

COMMODITY

AGROFORESTRY AND SPECIALTY WOOD CROPS

Description

Agroforestry

Agroforestry is a land management or systems enterprise that purposefully integrates the growing of trees with crops or livestock. Agroforestry is not defined by a single commodity but focuses on land use practices that can involve multiple agricultural commodities. It involves the mixing of trees and or shrubs with non-woody crops – and sometimes livestock – for the purpose of crop diversification, improved profitability and improved environmental stewardship. Agroforestry may involve the introduction of long-term crops (trees and shrubs) into open agricultural landscapes or the introduction of agricultural husbandry of a wide range of crops and livestock into existing woodlands.

Agroforestry crops include wood fibre crops, both native and exotic tree species; non-wood crops from trees; traditional agricultural crops such as horticultural crops, field crops, forages, special crops, and livestock; and non-timber forest resources. Agroforestry practices involve more than one crop growing on the same land area at the same time. Positive and negative competition can occur between crops for light, water and nutrients. Successful implementation of agroforestry practices requires good planning and management. Examples of positive competitive effects are those caused by plants that fix atmospheric nitrogen and trees that favourably modify the microclimate of another plant. Examples of negative competitive effects include the creation of excessive shade from large trees and competition for limited water resources.

There are five recognized agroforestry systems: silvopasture, alley cropping, forest farming, windbreaks/shelterbelts, and integrated riparian management.

Specialty Wood Crops

The cultivation of specialty wood crops in plantations can be considered part of a farm operation as defined under the *Farm Practices Protection (Right to Farm) Act* (FPPA) and the *Local Government Act*, provided that the crops are prescribed by the Minister of Agriculture. Currently, the specialty wood crops that are officially prescribed by the Minister are populus and salix species.

In general, specialty wood crops can be grown in all areas of BC and are managed in a manner similar to nursery crops. They can include hybrid poplar and non-hybrid plantings of cottonwoods, willows, black walnut, aspen, some conifers, and other trees from BC and around the world. In most cases, these trees are grown in plantations or in timberbelts for the production of pulp and paper, firewood or solid wood products. In some cases, native stands of trees are being intensively farmed for the same products.

Several of these trees are also being planted as fast growing ornamentals and for windbreaks, as well as in alley cropping and other agroforestry systems. Most plantings are established using unrooted cuttings. The industry comprises small independent producers, independent landowners under contract to forest companies, and forest companies that own the land outright.

In areas of the province with more than 150 frost-free days, some selections of hybrid poplar are capable of growing 15 feet in height per year. Plantings are usually laid out in grids of 10 feet by 10 feet or larger for solid wood products with rotations lasting 10–12 years or more. Plantings grown strictly for pulp production can be placed at closer spacings and on shorter rotation schedules.

Hybrid poplar clones are either male or female. Cotton from female trees and pollen from male trees have both caused nuisance problems for neighbouring residential areas. One of the clones being planted in southern BC reaches sexual maturity at five or six years of age; most others are mature after nine or ten years.

Areas of good agricultural soils that are classified to be of low capability due to periodic water inundation can be planted with poplar and other species. Most poplar and salix species are tolerant of high water tables and flooding. Some hybrid poplar plantations have done well after being subjected to flood conditions for as long as several months. Beavers can present particularly challenging conditions in planted areas that are prone to flooding.

Alternative uses of these species, if not used for the production of a crop, are as follows.

- Bioengineering in riparian areas. A wide variety of techniques incorporating several species are used for stream or still water bank stabilization.
- Reclaimed water use. Plantings of hybrid poplar can be used to expand the use of reclaimed water.
- Riparian buffers. Fish and fish habitat are protected by providing a buffer to reduce non-point source pollution, and to shade watercourses to moderate water temperatures and provide food, nutrients and cover for fish.

Christmas Trees

Practices for the production of Christmas trees are similar to those for field-grown nursery stock as outlined in the Nursery and Turf section of the Farm Practices Reference Guide. Christmas tree plantations can be located on both private and crown land. Crown land production is administered by permits granted through the Ministry of Forests, Lands and Natural Resource Operations (FLNRO). To support crown land production, dedicated farm buildings, storage areas, shipping facilities, machinery, processing equipment and related operations may be located or carried out on a producer's private holdings. Information on applying for Christmas tree production on Crown Land is available from FLNRO.

Farm Practices of Particular Interest

Practices for specific farm activities can be found in the Farm Practice section of this reference guide. Farm practices that are of particular interest to agroforestry and specialty wood crop production include the following.

