be eligible for SPS payments, they must meet cross compliance rules that require farmers to comply with a set of Statutory Management Requirements and keep their land in Good Agricultural and Environmental Condition (GAEC) (RPA, 2008). Woodland in an RDPE scheme is only eligible for payment if the land was eligible for SPS in 2008 and subsequently afforested (land-use code SA2) (page 22; RPA, 2010).

Grazed Woodland (land use code PP1)

Grazed woodland with less than 50 trees per hectare is eligible for SPS payments. If there are more than 50 trees/ha, it is still possible to claim aid (page 21/22; RPA, 2010):

- if there is evidence of a history of grazing (for example, if trees have swelling at the base that shows animals have been browsing);

- if new plantings are protected from grazing.

The grazing must not damage the land ecologically, for example, it must not reduce the number of existing tree seedling and saplings or reduce plants sensitive to grazing such as bramble. To claim SPS for grazed woodland, farmers must deduct the area taken up by tree trunks and areas where trees or bushes prevent the growth of vegetation suitable for grazing.

Other woodland

Land with more than 50 trees/ha is generally ineligible for SPS payment, particularly if the trees can only be used to produce wood. However, land used for short rotation coppice is eligible (land use code PC2), and the Handbook also states that it is possible to claim for an area with trees as long as agricultural activities can be carried out in the same way as on land without trees (page 23; RPA, 2010). In this case, the area taken up by the trees must be removed from the application if this area, together with other ineligible land or features, is 0.01 ha or more.

Other woody crops

Eligible crops that may feature as the woody component in agroforestry systems include (page 17; RPA, 2010):

- since 2009, land under permanent crops including top fruit and nuts are eligible
- nursery crops (defined as areas of young woody plants grown in the open air, on soil in greenhouses or under polytunnels for later transplantation (page 117; RPA, 2010)
- vines
- multiannual crops including raspberries, blackberries, mulberries, loganberries, black, white or redcurrants, gooseberries, cranberries, bilberries, other fruit of the genus *Vaccinium*.
- short rotation coppice including: alder, birch, hazel, ash, lime, sweet chestnut, sycamore, willow and poplar. SRC is defined as "woody, perennial crops, the rootstock or stools remaining in the ground after harvesting, with new shoots emerging in the following season" (page 117; RPA, 2010). The maximum harvest cycle is set at 20 years.

Hedgerows

Hedgerows that are part of the field boundary, characteristic of the regional landscape and are managed along good agricultural cropping and utilisation practice are included as part of the eligible land area as long as the total width of the hedge is less than 6 metres (3 metres from its centre) (page 29; RPA, 2010). Where the hedge is wider than this, it is treated as a temporary ineligible feature and its area deducted from the eligible area of the field.

Area Payments for Nuts

Payments for nut orchards can be claimed separately from the SPS under the Area Payment for Nuts scheme (page 51; RPA, 2010). Eligible nuts include almonds, hazelnuts or filberts, walnuts, pistachios and locust beans. Orchards have to be a minimum of 0.1ha, with minimum tree densities/ha of 30 for locust beans, 50 for walnut, almonds and pistachios and 125 for hazelnuts. It is uncertain whether nut trees within an agroforestry alley-cropping system would be eligible though, as the

Handbook states that an orchard is defined as 'an unvarying and geographically continuous area which is not divided by other crops or plantations' (page 51; RPA, 2010). Isolated nut trees or single rows of nut trees alongside roads or other crops do not classify as an orchard. The average payment in 2010 is €120.75/ha. The Area Payment for Nuts scheme is due to end in 2012 at the latest, and the funding will transfer to SPS.

1.2 Wales, Scotland and Northern Ireland

The devolved governments of Wales, Scotland and Northern Ireland have adopted very similar rules governing the Single Payment Schemes in their areas (DARDNI, 2010; The Scottish Government, 2010; Welsh Assembly Government, 2010a). Slight differences include varying specifications for boundary hedgerows (in Scotland, hedgerow width must not exceed 2m into the field; in Northern Ireland, boundary hedgerows must be less than 4m at the base), and the Area Payments for Nuts is not available outside England.

1.3 Implications of Pillar I support for agroforestry within the UK

The eligibility of agroforestry systems for SPS within the UK depends to a great extent on the nature of the woody component in the system. If the trees are managed for timber or wood fuel and tree densities are above 50/ha, this area of land is ineligible for payments unless the area can be grazed or agricultural activities can carry on in the same way as if trees weren't present.

Agroforestry systems that include permanent crops such as top fruit, hardy perennial soft fruits such as blackberries and raspberries, nuts and vines are eligible for payments, as are short rotation coppice systems. In these cases, the field area containing the trees and crops would be split and areas allocated to each component. Nursery crops are also eligible, although there is no mention of eligibility of nurseries for seed or vegetative propagative production. However, trees and bushes for amenity plantings, and their stock and seedlings, are eligible. While nut trees in widely spaced rows of agroforestry systems can be supported under the SPS, they would not be eligible for additional funding under the Area Payments for Nuts scheme. Boundary hedges are included in the area eligible for aid, unless they exceed a certain width.

2. Pillar II: Rural Development Policy

A Rural Development Policy was introduced into the EU as part of the CAP reforms under Agenda 2000 to form Pillar II. This provides support for the delivery of public goods from agriculture and the development of rural areas. The three key themes of the European Commission's Rural Development Policy 2007-2013 are:

1. Improving the competitiveness of the agricultural and forestry sector.
2. Improving the environment and the countryside.
3. Improving the quality of life in rural areas and encouraging diversification of the rural economy.

