irish agroforestry forum

PROPOSALS FOR A
NEW AGROFORESTRY SUPPORT PROGRAMME IN IRELAND

November 2020

Contents

1.

An overarching
strategy for
Agroforestry
support in Ireland

There is a wide body of interest in agroforestry within the farming, forestry, horticultural, organic and environmental sectors on the island of Ireland. From the amount of requests received by our forum's members for information on the technical and practical aspects of agroforestry a clear need has been identified for a dissemination hub of information tailored to the growing interest in agroforestry. The National Organic Training Skillnet (NOTS), Department of Agriculture, Food and the Marine, Ireland (DAFM) Teagasc Forestry Development Department, Leitrim Organic Farmers Co-op, Trees on the Land, Organic Trust and Queen's University of Belfast have recently formed a promotion and support group: the **Irish Agroforestry Forum (IAF)**. The Forum will establish and manage a supporting website, input to policy makers and organise such meetings, conferences, training/knowledge transfer events as will further its aims. It will also represent Irish interests at the European Agroforestry Federation (EURAF) and bring the benefits from EURAF members' experiences to practitioners in Ireland.

The aims of the Forum will be (not in order of priority) to:

a. Promote the potential and benefits of agroforestry as a multifunctional land use option that integrates trees into agricultural and horticultural systems at a range of levels and spatial orientations, to sustainably produce nutritious, wholesome food and quality timber while delivering a wide range of ecosystem services.

b. b. Promote, demonstrate and encourage agroforestry best practice by coordinating and organising educational and training activity focused on advisors, consultants, officials/inspectors and farmers/landowners.

c. c. Encourage innovative on-farm trials, transfer knowledge derived from existing trials and highlight potential areas for future research.

d. d. Act as a coordinated voice for those practicing and promoting agroforestry. To collate ideas and feedback and to advise and make submissions to the appropriate policy makers on the potential issues surrounding agroforestry support and measures, so to encourage the expansion of agroforestry and enhance its delivery of services.

e. Develop proposals to introduce trees onto farms towards supporting the goal of sustainable and resilient land use, while delivering a wide range of ecosystem services and public goods on the island of Ireland.

This document has been prepared by the Irish Agroforestry Forum.

2.

Definition of Agroforestry

2.

Agroforestry is a collective name for land use practices where trees are combined with crops and/or animals on the same unit of land and where there are significant ecological or economic interactions between the tree and the agricultural components (Lundgren and Raintree 1982).

Agroforestry is an ancient practice which is widely incorporated globally into land use systems. In Ireland, as the main land use is livestock grazing or tillage, silvopasture (where trees are grown in grazed or cut pasture in a regular or varied pattern – see Figure 1) and silvoarable (where trees are grown in rows between an arable crop) systems are, respectively, the most widespread systems applicable.
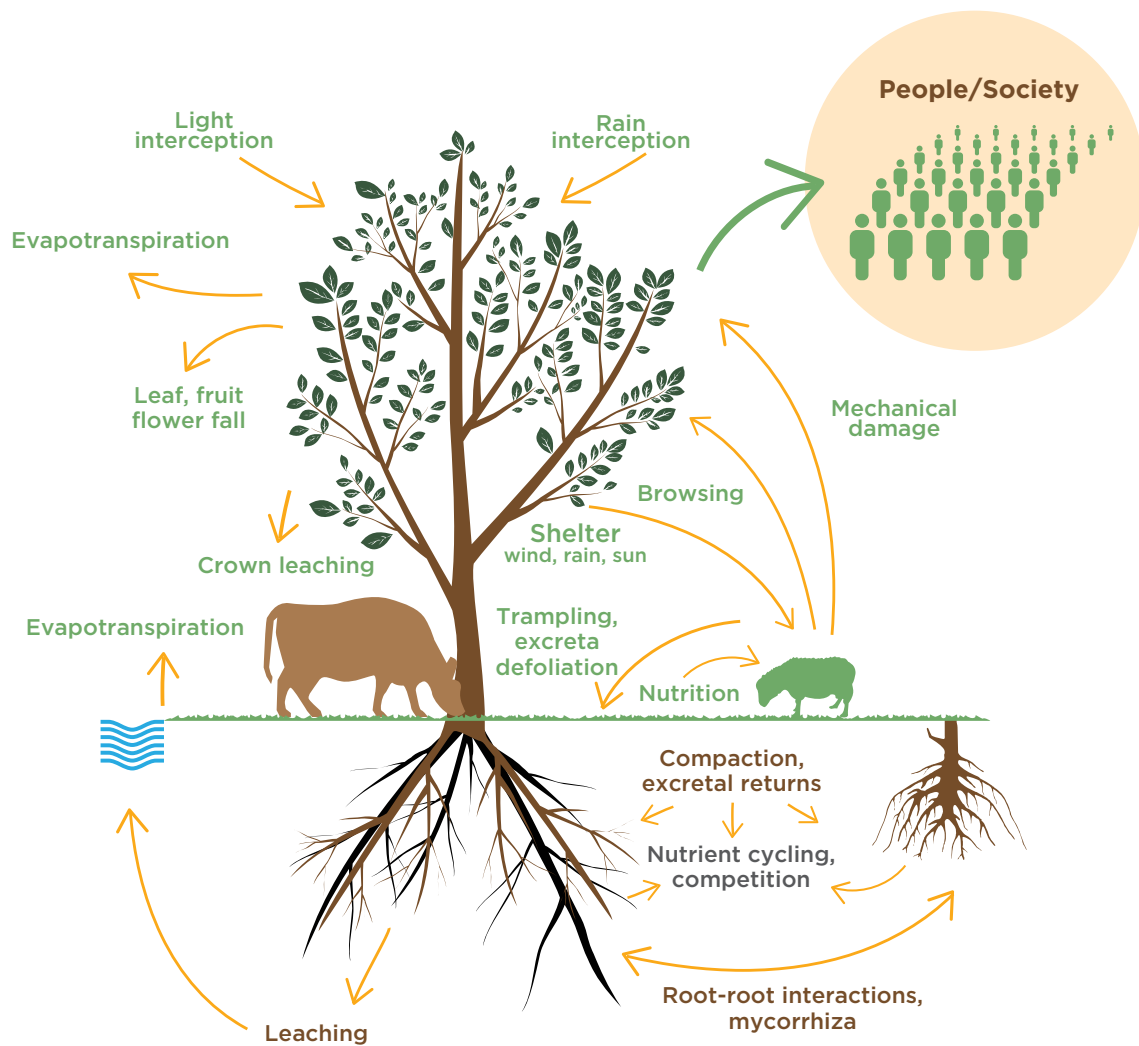
The interactions of silvopastoralism

Figure 1: Silvopastoral agroforestry, an integrated multifunctional land use option delivering a range of ecosystem services.

