

Table S1. Summary of the elements compared (France–Québec) according to 5 issues.

	France	Québec
1—Political Status and Recognition		
Definition and recognition by the agricultural sector	<ul style="list-style-type: none"> At the European level, agroforestry is recognized in the Common Agricultural Policy (CAP) as “land-use systems and practices where woody perennials are deliberately integrated with crops and/or animals on the same parcel or land management unit without the intention to establish a remaining forest stand. Lack of recognition of agroforestry practices in different sections of the CAP significantly reduces its impact. Agroforestry is recognized by the French Ministry of Agriculture and Food (MAA) as an agroecological practice and as a profitable pathway to diversification for farmers. 	<ul style="list-style-type: none"> Diverse agri-environmental practices are recognized by the Québec Ministry of Agriculture, Fisheries and Food (MAPAQ), including agroforestry. Terms associated to a function of specific agroforestry systems are preferred: windbreak, riparian buffer, plantation for promoting biodiversity. Intraplot agroforestry, such as silvoarable, tree-based intercropping (TBI), or silvopastoral systems are not strictly considered as agri-environmental practices by the Ministry.
Definition and recognition by other sectors	<ul style="list-style-type: none"> The French Ministry of the Ecological and United Transition recognizes the role of agroforestry systems for water quality by financing, through the Regional Water Agencies finances, the implementation of agroforestry systems. 	<ul style="list-style-type: none"> The Forestry sector supervises the role of forest engineers in the management of agroforestry systems.
Leadership exerted by political authorities	<ul style="list-style-type: none"> Agroforestry Development Plan is overseen by a steering committee coordinated by the MAA. Production of a five-year action plan to promote agroforestry systems. Organizations (RMT, REUNIR-AF, ATT) are supported to lead development plan. 	<ul style="list-style-type: none"> No official development plan. The development, reflections, and vision of agroforestry are mainly developed by the “agroforestry committee” within the Quebec Agriculture and Agri-Food Reference Centre (CRAAQ). The committee published a reflection and orientation document entitled Agroforestry for Quebec (2017), but it didn’t lead to an increased recognition of agroforestry yet.
Recognition at the regional level	<ul style="list-style-type: none"> The next Agroforestry development plan should include regional particularities. Existing measures financed through the 2nd pillar of the CAP (Measure 8.2.) take into account regional priorities. Twelve regions out of 22 have invoked this measure. 	<ul style="list-style-type: none"> Fifteen of the 34 Regional County Municipalities of Quebec mention agroforestry in their Agricultural Zone Development Plan.
2—Regulation and financing		
General requirements of public programs	<ul style="list-style-type: none"> Access to public support is conditional to environmental regulations. Maintenance of agroforestry systems is compulsory to be eligible for some public programs. Funding is granted upon compliance with strict implementation and maintenance norms (tree cover density, pruning and cutting periods, choice of species, etc.) 	<ul style="list-style-type: none"> Access to public support is conditional to environmental regulations. Maintenance of agroforestry systems is required for a minimal period of 5 years. Funding is granted upon compliance with strict implementation and maintenance norms. For all systems covered by the Prime-Vert Program, application of mulch is mandatory. Species composition of at least three different genera, with no one genus exceeding 50% of the total. Invasive alien species are prohibited.