Under the current RDP (2007-2013), support is structured along four axes (European Commission, 2010):

1. Axis 1 aims to improve the competitiveness of the agricultural and forestry sector. Measures that may be of relevance to agroforestry systems include Measure 122 'Improvement of the economic value of forests' and Measure 123 'Adding value to agricultural and forestry products'. Capital investments, grants to businesses and training are the main mechanisms of support.
2. Axis 2 aims to improve the environment by protecting and enhancing natural resources, and preserving high nature value farming and forestry systems and cultural landscapes. This axis includes agri-environment schemes as well as the only measures of direct application to agroforestry: Measure 222 supports the establishment of agroforestry systems on agricultural land. Within the UK, this has been implemented only in Northern Ireland. Other measures that may be relevant for agroforestry include Measure 221 'First afforestation of agricultural land'; and Measure 225 'Forest-environment payments'.
3. Axis 3 aims to enhance the quality of life in rural areas and diversification of the rural economy. Several of the measures may be relevant to agroforestry, especially those systems that have the potential for tourism or diversification into non-agricultural activities.
4. Axis 4 employs a bottom-up approach to rural development through the LEADER approach ('Links between the rural economy and development actions') that promotes local cooperation and networking. This Axis sits horizontally across the other three.

2.1 Article 44

Article 44 of the Rural Development Regulation (2007-2013) covers the first establishment of agroforestry systems on agricultural land (European Council, 2005). It sets out that:

'*support shall be granted to farmers to create agroforestry systems combining extensive agriculture and forestry systems. Support shall cover the establishment cost (70-85% of the establishment cost)*.'

Here agroforestry systems are defined as land use systems in which trees are grown in combination with agriculture on the same land, and Christmas trees and fast-growing species for short-term cultivation are excluded. In 2009, a review of implementation of forestry measures under the RDP by member states found that 17 Regions or States (Cyprus, Guadeloupe, Guyane, Hungary, Lazio, Lombardia, Marche, Sicilia, Umbria, Azores, Portugal (mainland), Andalucia, Aragon, Canarias,

Extramadura, Galicia, Northern Ireland) had adopted this Measure (European Commission, 2009). Since then, France has incorporated Article 44 into its new RDP 'Objectif Terres 2020'.

2.2 England

Within the UK, the main emphasis of the RDP is on Axis 2, with a focus on agri-environment schemes and measures that have environmental objectives. Within England, the schemes of relevance to agroforestry systems are the Energy Crops scheme, the Environmental Stewardship scheme, both managed by Natural England on behalf of DEFRA, and the English Woodland Grant Scheme, administered by the Forestry Commission.

2.2.1 Energy Crops Scheme (ECS)

Funding is provided through Axis 1 for the establishment of perennial energy crops with the objective of increasing the amount of energy crops to substitute fossil fuels and help meet targets for greenhouse gas emissions. This scheme contributes to the EU Biomass Action Plan and the Government's Biomass Strategy. Approved crops include the tall woody grass *Miscanthus* and short rotation coppice of willow, poplar, ash, alder, hazel, silver birch and sycamore (Natural England, 2009). Producers must demonstrate that the crop has an energy end-use; this includes own use for home or business. Payments support 50% of actual costs (suppliers/material/contractor costs) and 50% of on-farm costs (own labour/machinery). At least three hectares must be established, with a minimum block size of 0.5 hectares. Under these criteria, it would be possible to establish SRC as an agroforestry system under the Energy Crops Scheme as long as each area of woody crop was at least 0.5 hectares. However, in organic systems, there must be no overlap between Organic Farming Scheme/Organic Aid Scheme/Organic Entry Level Scheme options and ECS (Natural England, 2009).

2.2.2 Environmental Stewardship (ES)

The Environmental Stewardship scheme is a voluntary agri-environment scheme open to all farmers in England. In return for implementing a range of options designed to protect the natural and historic environment, promote public access and protect natural resources, farmers and landowners receive financial support. The ES has three elements: the Entry Level Stewardship (ELS) is the basic level of ES, open to all farmers, with standard payments of £30/ha/yr; the Organic Entry Level Stewardship (OELS) is the organic version of ELS, available on organic land, land under conversion or farms that combine conventional and organic, with standard payments of £60/ha/yr; and the Higher Level Stewardship (HLS) is a more selective and demanding scheme for farmers in high priority situations or areas, with payments dependent on management options undertaken. The ELS and OELS agreements run for 5 years, the HLS for 10 years.

Entry Level Stewardship (ELS)

To be eligible for ELS, farmers must choose from 60 options to reach a points target of 30 points per hectare (Natural England, 2010a). Options that target woody features on farmland are limited and include options for hedgerows and in-field trees.

Options for boundary features

These options recognise the value of hedgerows as landscape and historic features, wildlife habitats, for stock management and shelter, and for reducing soil erosion. Boundary lines of predominantly

native shrubs (at least 80%) that are under regular management by trimming, traditional hedge-laying or coppicing are eligible. Hedgerow management options determine minimum height of hedgerows (Options EB1 & 2 = 1.5m; EB3 = 2m) and maximum frequency of cutting (Options EB1 & 2 = every 2 years; EB3 = every 3 years).

Options for trees and woodlands

These options target the cultural and biodiversity value of farmland trees. Options for in-field trees in arable fields (Option EC1) and grassland (EC2) are available for trees with a trunk diameter of over 30cm at breast height. Trees in a group or line of more than four with overlapping canopies are not eligible, but if canopies do not overlap, each tree can earn the specified points. Cultivation, weed control, lime, fertiliser or manure applications, feeding of stock and storage of materials or machinery are prohibited beneath the tree canopy and extending 2m beyond, and fallen timber must be left *in situ* within the protected area.