3.

Current issues facing farming and forestry in Ireland

3.

From a sustainability perspective, Irish agriculture faces challenges in key areas: water quality, biodiversity, greenhouse gas (GHG) emissions, tree cover, meeting climate change mitigation obligations, air quality, soil health, ensuring family farm viability and access to markets.

Any improvements and delivery of enhancement measures in these areas must be seen against a background of land use capability, financial viability, income security and rural community stability.

Water quality. Eutrophication resulting from excess nutrients (N&P) from farmland is the primary water quality challenge. Approximately 50% of lakes and rivers are in unsatisfactory quality (EPA, 2016).

Biodiversity. Historically, much of Ireland's rich biodiversity has evolved from agricultural land management. However, current agricultural practices place a series of pressures on the natural environment. These environmental pressures include changes to land use, gaseous emissions, nutrient leakage and losses of agrochemicals from soils to waters, changes to biodiversity impacting flora and fauna and their habitats, and emissions of greenhouse gases (GHGs) and air pollutants such as ammonia (EPA 2016).

Greenhouse Gas Emissions. Emissions of GHGs from agriculture in 2017 were 20.2mt CO2eq and Teagasc projections for 2030 suggest a figure of 21mt, with a range around this figure depending on how the national bovine herd changes (Teagasc, 2019). Most of these emissions are directly related to livestock farming systems. Reducing GHG emissions is one of the greatest challenges facing agriculture in Ireland.

Climate change mitigation obligations. The target for agriculture in the Climate Action Plan is to get emissions back to a range of 17.5 - 19mt by 2030, which is a cut of 10-15% on the projected levels in 2030 relative to 2017.

Tree cover and Forestry. While there is a variation in the metrics and definitions used to quantify, hedgerow and non-forest wooded cover in Ireland, overall tree cover is still well below the EU average and in recent years tree planting targets have failed to be met. Land owners cite lack of a forest/woodland culture, inflexible support systems, exclusion from other farm environmental schemes and low broadleaf planting targets.

Air quality. Ammonia is a powerful air pollutant with significant implications for biodiversity and human health. It is the most significant air pollutant in Ireland with most (c.99%) emissions coming from agriculture. As a result Ireland fails to meet it's commitments under the NEC Directive (NEC, 2018).

Soil health. Soil pH, structure and organic matter are key indicators of soil health. In fields managed for intensive grassland or tillage production, if soil pH is not within the optimum range, most productive plants will not grow to their potential, nor will they respond fully to fertility amendments. If organic matter is low or the soil structure compacted the soil's capacity to cycle water and nutrients can be greatly diminished, resulting in either excessive leaching or surface run-off respectively. In semi-natural upland and lowland pastures, soil conditions need to be maintained at a level which supports the native flora and fauna and maintains and prevents a decline in biodiversity.

Family farm viability. Relatively small, family owned and run farms are the backbone of rural life in Ireland. Many of these are on the margins of financial viability and are seeking ways in which they can conform to future climate challenges and emission control obligations while remaining viable.

Access to markets. People are increasingly concerned about the origins of their food and, in particular, the welfare of animals. Growth in the organic retail sector and the increase in vegetarians and vegans is an indicator of this.

4.

How agroforestry can address these issues

4.

It is EU policy (under for example, Green Deal objectives) to promote sustainable farming practices and policies which attempt to address some of the issues caused by (or issues arising from) previous agricultural practices. There is scientific evidence (much of it from the island of Ireland) that the introduction of wide spaced trees in agroforestry systems can make these farmed landscapes more sustainable (see below), deliver a wide range of ecosystem services and align with a sustainable agriculture and forestry land management strategy. Such policies will focus on sustainable levels of livestock output, tightened nutrient management on farms to improve water quality, healthier soil with enhanced carbon sequestration potential, increased tree cover to contribute to habitat heterogeneity, stabilisation of rural communities including the family farm structure and enhancement of biodiversity through a more complex, sustainable lower-input agriculture (see section 6).

Water quality. Trees planted in an agroforestry situation improve soil structure which allows the soil to soak and filter water at much larger volumes. They have root systems which extend well below the understorey root network and can absorb any excess nutrients which might escape into the lower soil horizons and ultimately end up in the groundwater pool. There are additional benefits from root differentiation; a reduction in leaching losses of nutrients, faster nutrient cycling in the presence of grazing animals and reduced soil erosion. It can also help Ireland meet its obligations under the Nitrates Action Strategy. Agroforestry has a well proven role in riparian buffer scenarios and gives resilience to grazing during extreme rainfall through improved soil permeability [1-3].

Biodiversity. Introducing trees into farming systems creates spatial heterogeneity and soil enrichment which greatly enhances the opportunity for a much wider range of biodiversity [4,5], including greater numbers and range of pollinators [6,7], than would be found under crop or livestock production alone.

Greenhouse gas emissions and climate change mitigation obligations. Research in Northern Ireland has shown that agroforestry systems established with wide-spaced ash in grazed pasture can sequester up to 3.2 t C/ha/yr. If the sequestration potential of hedgerows is added to this, silvopastoral systems can support carbon-neutral beef production at approximately 2 LU/ha. Hence, there is huge opportunity to offset these by increasing the carbon storage potential from farmland through soils, crops and trees[8]. This will help meet climate change directives and implement mitigation and resilience strategies.