Eligible agroforestry systems to public funding	<ul style="list-style-type: none"> • Windbreaks less than 10 m wide, with no discontinuities greater than 5 m; • Groves with a surface area between 0.1 and 0.5 ha; <ul style="list-style-type: none"> • Plots on arable land or under permanent cultivation that integrate trees of forest species at densities less than 100 trees/ha (isolated or trees aligned in rows). • Scattered trees in meadows or permanent pastures. 	<ul style="list-style-type: none"> • Windbreak widths are limited to a maximum three rows of trees, 2 to 4 m between rows. • Intraparcellar systems (other than tree patches) are not recognized. • Riparian strip must be at least 5 m wide, but no funding is granted for the first two metres from the high-water mark.
Elements supported by public programs	<ul style="list-style-type: none"> • Establishment of supported agroforestry systems. • Conservation of existing agroforestry systems. 	<ul style="list-style-type: none"> • Establishment of supported agroforestry systems. • Replacement of dead trees and pruning of woody plants in windbreaks and enlarged treed riparian buffer strips.
Status of trees within agroforestry systems	<ul style="list-style-type: none"> • Trees form part of the eligible cultivated area for grants, but only under certain conditions. In alley cropping, only the surface of the cultivated area is eligible for grant. Hedges or shelterbelts bordering fields are recognized as part of the land parcel and, as such, may be eligible for the payment. • Trees in agroforestry are linked to the agricultural environment. Ministerial circular specifies the agricultural status of this practice 	<ul style="list-style-type: none"> • The establishment of trees becomes a risky investment, given that agricultural policies only protect crops and livestock from climatic and economic hazards. The economic role of agroforestry trees is not considered: felling agroforestry trees for their timber or biomass is prohibited and planting more than 50% of species producing marketable fruit or nuts is not allowed. Only the surface of the cultivated area is eligible for grant, but verification remain weak.
Level and scope of financial assistance offered by public programs	<ul style="list-style-type: none"> • Calculations are complex and even inconsistent. <ul style="list-style-type: none"> • European Agricultural Fund for Rural Development distributes subsidies to the regions. Measure 8.2 supports implementation of alley cropping. The average aid rate varies between 30% and 80% of the installation and maintenance costs. Payments are made in the form of an annual premium per hectare for a maximum of five years. • Measure 4.4, which relates to “aid for investments linked to the achievement of agri-environmental and climate objectives,” makes it possible to finance establishment of windbreaks and the preservation of heritage regional landscapes. <ul style="list-style-type: none"> • Agri-environmental and climate measures (AECM) are measures for maintaining traditional practices that are at risk of disappearing (mainly the conservation of hedges). Remuneration is based upon the incremental costs and lost revenues that are associated with maintaining or changing practices. • “Green Payment” requires, among other things, that 5% of the farm surface area be occupied by areas of ecological interest (AEIs). Agroforestry systems, isolated trees, and copses are considered AEIs. • Allocations are subject to compliance with “Good Agricultural and Environmental Conditions” (GAEC). Among these conditions, GAEC7 (maintenance of specific topographical features) requires conservation of windbreaks < 10 m wide and retention of all tree stands between 0.1 and 0.5 ha in area. 	<ul style="list-style-type: none"> • “Prime Vert program” covers 70% of eligible expenditures per project. The level of aid can reach 90% if the business is certified for organic farming, if the project results from a collective approach (group of producers), or if it is being conducted by next generation farmers (viz., entrepreneurs under 40 years of age). <ul style="list-style-type: none"> • The maximum financial assistance per business for the duration of the 5-year program is \$40,000. One project cannot exceed \$20,000 and \$6.45 per linear metre. Soil preparation, mulching, rodent protection, planting, and planning are eligible with maximum rates associated with each.
Other funding sources	<ul style="list-style-type: none"> • Some French water agencies fund the installation of agroforestry systems that reduce nonpoint pollution that originates from agriculture. 	<ul style="list-style-type: none"> • The Quebec Wildlife Foundation offers a program for public or private organizations to enhance biodiversity in agricultural areas at the scale of

- It is argued that that lack of recognition of agroforestry practices in different sections of the Common Agricultural Policy significantly reduces its impact.
- The recognition of the importance of hedges has been supported by creation of the “Haie Label” launched in 2019 with the financial support of €195,000 in public subsidies. It aims to preserve hedges, while supporting the development of sustainable wooded hedge–wood sector.
- Private investors are financing agroforestry trees. Note the program led by the Yves Rocher Foundation in partnership with AFAC—Agroforestry and numerous local agencies. The funding varies from 0,85 to 1,02€ per tree.

small- and medium-sized watersheds. Financial assistance may cover 70% of eligible expenditures per project.

- The “ALUS Montérégie Program” has been funding agroforestry projects. It is the result of a partnership between the Quebec Union of Agricultural Producers from Montérégie region and the program of ALUS Canada (Canada-wide, nonprofit initiative of the W.G. Weston Foundation). Annual premium per hectare for a maximum of five years is based upon the lost revenues that are associated with the space occupied by trees.
- Some agroforestry development projects are associated with private funding that has been obtained as carbon offset measures (Arbre-Évolution 2020; Carbone boréal 2020).
- To bring an agroforestry project to fruition, the agronomist is solely responsible for everything that is related to crops or livestock, while responsibility is shared with the forester for trees.

3—Knowledge acquisition

- Main research projects and institutions involved

- The overall network of sites makes France a pioneering nation in Europe for the development of alley cropping agroforestry.
- Historical Restinclières Agroforestry Platform (50 ha of plots) still in place. New better-adapted experimental plots co-financed by the “Agricultural and Rural Development Special Allocation Account” (CASDAR) in collaboration with farmers and Agroof. Research projects focus on different subjects: market gardening (SMART, 2014–2017), viticulture (Vitiforest, 2014–2018), poultry breeding (BOUQUET Project, 2017–2020), ruminant breeding (ARBELE, 2015–2018), mycorrhization (MYCOAGRA, 2016–2020), and hedgerows (Res’haie, 2019–2020).
- The Pan-European AGFORWARD research project (2014–2018), funded by the European Union in partnership with European Agroforestry Federation (EURAF), based upon existing agroforestry experiments, ongoing monitoring trials on pilot farms, and on previous research projects, such as “Silvoarable Agroforestry For Europe (SAFE).”
- The National Institute of Geographic and Forest Information (IGN) and RMT—Agroforesteries makes census efforts for a comprehensive understanding of the diversity and dynamics of French agroforestry.