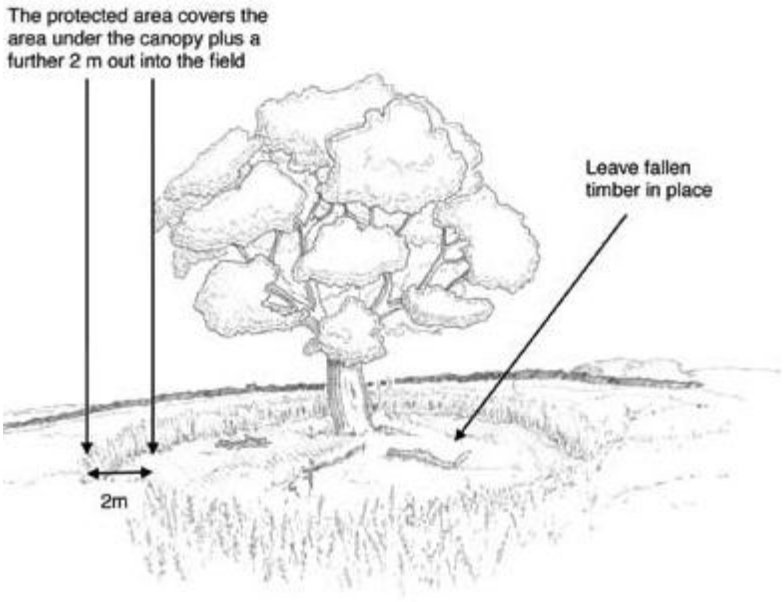

Figure 2 The protected area around in-field trees (taken from Natural England, 2010a)

In the 2010 ELS Handbook, new options have been introduced for the management of hedgerow trees, reflecting their importance for farmland biodiversity (Natural England, 2010a). Option EC23 supports the identification, tagging and protection of saplings of locally native tree species to encourage the establishment of new or young hedgerow trees and replace an ageing hedgerow tree population. A maximum of two trees per 100m of hedgerow, and at least 20m between trees, is specified to allow each tree to develop a full crown.

Uplands Entry Level Scheme (UELS)

A new strand of the ELS, the Uplands ELS replaces the former Hill Farm Allowance. In addition to the standard ELS options, a number of others are available under Uplands ELS. A compulsory requirement relevant to agroforestry systems is a restriction on supplementary feeding of livestock in native woodland (defined as a group of trees covering at least 0.1 ha, with overlapping canopies, at least half of which are native species) except during periods of extreme weather. The optional measures of relevance to agroforestry systems are:

Hedgerow restoration (UB14). This aims to support the development of tall, thick, continuous hedges to act as corridors between other habitats, through restoration by hedge-laying or hedge gapping-up.

Woodland livestock exclusion (UC22). This option aims to exclude all livestock from woodland parcels below 3 ha in size, of at least 50% native species, to allow regeneration of trees and shrubs and

woodland flowers. Farmers must agree to make the woodland boundaries stock-proof and exclude all livestock from the woodland for the agreement period.

Organic Entry Level Scheme (OELS)

Land must be managed according to organic standards and be registered with an approved Organic Inspection Body (Natural England, 2010c). The options relevant to agroforestry systems discussed above under the ELS are also available under the OELS and the only additional support is a Conversion Aid Payment for top fruit orchards. These payments support the conversion of top fruit orchards planted with pears, plums, cherries and apples at a rate of £600/ha/yr for 3 years. Orchards for alcoholic drink production are not eligible. Under the previous version of OELS, minimum densities were specified as 80 trees/ha; in the latest version, tree density is not specified and it states that orchards must be fully stocked at the appropriate spacing for the species and variety of fruit tree. This allows Natural England to assess individual applications and approve or reject agreements based on evaluation of cost effectiveness. There are no minimum or maximum sizes of blocks. An Upland OELS is also available with the same options on offer as described above in the ELS.

Higher Level Stewardship (HLS)

The HLS is a discretionary scheme in which agreements must represent good value for money and achieve maximum environmental benefits (Natural England, 2010b). Farmers choose from over 90 options; those relevant to agroforestry systems include options for boundary hedgerow features, for trees, woodland and scrub, and for orchards.

Options for boundary features

These options (HB 11 and 12) support the management of hedgerows that sustain target species of farmland birds, insects or mammals, or that make a significant contribution to the local landscape character and/or are historically important boundaries. Management includes sympathetic trimming to improve hedgerow structure, and encouraging a diversity of hedgerows across the farm. A Capital Works Plan can fund works such as laying, coppicing, planting up gaps or establishing new hedgerow trees.

Options for trees, woodland and scrub

These options recognise the historic and environmental value of traditional agroforestry systems combining livestock and woodland management. Ancient woodlands, wood pastures and parklands contain ancient trees, old coppice stools and pollards, which provide important wildlife habitats as well as being of historic interest. The environmental benefits of woodland and hedges to protect soils and watercourses are also recognised. Native species are recommended. These options are not available if the woodland is under any of the farm woodland schemes.

Options for ancient trees in arable fields (HC5) or intensively managed grass fields (HC6) aim to protect trees by establishing a 15m grass buffer around the base, minimising damage by livestock and soil compaction, and retaining all tree limbs and standing or fallen dead wood.

Options for the maintenance or restoration of wood pasture and parkland (HC12 and 13) that support a number of ancient trees or parkland features aim to protect the wildlife, historic and landscape character. These sites may be currently under arable cultivation, ungrazed or planted with conifers or other inappropriate trees. Management includes protecting trees from livestock damage, grazing, no fertiliser applications, no cultivations and no re-seeding.

Figure 3 Wood pasture in Hampshire (taken from Natural England, 2010a)

Option HC14 supports the creation of wood pasture on previous wood pasture sites or on sites next to, or linking, existing areas of wood pasture. Creation by careful and flexible grazing management to allow natural regeneration of trees and shrubs is recommended, although seeding a specific grass mixture or planting additional trees is allowed where necessary.

Where woodlands are part of the farmed landscape or part of the management of the agricultural holding (e.g. grazed), options HC7 and 8 can be used to maintain or restore these farm woodlands to enhance their wildlife and landscape value. Woodlands with silvicultural objectives should use the English Woodland Grant Scheme. Management under these options include maintaining rides and glades by grazing or cutting, high forest management and rotational coppicing. Restoration may require excluding livestock, removing inappropriate species, planting, protecting trees from grazing and re-introducing selective felling or coppicing to restructure the habitat.