Tree cover and Forestry. Outside the definition of commercial forestry plantations, there are existing trees, scrub and hedgerows which are an important part of the rural landscape and yet are not included in the climate credits attributable to tree cover [9]. We support projects that are underway eg - the National Hedgerow Survey and Farm Carbon Count - to quantify the distribution and extent of these other trees in the

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farmed landscape. Agroforestry will facilitate tree planting while still allowing productive farming. Planting should allow a greater diversity of species, uses of trees (eg fruit/nut), intra- plot variation, and ecosystem services delivery. There are opportunities for higher broadleaf targets to be met, and together with skilled silvicultural management, agroforestry is well placed to deliver high quality timber. In this way agroforestry can contribute to the broadleaf deficit in Ireland and create a resource supply for local sawmills. In turn this has the potential to strengthen local economies and will increase positivity towards trees and instilling a greater forest and woodland culture into communities.

Air quality. Most (92%) of ammonia emitted by livestock is released while they are housed and producing slurry. Agroforestry has been shown to extend the length of the grazing season by up to 15 weeks through improved carrying capacity of the soil and better grassland utilisation, a significant impact on ammonia emissions. Research is currently underway to quantify the amount of nitrogen trees can absorb from the atmosphere through their foliage when slurry is spread and when stock graze below them emitting methane and ammonia.

Soil health. The living roots of healthy plants are key to soil vitality and nutrient cycling. By maintaining optimum pH and increasing legumes, herbs and a diversity of grass species, this broadens the range and depth of rooting zones being utilised. Plant diversity builds soil organic matter and increases microbial diversity which sequesters and retains more carbon in the ground. Trees and woody species add another layer of complexity and root depth to the system, cycling nutrients and building fertility lower in the soil horizon. Also, many agricultural soils lack mycorrhizal and other beneficial fungi. Through symbiosis, mycorrhizal fungi can play huge role in providing plants

with nutrients which are more difficult to access. Fungal mycelia are also vital for building soil structure and increasing water infiltration. Other fungal species specialise in decomposition, having a role in recycling nutrients from leaf fall and other organic material. Trees widely integrated into the landscape will shift the soil ecology and balance the fungi to bacterial ratio, leading to significant benefits in soil health. Researchers in Ireland have shown that by incorporating agroforestry into a diverse, managed grazing platform, they could deliver a productive, carbon-neutral livestock system (see reference list).

Family farm viability. Agroforestry is a low entropy measure for restoring healthy soil function and nutrient cycling, these benefits alone will create more resilient, sustainable and profitable farms. Agroforestry systems also deliver multifunctional outputs which can create extra income on the farm through labour and direct sales. There will be opportunities for specialist tree seedling supply from local producers, and the promotion of on-farm activities such as agri-tourism and wood product processing which can help people maintain the ability to farm the land. Additionally, agroforestry can make a positive impact on sustainable landscape and rural development, because of the diversity of employment opportunities created by multi-functional systems.

Access to Markets. In silvopastoral systems, animals have access to "browse" or leaf material which broadens their range of diet. This can be tailored to address mineral deficiencies in the pasture therefore adding to the overall health of the livestock. Also, stock have been shown to spend significantly more time under trees in hot, sunny weather and when it is rainy or windy, than in the open. This will become increasingly important as extreme weather events are predicted to become more frequent as a result of climate change. The intimate spatial integration of trees and agriculture provides shelter that reduces wind and temperature stress for animals. This combined with the spatial diversity of their surroundings is evidenced as a more welfare friendly system than when no trees are present. Verifiable welfare credentials and environmental benefits of agroforestry can help meet farm sustainability criteria, enhancing future food marketing and export potential and landowners' access to markets. For example, in Northern Ireland, the RSPCA 'Freedom Food' stamp assures processors that the animals have had access to a percentage of trees.

These benefits will help address climate mitigation and adaptation challenges as well as delivering a range of other environmental services including the protection and enhancement of biodiversity and water quality.

There has been an active agroforestry research programme in Northern Ireland since 1989. This programme was largely driven by the concept of improving grassland sustainability (i.e. from an agricultural perspective) and has shown that silvopastoral systems established in permanent pasture can deliver most of the ecosystem

Figure 2. Calves grazing in Gavin Lynch's four acre silvopasture hazelnut orchard, in Wicklow. (Photo by Clive Bright)

Figure 3: 26-year-old silvopasture, AFBI Loughgall, Co Armagh (Photo by Jim McAdam)

services referred to above. This was highlighted by the strong support for agroforestry practice in the recent Sustainable Agricultural Land Management Strategy for Northern Ireland, adopted by DAERA as policy in 2017. Early examples of agroforestry planting in Ireland focused on ash as the preferred tree species. This was understandable given the site suitability, rapid growth, market value, leaf phenology and the nutritional value of the leaves in fodder. Of course, subsequent to the establishment of these plantations, ash dieback disease has precluded the planting of ash in grant-aided situations. However, future monitoring will indicate if the grazing sheep removing the leaves in the autumn will afford some protection to the plantation and slow the spread of infection as the fallen leaves are known to be a conduit for the disease.

The productivity of agroforestry systems is often greater than the sum of its individual parts grown separately. Temperate silvopasture practices improve the productivity of land typically managed separately for pasture or trees by 42–55%, depending on whether the productivity of the pastures is measured by livestock or forage output, respectively [10].

Economic predictions are also encouraging. Studies carried out by the University of Wales at Bangor on the economics of agroforestry compared to pure agriculture or pure forestry, have found that the productivity of a parcel of ground can be increased by up to 50% in some cases. Agroforestry offers farmers the opportunity to continue farming while still growing trees. The diversity of planting and integration models which agroforestry offer can change attitudes to the role of trees within the farmed landscape. There is clear evidence from examples across Europe that the attractiveness and tourism potential of even intensively farmed landscapes can be greatly enhanced by integrating trees in an agroforestry scenario.

Full supporting scientific evidence for all these benefits can be provided if required and a list of selected, relevant papers and reports is appended.

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5.

Sectoral proposals to introduce agroforestry

5.

Into farming systems

From a farming perspective, we very much welcome the expressed recognition of agroforestry as outlined in the recent Programme for Government - Our Shared Future, which acknowledges the need to reward farmers for adapting to more sustainable methods of farming through flagship environmental schemes. In the light of the urgent need and challenge to deliver on climate, water quality and biodiversity ambitions, agroforestry must be an integral part of future government programmes and be an important component within the CAP Strategic Plan (see section 6).