Weed Control

Weed control in agroforestry environments is complicated by the fact that more than one crop is grown at the same time. Weed control measures must recognize the needs of each crop (e.g., whether they are trees, shrubs or herbaceous plants), the interactions between the crops, and the effects each control method will have on the other crops. Hybrid poplar weeds need to be controlled for the first two to

three years of a new planting. Weeds may be controlled with registered chemicals, cultivation or some form of mulch utilizing plastic or organic materials.

See also Farm Practice: [Weed Control](#)

Above–Ground Pruning

Trees may be pruned to reduce competition for light and to improve the quality of the wood for solid wood products. Plantings for production of pulp are usually spaced closely together to allow self-pruning to occur. Multiple leaders should be eliminated in the first two or three years after planting.

See also Farm Practice: [Burning](#)
[Crop Residue Management](#)

Root Pruning

Tree roots must often be pruned to reduce competition for water and nutrients. Root pruning can be done with a shovel for small plantings or with a coulter or chisel plow for larger plantings. Care must be taken to prevent erosion and excessive damage to crops.

Harvest

Trees may be harvested at maturity if the intended crop is wood fibre. Harvest is carried out using traditional log harvesting equipment, including chain saws, small skidders and feller-bunchers. The harvesting of other crops is done using methods more appropriate to individual crops.

See also Farm Practice: [Mobile Equipment](#)
[Stationary Equipment](#)

Transportation

Harvested logs are loaded using traditional log handling equipment such as front-end loaders or self-loading trucks. Logging trucks are used to transport logs from the farm.

See also Farm Practice: [Transportation](#)

Roots, Branches and Stump Removal

Tree roots may inundate field drains and septic systems, causing damage and obstruction challenges. In addition, roots may produce suckers (shoots) after trees have been harvested, resulting in problems for subsequent crops. Branches and tree tops too small to be chipped or transported to a chipper may be left in the field requiring disposal as woody waste. Stumps are normally removed after harvest. Allowing coppice production of large trees to occur is not recommended because such trees exhibit a tendency to break off the side of the old stump as it matures.

See also Farm Practice: [Land Clearing](#)

Other farm practices and commodity-related operations may occasionally be applicable to agroforestry and specialty wood crop management activities and can be found in other sections of this guide under the following headings.

See also Farm Practice: [Irrigation](#)
[Pesticides](#)
[Product Processing](#)
[Storage of Farm Supplies and Products](#)
[Storage of Hazardous Material](#)

See also Commodity: [Nursery and Turf](#)

Principal and Accessory Buildings

From an operational perspective, the principal farm buildings or structures used in agroforestry and specialty wood crop settings are typically chemical storages and machine storage buildings. Accessory farm buildings may include a variation of chemical and machine storages or other types of facilities. From a watercourse protection perspective, however, the definition of principal and accessory buildings may differ. For the purposes of determining applicable setbacks from watercourses and property lines, therefore, local government bylaws or the *Guide for Bylaw Development in Farming Areas* should be consulted. Building assessments may need to be conducted on a case-by-case basis if the designation of a building as principal or accessory is unclear.

Legislation

Agricultural producers are expected to follow all legislation that pertains to their farming operation. The *Farm Practices Protection (Right to Farm) Act* stipulates that the farm operation must meet the *Public Health Act*, *Integrated Pest Management Act*, *Environmental Management Act* and the regulations under those Acts. Information on federal and provincial legislation can be found in Appendices B and C.

Acts that pertain to specific farm activities are listed in the farm practices section of this reference guide. Local government bylaws may also apply to some farm practices. Acts that are not referenced elsewhere and which are of special interest to agroforestry and specialty wood crop producers include the following.

Provincial Legislation

The *Forest Act* stipulates that whole logs must show a timber mark to be transported on public roads. Local BC Ministry of Forests, Lands and Natural Resources Operations (FLNRO) offices should be consulted on details associated with the moving of log products.

Publications

Publications that provide information on agroforestry and specialty wood crop production include, but are not limited to the following. Refer to Appendix D for details.

A Guide to Agroforestry in BC
Establishment & Cultural Guidelines for Using Hybrid Tree Species in Agroforestry Plantings
Growing Poplar and Willow from Hardwood Cuttings
Guide for Bylaw Development in Farming Areas
Opportunities for Growing Short-Rotation Woody Crops in Agroforestry Practices
Solid Wood Product Opportunities from Short Rotation Hybrid Poplar Trees
The Silviculture of Hybrid Poplar Plantations
Training Manual for Applied Agroforestry Practices - 2006 Edition, University of Missouri