Options HC9 and HC10 can be used to create small areas of new woodland (less than 1 ha) to benefit wildlife and the local landscape, and to protect soils and watercourses. Flood plain woodland can be created in riparian zones to act as buffers against diffuse pollution and mitigate flooding, in accordance with the Environment Agency's Catchment Flood Management Plans.

Options for orchards

These options provide support for traditional orchards characterised by widely spaced or half standard fruit trees of old varieties planted at low densities (less than 150 trees/ha) in permanent grassland. These orchards include apple (for fruit or cider), pear (for fruit or perry), cherry, plum, damson or cobnut plantations. Existing orchards over 30 years old are eligible for maintenance or restoration options, while remnant or recently planted orchards are supported by an orchard

Figure 4 Traditional orchard (taken from Natural England 2010c)

creation option. Those sites that can provide public amenity, particularly public access, will be given priority.

Options for the maintenance or restoration of high-value traditional orchards are aimed either at existing traditional fruit and nut orchards that are no longer managed primarily for production (HC18 and 20) or those in commercial productions that contribute to the historical landscape character of the area (HC19). Management includes maintaining characteristic tree forms, protecting trees from livestock damage, retaining and protecting all mature standing trees, retaining some standing dead trees and dead wood on living trees, and managing the sward through hay-cutting or grazing. Restoration includes restorative pruning, re-introducing annual pruning, a tree-planting programme and establishing or re-introducing management of a grass sward. For orchards in production, an agreed programme of crop protection must be followed and other management tailored to site conditions and fruit varieties.

Option HC21 supports the establishment of traditional orchards on small sites (less than 1 ha) that are known to have been orchard in the past, or are remnants, and requires the recommendation of a specialist to identify appropriate sites based on remnant trees or old map records. Recently planted traditional orchards may also be eligible and this option may also support the extension of orchard habitat next to sites supporting threatened species such as the noble chafer beetle. Traditional varieties on vigorous rootstocks must be used, and vegetation controlled with mulch or targeted herbicide within a 1m diameter of the base. Formative pruning and prevention of damage by livestock is required.

2.2.3 Farm Woodland Grants

In England, farm woodland grants are managed by the Forestry Commission. The Farm Woodland Scheme and Farm Woodland Premium Scheme are now closed to new applicants, and have been replaced by English Woodland Grant Scheme (EWGS). This has a suite of grants available for both the stewardship of existing woodlands and the creation of new woodlands. As part of the EWGS, the Woodland Creation Grant (WCG) aims to "encourage the creation of new woodlands where they deliver the greatest public benefits, including annual Farm Woodland Payments to compensate for agricultural income forgone" http://www.forestry.gov.uk/forestry/infd-6dcegu.

The Woodland Creation Grant is available only on bare land (including woodland open space) that has been under a non-woodland use or land cover for at least 10 years. There is no minimum size for the new woodland, but as the requirement is to create a new woodland rather than a group of trees, planting areas should usually be larger than 0.25ha and wider than 30m on average, with a minimum of 15m at any point (Forestry Commission England, 2009). Woodland intended primarily as a biomass fuel is not eligible. Five woodland categories prescribe the characteristics, tree densities and spacing eligible for the WCG. For four of the five categories, density requirements of above 1100/ha prevents the development of agroforestry. The fifth category, Special Broadleaved, requires a minimum of 100 stems/ha of appropriate single species broadleaved trees grown at wide spacing up to a maximum of 10m.

Farm Woodland Payments are compensation payments for the loss of agricultural income following conversion of agricultural land to forest, as well as contributions towards the costs of planting and

looking after the trees. The requirements of the WCG, set out above, must be met to be eligible for Farm Woodland Payments. Compensation rates, in addition to the rates awarded through the Woodland Creation Grant, vary from £300/ha/yr^{-1} on arable land in the lowlands, to £60/ha/yr^{-1} on unimproved land or land in the Uplands.

2.4 Wales

The Rural Development Plan for Wales 2007 to 2013 provided support for a suite of agri-environment schemes: Tir Cynnal, (entry level AES) and Tir Gofal, (higher level AES), Tir Mynydd (support for less favoured areas), the Organic Farming Scheme, and the Improved Land Premium (previously the Farm Woodland Premium Scheme). These schemes are now closed to new applicants and the schemes are being integrated into a single scheme, Glastir, a new Sustainable Land Management Scheme for Wales, managed by the Department for Rural Affairs (Welsh Assembly Government, 2010a).

Glastir has three elements – an All-Wales Element (AWE) open to all eligible farmers in Wales, a Targeted Element (TE) with a focus on environmental issues that need a co-ordinated complex or large-scale response, and a Common Land Element (CLE) that provides support for environmental improvements on common land (Welsh Assembly Government, 2010b). Additional funding is available for Organic Conversion, and there is an Agricultural Carbon Reduction and Efficiency Scheme (ACRES) that provides grants to purchase new technology and equipment to enable the efficient use of energy, water and manure or slurry. The inclusion of woodland grants, including farm woodlands, within Glastir is currently under review.

The AWE consists of two components; the Whole Farm Code (WFC) which is a set of compulsory requirements, and Management Options that farmers can select to achieve a points threshold. Organic land automatically reduces the points threshold by 50%. Farmers can choose whether to include woodland in their AWE. If they exclude the area of woodland, their points threshold is reduced as is the overall payment; if the woodland area is included in the AWE application, it is eligible for payment but they are prohibited from placing Management Options within the woodland.

As part of the compulsory Whole Farm Code, in-field and veteran trees must be retained and protected, with no cultivation below the tree canopy (Welsh Assembly Government, 2010c). Voluntary Management Options relevant to agroforestry include:

Connectivity Options.

Options for creating a wildlife corridor of trees and shrubs. Establishing a 2m-wide double staggered row of native hedging trees and shrubs on improved land aims to improve connectivity between existing hedgerows (Options 1 and 2). Option 3 supports the establishment of a wooded strip, 5 to 15m wide, comprised of at least 5 species of native trees and shrubs at a density of 1600/ha.