Agroforestry has been shown worldwide to have huge (overall) potential including mitigating emissions, enhancing biodiversity, delivering improved soil function and enhancing water cycling associated with having trees spread across (and integrated within) the landscape. Agroforestry is an ideal measure to help achieve many of the ambitions outlined in the Green Deal and Biodiversity strategies.

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The tillage sector has the potential to produce protein and cereal crops to reduce imported feeds and farm inorganic nitrogen usage, improve soil health and capture soil carbon from what is, in many cases, a very low baseline. Through strategic integration with the livestock sector it can help reduce GHG and ammonia emissions. The sector is suffering steady decline and needs government support. Tillage lends itself to an agroforestry approach - silvoarable systems have been shown to deliver the wide range of ecosystem services which can make them more sustainable and deliver strategic industry objectives. The EU specifies that the related framework definitions for 'arable land', 'permanent crops' and 'permanent grassland' should be set out in a broad way to allow Member States to further specify definitions according to their local conditions. They instruct that the framework definition

Figure 4: Belted Galloway cattle in Jane Shackleton's agroforestry-based beef system in Mullagh, Co Cavan. Note the trees selected for felling for high quality form and timber (marked in red). (Photo by Jane Shackleton)

Figure 5: agroforestry being established for rotational outdoor livestock rearing at Allshires, Roscarberry, Co Cork (Photo by Jim McAdam)

Figure 6: Agroforestry is also applicable to upland farms.(Photo by Eugene Curran)

for 'arable land' should be laid down in a way that allows Member States to cover different production forms, including systems such as agroforestry and arable areas with shrubs and trees and that requires the inclusion of fallow land areas in order to ensure the decoupled nature of the interventions.

This is a sectoral interest-based proposal as to how an agroforestry scheme (from both an agri-environment and farm forest perspective) could be accessible, flexible, and fit comfortably within any farming context, while enhancing farm resilience, without negatively affecting production. With this in mind, we propose the following recommendations:

1. Remove all conflicting penalties.

A major hindrance to the development of a biodiverse landscape that leverages the advantages of perennial woody species and trees, is the exclusion of areas of scrub and trees from productive land eligible for payments. This is not only a financial burden, but it also exacerbates the current perceptions of the presence of trees on agricultural land. Alleviating this perception is central to the broad acceptance of any scheme to get more trees on the land as such grazed scrub could be regarded as agroforestry.

2. Trees for all land types and farming (and forest systems) operations.

Worldwide, agroforestry is associated with and tailored to all types of land-based agriculture from horticulture, poultry production, arable operations to extensive and intensive livestock production. For an agroforestry program to be effective, facilitating this diversity should be core to the design of any scheme.

3. A wide, inclusive, range of tree species and forms need to be permissible in any future agroforestry programmes.

We see a dynamic role for trees on farms (which can incorporate timber production), but also biodiversity, carbon sequestration, water cycle quality and security and animal welfare. Using trees in an agroforestry context allows for increased farm incomes from fruit and nut trees

as well as speciality quality timber production options. Trees for fodder and browse, trees for coppice, trees for timber, fruit, nuts, or long-standing trees, the use of fast-growing trees like poplar and willow for water filtration, and pioneer trees for "nursing" long-standing trees, shelterbelts, short rotation coppice and pollards, trees for creating and linking habitats, riparian woodland for protection and enhancement of water quality (reference Woodland for Water Measure) etc. Native trees should be promoted but a much wider list of tree species, especially those with a supporting body of agroforestry research, should be open to consideration.

4. More options should be made available for farmers to introduce trees to their farms. We would suggest the following approach:

a. Trees planted on farmland as part of an environmental scheme or confirmed as planted not necessarily for commercial outcomes;

b. Recognition that trees can be planted for the ecosystem services they deliver;

c. Acceptance of the current status that certain soil types and land subject to statutory designation should not be considered for agroforestry planting where they are not aligned with habitat or species objectives;

d. A pro-rata approach where the percentage of land planted under the afforestation programme draws the relevant afforestation grants and premiums and is bound by its terms and conditions, while the area in between is eligible for agricultural payments. This has been successfully trialled; For areas in excess of 400 trees/ha and requiring a strong silvicultural input, farmers could plant under the Afforestation Programme. Under each approach a detailed application would be required highlighting short, medium and long term objectives;

e. Participants should have access to a suitably trained agroforestry advisor, be made aware of available research and carry out mandatory training prior to approval. Support should be given to provision of a

Figures 7 & 8: An early agroforestry pilot project site near Clonakilty (Liam Beechinor) planted in 2012 (Left photo by Eugene Curran) and in 2019 (Right photo by Jim McAdam)

suite of training and up-skilling options.

5. Results-based approach if planted under the agriculture measure.

To encourage farmer uptake and to deliver value-for-money, we see it as essential that the programme primarily focuses on a results-based approach. Agroforestry systems which deliver tangible and quantifiable objectives (e.g. in terms of numbers of trees established, simple wildlife indicators, multiple outputs etc.) ideally lend themselves to this approach. This will ensure commitment from the farmer and help break down adverse social perceptions (address reservations) around trees and agriculture.

In this proposal, "the tree" is the underlying metric. How that tree has been established would be a matter of individual choice by the landowner (recognising experience and innovation with supporting advice and training as covered above) and the primary agroforestry payment (Tier 1) should be based on this. The understorey management can be quantified and rewarded under the concept of ecosystem services delivered (qualifying for a second Tier of support). This can be based on simple assessment metrics (e.g. hedgerow length, sward species diversity, simple soil health assessments) and application of already published metrics on these criteria. For the purposes of the programme, the farmer should be recompensed as follows:

a. The initial installation payment (Tier 1) should have a set rate per tree (with a quantity ceiling per farm). This payment should cover an average cost of fencing (different costing regarding fencing as required e.g. individual tree fencing vs clusters or rows will incur varying costs). The farmer should be allowed to protect the trees as they see fit. This sum is paid upon completion of planting with a clawback clause if tree survival is below a certain percentage after 5 years, allowing replanting within this period.

b. Subsequent payments made are based on results, i.e. survival rates (and appropriate health/vigour) at annual intervals. These payments should begin low

and grow in value as the trees become established – reflecting the value of the trees in the landscape and as positive reinforcement for the farmer's commitment to the care of the trees. It is recognised that payments may not be able to be made indefinitely - particularly as there will be an income stream from the agricultural activity. However positive recognition of the range of benefits the trees are contributing could be recognised in a form of carbon credit scheme supplemented by education and encouragement to follow best-practice examples. This element is crucial on a number of levels as it helps to significantly enhance perceptions of trees on agricultural land and act as a rewarding self-policing and commitment mechanism.