- Main funding research and development in agroforestry is offered by MAPAQ. Prime-Vert program (2013–2018) included “agroforestry and adaptation to climate change”. For the period 2019–2020, the program for the “Fight Against Climate Change in Agriculture” was proposed, with the inclusion of agroforestry domain. Innov’action program is available from Agriculture and Agri-Food Canada (AAFC), in partnership with MAPAQ. These programs have made it possible to analyze agricultural yields in intraparcellar agroforestry systems.
 - Canadian Agricultural Greenhouse Gas Program (AGGP) supports projects to mitigate greenhouse gas emissions. Since 2010, nine agroforestry research projects have been funded.
 - The Ouranos consortium on regional climatology and adaptation to climate change has co-financed research projects on the value of riparian strips, the value of ecosystem services from agroforestry, and the potential connectivity networks in agricultural areas.
 - The Ministry of Municipal Affairs and Land Occupancy set in place the “Rural Measurement Laboratory” (2007–2014). This funded the “Rural Agroforestry and Landscape Laboratory” to set and monitor 30 agroforestry plots.
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4— Knowledge transfer and training

<ul style="list-style-type: none"> • Information tools and strategies 	<ul style="list-style-type: none"> • AGFORWARD program produced practical specific sheets, (e.g., selection of species, soil preparation, tree planting, pruning). • EURAF has set up the AFINET project, which is a thematic network promoting the exchange and transfer of agroforestry knowledge at the European level. <ul style="list-style-type: none"> • France CASDAR act in knowledge transfer through calls for projects addressing “agricultural education for agro-ecological transition”. Creation of experimental agroforestry plots in agricultural schools (high schools and centres for professional training and agricultural promotion). • Books have been published, including a 2nd re-issue of “Agroforesterie: des arbres et des cultures” (Agroforestry: trees and crops) in 2018 and a 2nd edition of “Les Haies Rurales” (Rural Hedgerows) in 2019. <ul style="list-style-type: none"> • In 2019, AFAF and the Institute for Forest Development (IDF) published a technical guide on poplars sylviculture in agroforestry. • APCA (2020) has placed a document online for guiding agricultural advisers for agroforestry projects. • Mixed Agroforestry Systems’ creation of Technical and Economic References (SMART) project, has enabled the creation of an agroforestry orchard guide. <ul style="list-style-type: none"> • Collaborative website Agri-Réseau (2020) makes various documentary resources including guide to the development of agroforestry management plans, technical specific sheets on implementing windbreaks, treed riparian strips, wooded islands, and alley cropping systems. • The CRAAQ Agroforestry Committee has developed several knowledge transfers tools: network of agroforestry demonstration sites, accessible online; a video on agroforestry and an interactive fact sheet documenting the effect of trees on the microclimate in the context of climate change; visits to agroforestry plots, workshops, and their proceedings; and a compilation of a variety of documents that are accessible on the Agri-réseau website. • The website of the Laboratoire rural Agroforesterie et Paysage also provides detailed information on agroforestry. • In 2014, the Gestrie-Sol agri-environmental advisory club published a guide that synthesizes information on seven types of riparian strips, titled “To everyone their own hedgerow”. <ul style="list-style-type: none"> • An annual agroforestry conference has been held at Laval University since 2013.
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<p>Training and educational programs</p>	<ul style="list-style-type: none"> • Technical schools in Paris (AgroParis Tech) and Bordeaux (Bordeaux Science Agro.), and private engineering school UniLaSalle offer advanced courses. But no diploma program in agroforestry exists. • The forestry high school in Croigny, Aube region, offers long-duration training (32 weeks), specifically on agroforestry consultancy. Its focus is on those seeking employment, employees wishing to upgrade their skills, or adults undergoing professional retraining. • Laval University, Université du Québec en Outaouais (UQO), and TELUQ (Quebec’s online university), offer agroforestry courses in undergraduate agronomy, forestry and environmental science programs. <ul style="list-style-type: none"> • Laval University offers a Master’s program in agroforestry. • The Institute of Agri-Food Technology and Victoriaville college offer various technical courses. The availability of one-time or ongoing training for professionals is severely limited.
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5— Development actors and implementation in the field

<ul style="list-style-type: none"> • French Association of Country Trees— Agroforestry (AFAC— Agroforesteries), Permanent Assembly of Chambers of Agriculture (APCA), French Agroforestry Association (AFAF), and Trees and Landscape32 are the principal French organizations that are involved in the development of agroforestry. <ul style="list-style-type: none"> • Agroof-SCOP plays an important role in the development of the practice and concentrates its work upon research and development, and training issues. 	<ul style="list-style-type: none"> • CRAAQ agroforestry committee is the main body for knowledge transfer work in agroforestry. Some agri-environmental clubs, MAPAQ’s regional offices, the Quebec’s Union of agricultural producers (UPA), watershed organizations (OBV) have varying skill levels. <ul style="list-style-type: none"> • Absence of regional organizations and working groups, including producers
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- AFAF, APCA, & RMT — Agroforestry websites, each offer a directory of agroforestry advisors in the country.
 - The “Végétal Local” brand meets the demand for regarding the choice of tree species, wild plants of local origin are being recommended more and more.
 - Some intensive agricultural regions lack agricultural advisors, which slows down the agroforestry projects and may discourage farmers. Few organizations that offer tree-planting services.
 - Private nurseries provide the trees and shrubs and do not exercise control over the geographical origin of seed sources.
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