Options for hedgerow management to improve connectivity. Management options range from simple hedgerow management that requires hedges to be at least 1.5m wide and 1.5m high, less than 50% of the length to be cut in one year, and saplings left to grow into hedge trees (Option 4), to enhanced management that maintains hedgerows of at least 2m in height, and cuts no more than a

third of the length each year (Option 5). Option 6 restores gappy hedgerows by double fencing and replanting native shrubs.

Options for management of streamside corridors along watercourses. Option 9 supports the creation of a streamside corridor on improved land on one side (9a) or both sides (9b) with tree planting, to enhance landscape character, encourage biodiversity, remove carbon dioxide and act as a buffer to reduce diffuse pollution and agrochemical runoff. Trees must be planted at a denisity of 30 per 100 linear metres, using native species.

Options for woodland edges. Option 24 allows woodland edge to develop out into fields adjoining improved land, with the aim of increasing the size of existing woodland, enhancing landscape character and encouraging biodiversity. This involves removing the original fence and creating a new fenceline 6m out into the field.

Landscape feature options.

Option 13 supports the planting of individual native trees on improved land, to enhance landscape character, historic value and habitat. Options for orchard management include restoring a traditional orchard and creating a new orchard on improved land.

The second element of Glastir, the Targeted Element, includes a number of options relevant to agroforestry. These include the creation or restoration and maintenance of tree shelter belts to contribute to water management, support for both existing and new semi-natural broadleaved woodlands, the restoration of planted ancient woodland sites to enhance biodiversity, and management of existing improved and semi-improved wood pasture.

2.5 Northern Ireland

2.5.2 The Northern Ireland Countryside Management Scheme (NICMS)

The NICMS is the agri-environment scheme in the Northern Ireland Rural Development Programme 2007-2013 (Department of Agriculture and Rural Development, 2007). The scheme includes compulsory management requirements covering cross-compliance, field boundary management, and farm nutrient and waste management. If certain habitats such as grasslands, wetlands, woodlands and moorlands are present on the farm, they must be managed according to management prescriptions and participants must meet a minimum level of environmental benefit (Minimum Entry Environmental Benefit). In addition to these compulsory requirements, farmers can choose a range of options (Habitat Enhancement Options and Enhancement Measures) which contribute towards meeting the MEEB. Aspects of the NICMS of relevance to agroforestry include:

Compulsory management requirements for hedgerow field boundaries.

These are primarily aimed at enhancing biodiversity value and include restrictions on timing and frequency of cutting, hedge height, and trees in hedges.

Management of woodlands and parklands.

Eligible woodlands must have 50% tree canopy cover and must contain at least 50% native broadleaf tree species. With the aim of enhancing the conservation value of these woodlands, two

management options are available; no grazing or light grazing. The light grazing option allows summer grazing at a maximum density of 0.5 LU/ha. Parkland and lowland wood pasture is valued as a traditional landscape feature and planting and restoration activities can be supported to recreate the characteristic design of the original site.

Habitat Enhancement Options:

- Riparian zone management. Aiming to contribute towards improved water quality and increased biodiversity, one option available is to plant native trees along waterways. A minimum width of 2m is required and 80-100% of planted trees must be native broadleaf or conifers, from locally sourced seed where possible.
- Field boundary restoration. Hedge restoration and regeneration including laying, coppicing, replanting and planting in gaps.
- Ungrazed grass margin planted with native trees. Grass margins of at least 2m width from which livestock are excluded can also be planted with native trees, along the same guidelines as for the riparian zone management above, to provide additional habitat and resources for farmland birds and mammals.
- Traditional orchards. Planting of new orchards on improved and semi-improved grassland aims to conserve local history, ensure the survival of heritage varieties and enhance landscape characteristics. Orchards must be at least 0.01ha and include three approved varieties, and may be mown or grazed where trees are protected by guards. It is also permitted to have small areas of vegetables, fruit bushes and other crops for own use planted within the orchard.

Enhancement Measures

- Tree planting and management. Payments are available to support the planting of parkland trees, traditional fruit trees, trees and whips for screening buildings or interplanting, and tree management activities including surgery, pollarding and restorative pruning of orchards.

2.5.2 Forest Grant Schemes administered by the Forest Service

Woodland Grant Scheme

As part of the NIRDP 2007-2013, the Woodland Grant Scheme aims to support the creation and sustainable management of woodlands and forests and to improve the local economy and provide an alternative land use to agriculture. This is the only scheme within the UK that specifically addresses Article 44 of the RDR for the first establishment of agroforestry. Establishment grants are available for agroforestry systems, as long as the aims of the Woodland Grant Scheme are met. Payments are calculated *pro rata* up to 400 stems/ha (Jim Mcadam, AFBI, pers comm. 2010).

Farm Woodland Premium Scheme

This scheme supports the creation of new woodlands on farmland to improve the landscape and increase biodiversity by compensating for agricultural income foregone. Annual payments are made

for a period of 10-15 years. New woodlands must meet the criteria of the Woodland Grant Scheme, but agroforestry is not eligible in the FWPS.

Short Rotation Coppice Scheme

This scheme provides support for the establishment costs of SRC crops for renewable energy, with a minimum qualifying area of 3 ha.

2.6 Scotland

The Scottish Rural Development Programme 2007-2013 sets out a range of options for Land Managers (http://www.scotland.gov.uk/Topics/farmingrural/SRDP/RuralPriorities/Options accessed 17/08/10). From autumn 2010 the scheme is limited to Axis 2 agri-environment and forestry options only. Those relevant to agroforestry include:

Water margins and enhanced riparian buffer areas.

Management options to protect water courses from erosion and pollution and enhance biodiversity. Riparian buffers may be planted with native trees of local origin.

Hedgerow Options

Management to enhance existing, restored or new hedgerows for biodiversity by following a controlled cutting regime, filling in gaps by coppicing, laying or planting. Management of extended hedges that are wider and taller than normal with undisturbed grass margins alongside.