6. Where does a future agroforestry programme fit into an all-embracing farm support scenario?

Throughout this process, we have consulted widely with the industry and held discussions within the Forum on where we see the potential role of agroforestry. There is a huge interest across the livestock, horticulture and tillage sector in incorporating trees into their farm business. The technology exists to identify where nutrients are concentrating on farms associated with water runoff. These areas could be targeted for planting trees under agroforestry and in locations where they can make maximum impact. While agroforestry can be designed to benefit all farming systems, it is especially in keeping with the ethos of organic farming. The National Organic Training Skillnet (NOTS) conducted a survey of some of their members and found that although many were keen to incorporate agroforestry on their farms, most have not applied for the current agroforestry scheme because, as a land-based forestry payment, it excludes them from any future schemes such as the new REPS or OFS on the same area.

Agroforestry has the potential to be an alternative, profitable and productive land use that could assist landowners and Ireland in meeting future climate change, animal welfare and environmental objectives (see Section 4).

> Agroforestry as a land use system can incorporate trees in a wide variety of spatial plantings and embrace current geospatial organisation of trees in the farmed and forested landscape – e.g. hedgerows, copses, biomass systems, where these have the agricultural component intimately interwoven through them.
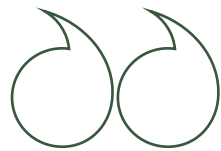
Into forestry systems

Agroforestry can be seen as a system that integrates potentially high value trees with farming or horticultural enterprises on suitable sites.

Agroforestry as a land use system can incorporate trees in a wide variety of spatial plantings and embrace current geospatial organisation of trees in the farmed and forested landscape – e.g. hedgerows, copses, biomass systems, where these have the agricultural component intimately interwoven through them. Across the world, agroforestry encompasses a wide variety of practices ranging from simple shelter-belts of trees around fields to an intimate integration of food crops and trees e.g. silvopasture, silvoarable, hedgerow, shelterbelts, riparian buffers, forest farming (cultivation within a forest).

The Department of Agriculture, Food and the Marine has a measure in its Afforestation Programme that grant aids eligible landowners to develop their land under agroforestry, while at the same time providing them with a five-year premium. The design and specifications are primarily geared towards silvopastoral systems, as these have proven successful in Northern Ireland. The grant covers the establishment and early protection of 400 (minimum amount) to 1000 trees per hectare and, while there are clear specifications as to the standard required, there is a certain amount of flexibility in design and approach. For example, in response to demand from the public, fruit and nut trees can be planted.

As there are fewer trees than in conventional forestry, greater attention can be focused on these trees. High pruning and selective thinning has the potential to produce high value veneer, quality sawlog and renewable energy through firewood. As opposed to quantity, the focus should be on quality. Planting in mixtures should be encouraged although in some scenarios, to reduce the complexity of management, there may be a place for concentration on a single species for a particular purpose. Combinations of short rotation and long rotation species could be planted, ensuring a staggered return on timber production and other objectives through thinning.

Controlled Grazing within existing forests.

It is important to recognise that many landowners want to use their existing plantations as productively as possible. Many of these plantations are quite mature and could handle structured grazing incorporating selective timing and adaptive rotational grazing to ensure that fodder resources are available at critical times in their animal's annual nutritional demand cycle. Farmers could be trained to manage and structure their plantations in such a way that grazing could be possible.

The main criticism with this scheme has been the lack of flexibility in planting and protection specifications and the reclassification of land planted in agroforestry

Figure9: Silvoarable with short rotation coppice at Wakelyns research farm in the UK. (Photo by Maja Lindstrom)

as afforested. Support including education and training, should be provided for the controlled introduction of agriculture into existing established forests to manage vegetation as a form of silvicultural tool. For example, planting trees in groups or permitting grazing in respaced or thinned forests can provide shelter for the animals while at the same time suppressing potential fuel banks for wildfires.

Part of the learning curve from applications, plantings and interactions to the scheme to date has been a recognition of different designs and layouts of agroforestry parcels depending on the objectives of the owners. For example, in some cases, poultry farmers require larger numbers of plants than others yet do not have the same specifications for protection.

Potential with forests affected by ash dieback

There is huge potential for dairy and tillage farmers using agroforestry to 'green up' their operations without a significant loss in production. The challenge is for any new measure to reflect these requirements. Exceptional measures might be to offer an 'agroforestry transition programme' to those with plantations of ash suffering from ash die-back.

There is huge potential for dairy and tillage farmers using agroforestry to 'green up' their operations without a significant loss in production.

Figure 10: Developing agroforestry within a poultry unit in McAdoo, Monaghan (Photo by Kevin O'Connell, Teagasc)

Aligning with Agri-Environment measures

Most agri-environment measures embrace the need to increase tree cover on farmland in some form or other. We urge that the introduction of trees onto farms is supported for as wide a range of spatial planting options as possible - from hedgerows to wide-spaced - trees established for timber production and other benefits. This will allow the principle of multiple outputs within goals of sustainability and carbon neutrality to be pursued in as wide a range of farming scenarios. This will also ensure that silvopasture can be used to extend the grazing season to help higher grass utilisation, reduce the period when animals must be housed and hence reduce ammonia emissions and give resilience to grazing during extreme rainfall as the improved soil percolation will minimise potential damage to tree roots or soil structure.

Silvopasture has been shown to increase biodiversity, support greater numbers and range of pollinators, improve carbon sequestration, reduce water run-off compared to pasture alone. From a welfare perspective, the intimate spatial integration of trees and agriculture reduces wind and temperature stress and provides shelter for animals. There are additional benefits from root differentiation, a reduction in leaching losses of nutrients, faster nutrient cycling in the presence of grazing animals and reduced soil erosion.