Wood Pasture

Management of ancient wood pasture for biodiversity by managing grazing levels, maintaining veteran trees and introducing or encouraging regeneration of appropriate trees.

Woodland Creation

This option supports the creation of new woods that meet one of six designs: productive low or high cost conifer woodland, productive broadleaved woodland, native woodland, naturally regenerated native woodland and mixed conifer/broadleaf woodland. Plantings must meet UK Forestry Standard requirements, be at least 15m in width with a minimum stocking density of 1100/ha depending on the woodland type. Woodland creation on agricultural land will be supported by annual payments per hectare for tree maintenance for 5 years after planting. An additional Farmland Premium is available to cover the loss of agricultural income for either 10 or 15 years.

Sustainable Management of Forests

Sustainable management of forests and woodlands of high environmental value, for example, areas of native woodland under active management or where domestic livestock needs to be removed to bring them to a favourable conditions; areas of native woodland where controlled livestock grazing will promote biodiversity; and areas of woodland that have a high level of recreational use.

Woodland Improvement

A Woodland Improvement Grant is also available that is aimed at improving existing woodlands for Biodiversity Action Plan species and habitats.

2.7 Implications of Pillar 2 support for agroforestry within the UK

Currently, there is no direct support available for agroforestry in the UK within the RDP, except within Northern Ireland, where Article 44 has been implemented. Two schemes that can provide support for agroforestry in England, although not implicit in their design, are the Energy Crops Scheme and Conversion Aid payments for top fruit orchards. The Energy Crops Scheme states a minimum block size of 0.5 ha, which potentially could fit within an agroforestry design, while the conversion aid payment for organic top fruit orchards has no minimum block size but requires certain planting densities.

The primary focus of agri-environment schemes within the UK is to protect the environment. Most options aim to enhance the environmental, biodiversity or cultural value of farmland through careful management of existing features such as hedgerows or the introduction of semi-natural habitats including grass buffers. As such, productivity is of secondary importance. While agroforestry systems provide a means of improving ecosystem service delivery on farmland, the management needed to maintain productivity often conflicts with management requirements specified by the schemes. The biodiversity and cultural value of permanent woody features such as hedgerows and in-field trees are targeted under all AES's, promoting the use of native species and carefully controlling the cutting regime to create a valuable habitat. Traditional agroforestry methods such as parklands, wood pastures and traditional orchards are also valued particularly for their cultural heritage, and several options support the restoration and maintenance of these systems. In both cases, management is targeted at improving the biodiversity and/or cultural value of these features, and their value as multifunctional systems that balance productivity with environmental protection is not considered.

Farm woodland schemes are available across the UK to provide compensation for the loss of agricultural income following conversion of agricultural land to forest, as well as contributions towards the costs of planting and looking after the trees. Within most of these schemes, tree densities are above those that would be found in an agroforestry system, the exception being in Northern Ireland. Here, they have adopted Article 44 which supports the first establishment of agroforestry, and payments are made on a *pro rata* basis depending on tree density.

3. Relevance of agroforestry to other policy instruments

In Europe, agroforestry has the potential to address the three key themes of the European Commission's Rural Development Policy 2007-2013:

1. *Improving the competitiveness of the agricultural and forestry sector.* A central hypothesis of agroforestry research is that complementarity of resource capture by trees and crops should lead to increased yields in agroforestry systems compared to forestry or agricultural monocultures (Cannell *et al.*, 1996). By combining crops or livestock with a tree component, it is possible to generate income in the short-term from the agricultural element, in addition to the long-term investment in the trees, which should increase competitiveness over a forestry-only enterprise. Agroforestry can also bring marginal land into production, and by reducing reliance on synthetic inputs, could potentially improve efficiency.

2. *Improving the environment and the countryside.* Integrating trees on farmland has many environmental benefits including enhancing soil fertility, reducing nutrient leaching, reducing soil and wind erosion, improving water quality and regulating hydrological cycles, enhancing biodiversity and landscape quality, increasing aesthetics, remediating polluted land, mitigating greenhouse gases and sequestering carbon (Jose, 2009). Agroforestry can also reduce resource-use pressure on native woodlands and slow rates of deforestation (Bhagwat *et al.*, 2008). As a multi-functional biodiverse system, agroforestry systems are predicted to have greater resilience to the effects of climate change (Schroeder, 1994; Montagnini and Nair, 2004; Peichl *et al.*, 2006; Schoeneberger, 2009).

3. *Improving the quality of life in rural areas and encouraging diversification of the rural economy.* There are many perceived socio-economic benefits of agroforestry, including improved rural employment opportunities, diversification of local economies and products, and non-market benefits associated with landscape, aesthetics, ecosystem services and recreation.

More specifically, the environmental benefits of integrating trees into agricultural systems can contribute to meeting the aims of a number of mandatory EU regulations in force within the UK, including the European Nitrates Directive, the Water Framework Directive, the Renewable Energy Strategy and the Soil Protection Strategy.

3.1 Nitrate Vulnerable Zones

The European Nitrates Directive calls for Nitrate Vulnerable Zones (NVZs) to be identified and for those farmers with land in NVZs to comply with rules to tackle nitrate losses from agriculture. Within England, 68% of agricultural land is designated as NVZs (DEFRA, 2009). The mandatory Action Programme of measures to reduce nitrate losses targets the application and storage of both chemical fertilizers and livestock manures. Research in the US has shown that agroforestry systems can reduce nutrient losses compared to conventional agricultural practices due to the 'safety net' ability of tree roots to take up nitrate leached below the rooting system of crops, and riparian buffers in particular are designed to target pollution run-off into waterways (Nair and Graetz, 2004; Borin *et al.*, 2009). By accessing nutrients from lower soil horizons and recycling these into the top soil via leaf fall, trees can reduce the need for fertilizer inputs. The inclusion of nitrogen-fixing tree

species such as alder can enhance nitrogen availability to the adjacent crop; studies have shown significant transfer of fixed nitrogen from alders to alley-cropped maize (Jose *et al.*, 2004).