The role of hedgerows already sets a precedent for some of the benefits that perennial woody species can play in the landscape. On many farms, hedges perform a similar function as linear woodland strips - they enhance biodiversity, store carbon and afford many welfare benefits to livestock.

Measures incorporating trees on the farm and agroforestry systems have the potential to deliver significant additional ecosystem services in relation to water, carbon and
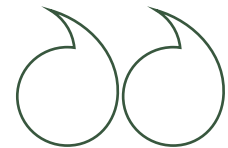
...due to the low fertilizer application, herbicide and cultivation inputs, agroforestry has great potential for planting in acid-sensitive areas or in areas where the freshwater pearl mussel is in danger.
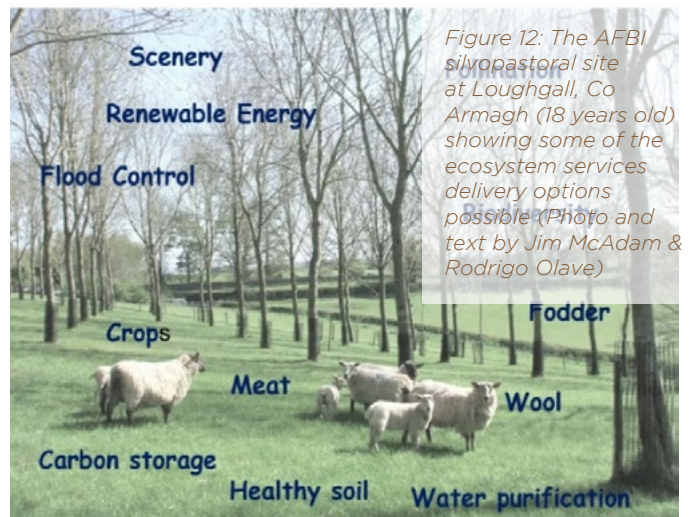
biodiversity. In this regard EU directives (Article 6) state that such measures should:

a. Be part of a flexible suite of options under voluntary eco-schemes and agri-environmental schemes and/or
b. Included in a separate eco-scheme supporting trees on the farm

There is also potential within this article for measures that integrate small areas of trees on the farm and appropriate management that can deliver a range of specific environmental- and climate-related objectives. This would help increase awareness among farmers and provide for greater uptake of measures with multiple environmental benefits. Carefully designed planting of agroforestry on hill farms can mitigate soil erosion and slow water runoff from higher slopes in water catchment areas, reducing the risk of flooding in waterways lower down.

In addition, due to the low fertilizer application, herbicide and cultivation inputs, agroforestry has great potential for planting in acid-sensitive areas or in areas where the freshwater pearl mussel is in danger. The potential of agroforestry as a protective measure has been endorsed by the EPA who allow agroforestry planting to take place in acid sensitive areas without the need for water sampling. There has been widespread support for the measure by NGOs and environmental lobbyists.

In Northern Ireland, agroforestry is supported as an agri-environment option under the Environmental Farming Scheme (Wider).

6.

An overarching strategy for Agroforestry support in Ireland

6.

Incentives for future support

A strong support programme for tree planting options on the farm and measures that include appropriate agroforestry systems will help enable delivery on many of the ambitions under the Green Deal and the Biodiversity strategies.

Such a programme can help boost the efficient use of resources by moving to a clean, circular economy, restore biodiversity and enhancing the environment. It will support key national and environmental policies including the recently outlined *Programme for Government – Our Shared Future*, FoodWise 2025 objectives, those outlined in Ireland's Climate Action Plan (2019), Project Ireland 2040 among other important national objectives.

The Programme for Government – Our Shared Future highlights priorities including 'A new strategy to expand afforestation, particularly Close to Nature Forestry and agro-forestry'. Appropriate farm forest and agroforestry systems will also facilitate the government objective to 'support farmers to embrace farming practices that are beneficial environmentally, have a lower carbon footprint and better utilise and protect natural resources.

Well planned and appropriately managed farm forests and agroforestry systems can help achieve many key CAP objectives. These objectives focus on environmental ambition, transition towards sustainable agriculture and the development of vibrant rural areas. In this regard, it is critical that the new CAP regulations deliver an appropriate framework for the inclusion of strong farm forestry elements in Ireland's National Strategic Plan and the development of agricultural schemes under the CAP that contain attractive tree planting options for farmers and landowners.

Agroforestry systems can work in tandem with a range of agricultural systems and deliver a range of benefits for landowners and communities. CAP Regulations must provide the necessary structure and flexibility to allow for the future design of national schemes that support agroforestry and trees on the farm in conjunction with the other elements of Ireland's agriculture and rural economy. They must allow for the design of agricultural schemes that offer agroforestry and tree planting as attractive options for landowners. Future agri-environmental schemes and other relevant farm schemes should acknowledge and facilitate the wide range of sustainable benefits that can be delivered by agroforestry and trees on the farm and facilitate complementary approaches.