3.2The Water Framework Directive

The EU Water Framework Directive, adopted in 2000 and as part of UK law in 2003, provides a framework for the protection and management of surface and ground waters with the aim of reaching a common standard of water quality across Europe (http://ec.europa.eu/environment/water/water-framework/index_en.html accessed 17.08.10). The Directive provides, among other things, for the identification and analysis of European waters, on the basis of individual river basin districts, and the adoption of management plans and programmes of measures appropriate for each body of water. These River Basin Management Plans have been developed in collaboration with organisations and individuals and identify the main issues relating to each river basin. Management Plans detail a wide range of measures for agriculture and the rural land management sector, targeting the control of pollutants such as nitrates, abstraction, and physical modification. Integrating trees within the agricultural landscape could help mitigate pollution from runoff and leaching, and could alter the hydromorphology of a basin.

3.3 Combating Climate Change – The Read Report

This report looks at the potential of UK forests and woodlands to mitigate and adapt to climate change (Read *et al.*, 2009). The report highlights the contribution of woodland as a carbon sink and estimates that planting new woodland on an extra 4% of land (23,200 ha) over the next 40 years would store 10% of the UK's predicted GHG emissions by the 2050s. Promoting wood fuel and wood based products as substitutions for fossil fuel based products is identified as a key action to reduce carbon emissions in the UK.

3.4 UK Biomass Strategy

The UK Biomass Strategy (DEFRA, 2007) promotes a major expansion in the supply and use of biomass fuel within the UK to meet the Governments Renewable Energy Strategy target of 15% of energy from renewable sources by 2020. The Biomass Strategy identifies the potential to use a further 350,000 ha across the UK by 2020 to bring the total land available for biofuel and energy crops to 17% of total UK arable land, thus supporting a biomass resource of approximately 96.2 TWh (8.3 Mtoe). The Strategy recognises that this will conflict with other land uses as well as having implications for biodiversity and the landscape, and so seeks a sustainable approach based on lessons learnt from more traditional forms of agriculture and an increased understanding of ecosystem functioning. This demand for a multifunctional approach to land use fits well within the agroforestry ideology where perennial woody crops can be integrated within agriculture to the benefit of both biomass and crop or livestock production while maintaining or enhancing ecosystem services.

3.5 Thematic Strategy on Soil Protection

The Soil Thematic Strategy aims to develop an adequate level of soil protection across Europe, recognising the socio-economic and environmental importance of conserving and protecting this non-renewable resource (http://ec.europa.eu/environment/soil/index_en.htm accessed 26/08/10).

As part of the Strategy, the proposed Directive has three strands – identification of problem areas at risk of erosion, decline in organic matter, compaction and landslides; preventive and mitigation measures to ensure sustainable use of the soil; and operational measures to act upon the risk areas. The Directive has not yet been adopted due to the opposition of several Member States. A major role of agroforestry is in soil management, including the control of erosion and maintenance and improvement of soil fertility (Young, 1997). This has been of particular importance in tropical systems with impoverished soils, but is now of increasing relevance in temperate systems where intensive agriculture has degraded soil resources.

4. Recommendations for policy changes necessary to support agroforestry within the EU and UK

Within the UK, where subsidies can represent a significant proportion of farm income, agroforestry has a limited future if it is ineligible for support payments. Changes to current UK and EU agricultural policies would be needed to fully support widespread uptake of agroforestry. Under Pillar I, agroforestry needs to be recognised by the EU as a valid land use to be eligible for Single Farm Payments, while under Pillar II, adoption of Article 44 across the whole of the UK would support the first establishment of agroforestry. It is less clear how agroforestry could fit within existing agri-environment schemes, although it may be possible to develop options that reflect the environmental benefits of an agroforestry approach. To promote agroforestry as a sustainable approach to production, there is a need to identify clear market and policy reasons for providing support, by collating, managing and, through research, providing evidence on the benefits of agroforestry to balance production with delivery of ecosystem services.

4.1 Short-term (2011-2013) policy actions

4.1.1 Pillar I: Single Payment Scheme

Under current policy support schemes, the main focus for increasing support for agroforestry within the UK needs to be on promoting awareness of agroforestry among policy makers and scheme administrators. Although certain agroforestry systems fit within the current Single Payment Scheme framework (e.g. top fruit and nuts, short rotation coppice), the definition of woodland as 50 stems/ha mean that most agroforestry systems are classified as woodland and therefore excluded from support. However, SPS rules state that it is possible to claim for an area with trees as long as agricultural activities can be carried out in the same way as on land without trees. This is clearly the case for well designed and managed agroforestry systems, but it is uncertain how this is assessed by Natural England. By raising awareness of what agroforestry is, and the productive and protective advantages of this approach, scheme administrators may be encouraged to take a more sympathetic and flexible attitude towards interpreting and applying this rule, thus allowing agroforestry systems with greater than 50 stems/ha to maintain eligibility for the SFP.

4.1.2 Pillar II: Rural Development Policy

Within the UK, only in Northern Ireland has Article 44 been adopted, and this has been implemented through *pro rata* payments in the Woodland Grant Scheme. It appears that this approach has not been very successful, with low take-up (Jim Mcadam, AFBI, *pers comm*. 2010). Adoption of Article 44 on a *pro rata* basis within existing Farm Woodland grant schemes in England, Scotland and Wales, combined with promotional activities to highlight to producers the availability of support for, and the benefits of, this approach, would encourage greater establishment of agroforestry across the UK.

4.2 Long-term (2014-2020) policy actions

4.2.1 Pillar I: Single Payment Scheme

For agroforestry to be accepted by the EU as a valid land use under SPS, a clear and practical definition is needed. This is difficult though, as agroforestry systems comprise a wide range of designs and types. A working party of the Silvoarable Agroforestry For Europe (SAFE) project proposed the following definition (Lawson *et al.*, 2005):

"Agroforestry systems refer to agricultural land use systems in which high-stemmed trees are grown in combination with agricultural production on the same parcel. The tree component of agroforestry can be isolated trees, tree-hedges or regularly spaced low density tree stands. An agroforestry parcel is defined by two characteristics: at least 50% of the plot is in crop or pasture production; and tree density less than 200/ha (of stems greater than 15cm diameter at 1.3m height), including boundary trees."