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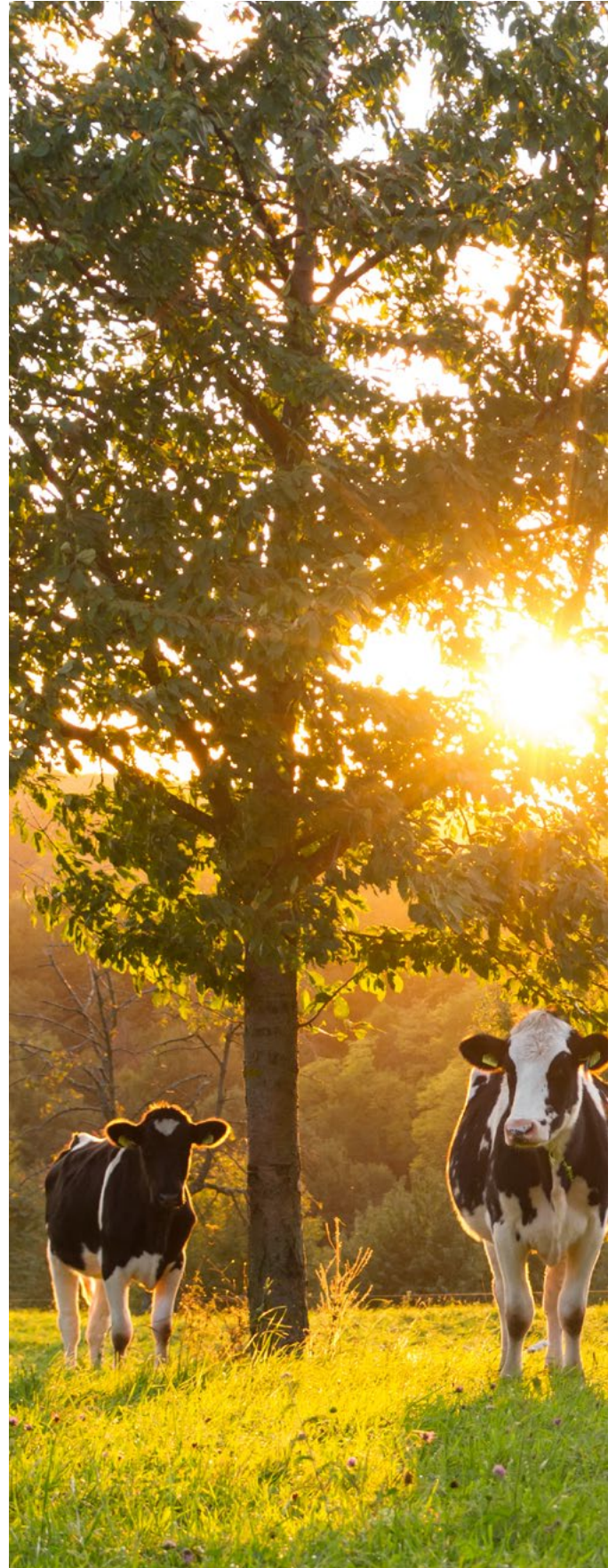
The Programme for Government – Our Shared Future highlights the objectives in relation to CAP, including its advocacy 'for a fair system of eligibility conditionality under reform of Good Agricultural and Environmental Condition rules, recognising that farmers should not be unfairly penalised for maintaining land that contributes to biodiversity principles'. In this regard, it is essential that farm forests, including agroforestry systems, must retain their eligibility as crops when determining applicant's entitlements to the newly proposed Basic Income Support for Sustainability (BISS) scheme. Existing qualifying forestry and agroforestry owners should continue to qualify for Direct Payments under the new CAP. It is also imperative that BPS/BISS eligibility for appropriate forest parcel continues beyond the term of forest premium payment. This is to ensure due recognition of the long-term commitment of both land and resources to forest owners towards the delivery of key national objectives surrounding climate change mitigation and societal benefits.

> The appropriate integration of trees on the farm can represent an excellent use of available resources from both economic and environmental perspectives. To this extent, the practice of farm forestry should be considered under 'genuine farmer' description, as it is an important on-farm carbon sink and sequestration measure. This will support a greater focus on the environmental benefits that forests and woodlands provide, including biodiversity, water quality and carbon storage and sequestration.

The Government is committed to undertaking a national Land Use Review, including farmland, forests, and peatlands, so that optimal land use options inform all relevant government decisions. The review will balance environmental, social, and economic considerations and involve a process of evaluation of the ecological characteristics of the land. It will include consideration of emissions to air and water, carbon sequestration, and climate adaptation challenges. Policy co-benefits, such as rewetting or forest regrowth to mitigate flooding risks in river catchments, will be considered. All stakeholders will be consulted. Such a review would allow knowledge transfer to policymakers, advisory services, and landowners, to assist farmers in making an informed choice as to how best to use their land, while also benefiting from available supports and incentives. Agroforestry is one option that can deliver these objectives.

Government confirms awareness of agroforestry and affirmation of support

Minister of State at the Department of Agriculture, Food and the Marine, Pippa Hackett stated in a recent interview that the "relatively new practice of agroforestry" is gaining traction in Ireland and could be helped with more supports. She stated that agroforestry could include a broad spectrum of trees - from short-rotation coppice biomass to mature commercial species because the land in between the trees can still be utilised to cut silage and graze animals. She added that if trees were planted appropriately, tillage farming could be practiced as well. She felt that agroforestry created opportunity and that there was scope with a continuous cover model as well … "it would be perceived as a long-term investment on your farm. It delivers for all those other elements of biodiversity. It's a mixed species as well, so you get a variety of plants".

Meeting EU objectives and directives

Appropriate integration of trees on the farm and agroforestry systems can offer significant support towards specific objectives outlined in Article 6. These are reflected in the narrative above and embrace activities such as maintaining farm viability through promoting competitive advantage, young farmer empowerment and job creation, food security, animal welfare, sustainable farming and forestry, climate change mitigation and adaptation, contributing to the protection of biodiversity, enhancement of ecosystem services and preservation of habitats and landscapes.

Wider considerations for agroforestry support
There is little history of planted agroforestry in Irish agriculture. Our climate, landscape and cultural history are different from other countries in Europe where agroforestry is part of the agricultural and woodland norm.

Agroforestry research in Northern Ireland and in Ireland has shown that agroforestry can work in a wide range of scenarios with exceptionally positive benefits - many highlighted above. As mentioned above, in Northern Ireland, agroforestry is supported under the RDP within an agri-environment measure - the Environmental Farming Scheme (Wider). Uptake of the scheme has been promising with most interest coming from livestock farmers, however there are drawbacks to the scheme. Although the land remains classified under agriculture, support payments are currently only guaranteed for 5 years and planting and tree protection prescriptions are seen as unduly rigid - as is the case in the South.

While it is clear from experience on the island that agroforestry as a viable, sustainable land use creates a unique set of opportunities, it does not fall directly into either the forestry or agriculture sector. This is reflected in the levels of uptake and drawbacks of the current support measures in operation. However, given the shorter rotations i.e. annual / biannual cropping time and livestock management in agriculture, we feel that agroforestry is very relevant also as a farm support measure. Although agroforestry probably lends itself better to an agricultural or environmental support

platform, there are clearly situations where it is suited to a forestry measure.