However, by restricting this definition to high-stemmed trees, systems that include low-branching trees (e.g. top fruit) or hedge-like structures (e.g. short rotation coppice) would be excluded. By removing the 'high-stemmed' constraint, this definition should cover the full range of systems.

4.2.2 Pillar II: Rural Development Policy

An alternative solution to incorporating Article 44 into existing Farm Woodland grant schemes within the UK would be to create a separate scheme, similar to the Energy Crops Scheme, which would provide payments for the establishment of agroforestry (70-85% of the establishment cost). Provided that the systems meet SPS rules for eligibility and therefore be able to access ongoing payments, this approach would allow farmers to meet the often considerable costs involved with establishing agroforestry.

Within the existing agri-environment schemes, traditional agroforestry systems including wood pasture, grazed orchards and parklands are supported by payments in recognition of their cultural and biodiversity values. Management options for other woody features including hedgerows, in-field trees and woodlands are based on enhancing their value for biodiversity, and therefore may not be compatible with a productive agroforestry approach. New options could be developed specifically for silvoarable and silvopastoral systems to reflect their many environmental benefits, which allows for management to maximise production. Combining these options with others such as wild bird seed or nectar flower mixtures may provide additional value for both biodiversity and ecosystem services such as pollination and pest control in both the woody and agricultural components.

5. Other options for support

5.1 Payments for public goods

Recently, there has been considerable interest in placing a monetary value on the delivery of ecosystem services or public goods, such as soil protection and carbon sequestration. Porter *et al* (2009) calculated the values of market and non-market ecosystem services of a novel combined food and energy agroforestry system in Taastrup, Denmark. Belts of fast-growing trees (hazel, willow and alder) for bioenergy production are planted at right angles to fields of cereal and pasture crops, and the system is managed organically with no inputs of pesticides or inorganic N. Field-based estimates of ecosystem services including pest control, nitrogen regulation, soil formation, food and forage production, biomass production, soil carbon accumulation, hydrological flow into ground water reserves, landscape aesthetics and pollination by wild pollinators produced a total value of US $1074 ha-1 of which 46% is from market ecosystem services (production of food, forage and biomass crops) and the rest from non-market ecosystem services. Porter *et al* (2009) then extrapolated these values to the European scale and calculated that the value of nonmarket ecosystem services from this novel system exceeds current European farm subsidy payments. Obviously there are many challenges involved with using an ecosystem services or public goods approach to developing a support scheme for sustainable agricultural practices, but there has been much progress in the field of ecological economics recently and increased awareness at policy level of the potential of this approach (Cooper *et al.*, 2009).

5.2 Carbon credits

One particular area of environmental services where there has been more progress is the potential of an agroforestry approach to conserve and sequester C while maintaining land for food production and reducing deforestation and degradation of remaining natural forests. The 1997 Kyoto Protocol calls on participating countries to reduce the rising levels of CO_2 and other greenhouse gases by decreasing fossil fuel emissions and accumulating C in soils and vegetation of terrestrial ecosystems. It provides a mechanism by which countries that emit carbon in excess of agreed limits can purchase carbon credits from countries that manage carbon sinks. Leading the way with establishing tradable securities of carbon sinks to off-set emissions, Costa Rica invested $14 million in 1997 for the Payment for Environmental Services (PES), with 80% of funding coming from a tax on fossil fuels and 20% from international of carbon from public protected areas. This scheme lead to the reforestation of 6500 ha, the sustainable management of 10,000 ha of natural forests and the preservation of 79,000 ha of private natural forests (Montagnini and Nair, 2004). In 2003 the scheme was expanded to include agroforestry systems, and the Costa Rican government budgeted $400,000 for the integration of agroforestry management into the C trading schemes with payments depending on the number of trees present on the farm (Oelbermann *et al.*, 2004). Introducing carbon payments to landowners and managers of agroforestry systems in temperate regions opens the way to obtaining additional income from these systems and may increase the attractiveness of establishing an agroforestry system, as well as adding value to established systems such as riparian buffers, shelterbelts, silvopastoral and silvoarable systems.

5.3 Community schemes

The socio-economic value of agroforestry for poor smallholders in marginal and low-input systems in the tropics is well recognised (World Agroforestry Centre, 2008). However, with a growing awareness of issues such as food miles, food safety and security, there has been increased interest in sustainable, local food production within the UK. Local food production schemes with community involvement, such as Community Supported Agriculture (CSA), may provide an approach to establishing and supporting agroforestry. CSA's usually involve a financial commitment from local consumers into a farm or growing project in return for a regular share of the produce. This provides a connection between local farmers and consumers, develops a local food supply, supports the local community spirit and helps to spread the risks and rewards of farming. As well as the financial involvement, many CSA's also have farm work days when members help out with tasks on the farm. This aspect may be particularly valuable within an agroforestry system where tasks such as tree pruning or fruit harvesting are labour-intensive and costly. In these cases, it may be possible for members to commit to a day's pruning or harvesting in return for wood fuel (thus reducing the costs and difficulties of dealing with woody waste) or fruit.

5.4 LEADER funding

The LEADER approach is a delivery mechanism for Axis 4 of the RDP funding, promoting a community-led, bottom-up approach to rural development and improving the rural economy. Regional Implementation Plans identify regional and sub-regional priorities and delivery of the RDP for England, and Local Action Groups implement Local Development Strategies setting out plans for their areas. Grants are available for farmers, foresters, small rural businesses and community groups and charities for a wide range of activities including farm diversification, adding value to timber and projects that will benefit local communities. Depending on the themes identified by the Local Action Groups, the establishment of an agroforestry enterprise, especially one that involves the local community, may be eligible for funding.

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