Agroforestry is a novel land use system to the island of Ireland and as such embraces both agriculture and forestry objectives and deliverables and therefore an agroforestry support programme should be offered by both sides of DAFM (Agriculture and Forestry) and tailored as such and DAERA should consider offering it as a forest option as well as its current support. This subtle change at policy level should allow the scheme to be more flexible and, as a result, significantly increase the uptake.

We would therefore propose, as the underpinning science base is clear and the level of expression of interest and potential for support within Government is high, that agroforestry be supported as both an agricultural and forestry measure with specific layers of environmental enhancement options recognised in both

Challenges

We recognise that this would require some working through with DAFM but it would be towards a whole-farm approach to farming in line with current policy thinking. We are fully aware that agroforestry is a relatively new concept for farm and forestry policy support, that there are few examples of support measures in temperate regions and that the administration of an agroforestry support measure will create significant challenge for policy and scheme administrators. For example, schemes based on carbon capture will rely on, as yet undeveloped, measurement metrics. There will also be a need for training, education and research evidence to underpin the uptake of agroforestry systems.

There is an ongoing need for knowledge transfer programmes and support for pilot/demonstration sites to raise awareness of the benefits of forestry, agroforestry and ecosystem services, including tackling the attitudinal and behavioural barriers to changing land management and use.

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In conclusion

In the narrative above we have outlined in some detail what benefits we see could accrue from, and the type of support we would like to see for the role of agroforestry in the agricultural, forestry and environmental sectors.
We propose, as a starting measure, to include agroforestry as a layered option pilot project in proposed future agri-environment schemes. programme. Because, as suggested, payment is being offered on a per-tree basis rather than land area, agroforestry could be treated as a per unit payment similar to a "linear payment" as per hedgerows.

We also fully support the aspiration indicated in the Programme for Government for the 'development of on-farm forestry initiatives through the new CAP, aligning agri-environmental schemes with climate change objectives and investing further in knowledge transfer'. In this regard, we propose a broader and flexible agroforestry scheme as an important component within the next Forestry Programme.

With this approach, we envisage that agroforestry has the potential to be a highly attractive and successful farm support measure.
Agroforestry can increase farm livelihoods and farm resilience without negatively affecting current farm production whilst delivering a valuable array of public goods. It has huge potential to be the tool of least resistance to meet government targets of 400 million trees planted by 2040 and to meet other goals around water quality, biodiversity, carbon sequestration and climate change mitigation.

Appendices

SELECTED LIST OF RELEVANT PUBLICATIONS AS SUPPORTING EVIDENCE FOR THE ABOVE CLAIMS FOR AGROFORESTRY

1. **Carroll, Z.L**., et al., Can tree shelterbelts on agricultural land reduce flood risk? Soil Use and Management, 2004. 20(3): p. 357-359.

2. **Marshall, M.R**., et al., The impact of rural land management changes on soil hydraulic properties and runoff processes: results from experimental plots in upland UK. Hydrological Processes, 2014. 28(4): p. 2617-2629.

3. **Cole, L.J., J. Stockan, and R. Helliwell**, Managing riparian buffer strips to optimise ecosystem services: A review. Agriculture, Ecosystems & Environment, 2020: p. 106891.

4. **Torralba, M.**, et al., Do European agroforestry systems enhance biodiversity and ecosystem services? A meta-analysis. Agriculture, Ecosystems & Environment, 2016. 230: p. 150-161.

5. **Valdés, A**., et al., High ecosystem service delivery potential of small woodlands in agricultural landscapes. Journal of Applied Ecology, 2020. 57: p. 4-16.

6. **Varah, A**., et al., Temperate agroforestry systems provide greater pollination service than monoculture. Agriculture, Ecosystems & Environment, 2020. 301: p. 107031.

7. **Kay, S**., et al., Agroforestry can enhance foraging and nesting resources for pollinators with focus on solitary bees at the landscape scale. Agroforestry Systems, 2020. 94(2): p. 379-387.

8. **Kay, S**., et al., Agroforestry creates carbon sinks whilst enhancing the environment in agricultural landscapes in Europe. Land Use Policy, 2019. 83: p. 581-593.

9. **Zomer, R.J.**, et al., Global Tree Cover and Biomass Carbon on Agricultural Land: The contribution of agroforestry to global and national carbon budgets. Scientific Reports, 2016. 6: p. 29987.

10. **Pent, G.J**., Over-yielding in temperate silvopastures: a meta-analysis. Agroforestry Systems, 2020. 94(5): p. 1741-1758.

11. **Raskin, B. and S. Osborn**, The Agroforestry Handbook - Agroforestry for the UK. 1 ed. 2019, Bristol: Soil Association. 150.

ADDITIONAL PUBLICATIONS / INFORMATION

National Emissions Reduction Directive Commitments https://www.eea.europa.eu/themes/air/air-pollution-sources-1/national-emission-ceilings/national-emission-reduction-commitments-directive

Marie-Laure Augère-Granier 2020. Agroforestry in the European Union: European Parliament Briefing document. Members' Research Service. June 2020. Agroforestry in the European Union

Lundgren B.O. and Raintree J. B. (1982) Sustained agroforestry. In: Agricultural research for development: potentials and challenges in Asia. Ed. B. Nestel. INSAR, The Hague, 37-49.

European Agroforestry Federation (EURAF) policy briefings 2020. CHECK THE EURAF WEBSITE TO INCLUDE LINKS WHEN AVAILABLE. https://euraf.isa.utl.pt/node/1619
EURAF Policy Briefing documents [ADD LINKS AS THEY BECOME AVAILABLE]

1. Agroforestry and the Green Deal tiny.cc/f8posz

2. Agroforestry in the EU Forest Strategy https://docs.google.com/document/d/1dd0-pugx92iEzlsa3CwtmqN57NIEu-5Sr_reaoFXtJg/edit#

3. Agroforestry and CAP Direct Payments tinyurl.com/y3goubg4

4. Agroforestry and Enhanced Conditionality tinyurl.com/yyx9k7fk

5. Agroforestry and Ecoschemes tinyurl.com/y327ffvv

6. 6. Agroforestry and Pillar II

There is a large body of documented research from the agroforestry programme in Northern Ireland. This mainly surrounds the establishment and early development of silvopastoral systems and much of it is in unpublished theses and reports which are not easily accessible. These have been listed and can be made available if required.