Best Management Practices

CROPLAND RETIREMENT

Best management practices (BMPs) for soil health will help most cropland soils remain productive. But some soils are simply not suitable for intensive cropping, and the most appropriate BMP is to retire then.

This factsheet looks at the problems with cropping marginal or fragile lands, benefits of and options for cropland retirement, suitable planting types, planning steps and how-to tips.

THE ROLE OF HEALTHY SOIL IN A CHANGING CLIMATE

Agriculture and climate are directly linked – anything that has a significant effect on our climate will influence farm production. Greenhouse gas (GHG) emissions and climate change are global concerns, and agriculture can be part of the solution.

BMPs that improve soil health can also help lower GHG emissions, reduce phosphorus loss from fields to surface water, and improve resilience to drought or excessively wet conditions. Healthy soil – an essential component of a healthy environment – is the foundation upon which a sustainable agriculture production system is built.

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Marginal and fragile lands

Some soils are not suitable for intensive cropping, and efforts and costs to work them will not show a return.

Such land is often referred to as *marginal* – marginal in terms of its ability to produce a crop profitably.

Marginal lands are naturally too stony, shallow to bedrock, too wet, droughty, infertile, steep or too heavy for cropland agriculture. When mixed farming was more common, this land was often left for rough pasture or let alone to return to a somewhat natural state.

Agricultural lands that are shallow to bedrock may not be suitable for cropping or pasture use. These lands should be retired or allowed to revert slowly to natural vegetative cover (also known as *natural field succession*).

Some lands are not marginal for agriculture, but are prone to severe erosion by wind, water and tillage practices or to extreme compaction. Others are productive but located in bottomlands and are subject to flooding. These lands are known as *fragile* lands.

In most cases, it is cost-prohibitive to rehabilitate fragile and marginal lands. These lands are usually better suited to pasture, forest land and wildlife habitat.

Cropland retirement is the removal of fragile and marginal cropland from production, and planting them to grass, trees, or other long-term vegetation. Retired lands may remain out of production permanently or may be brought into production after a period (usually decades) of rehabilitation.

Fragile lands, such as cropland on coarse sandy soils, should be retired from cropland.

Problems with cropping marginal and fragile lands

POOR RETURNS

It doesn't pay to farm inferior cropland. Growing crops on marginal or fragile lands offers a poor return on investment for seed, fertilizer, pesticide, fuel, time, and equipment use.

EXTREME SOIL DEGRADATION

Some soils are so eroded or compacted that it is nearly impossible – and certainly cost-prohibitive – to rehabilitate them. All that remains are compacted, high pH parent materials. These are priority areas to return to permanent/perennial/long-term cover.

HABITAT DESTRUCTION

Cropland runoff, excessive flooding, and the deposition of sediment in floodplains can harm habitat for fish and wildlife in riparian (streamside) areas. Cropland retirement could prevent this.

DEGRADED WATER QUALITY

Runoff to a watercourse is a common sight on fragile cropland. Cropland runoff can carry crop nutrients, pesticides and other inputs along with displaced soil.

GREENHOUSE GAS (GHG) EMISSIONS

Marginal lands that are too heavy or too wet to crop are also at the greatest risk of GHG emissions of methane and nitrous oxides. The risk would be eliminated if these lands were retired to trees or other perennial vegetation.

How cropland retirement works

COVER

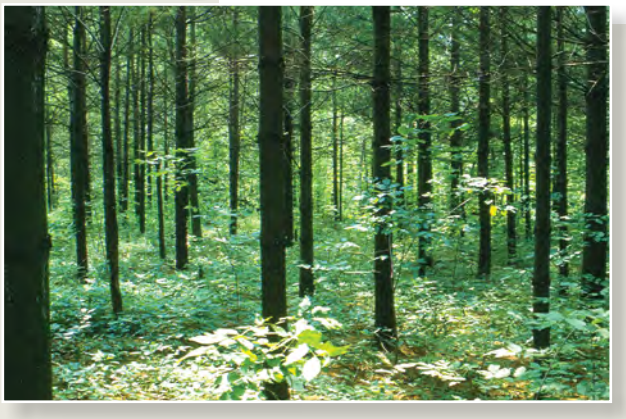
Retirement plantings cover the soil with perennial vegetation such as trees, grass or shrubs, providing a permanent cover to protect soil from erosion.

SOIL REHABILITATION

Trees and other long-term perennial plants will rehabilitate degraded soils over their lifetime. Roots add organic materials, sequester carbon, improve soil structure, and penetrate compacted layers. Retirement can also be viewed as long-term rehabilitation: some lands could be returned to crop production after the perennial crop has been harvested (40–100 years) if required.

HABITAT IMPROVEMENT

Plant it and they will come. Planting any kind of perennial cover will attract wildlife. Adding wildlife structures can help to attract desirable species.



ECONOMIC DIVERSIFICATION

Well-managed woodlots and other plantings can generate alternative sources of income.

WATER QUALITY

In addition to protecting soils, retired croplands offer protection to adjacent surface waters. Infiltration rates are higher on retired lands, resulting in less runoff. Runoff is cleaner because the soil is covered.

Types of plantings for cropland retirement

Most often, fragile or marginal cropland is retired to one of the following types of plantings:

PURE CONIFER

Conifer or evergreen plantations are planted stands of pure evergreens – usually at spacings of 2.5 x 2 m or 2.1 x 2.1 m (8 x 6 ft or 7 x 7 ft), designed to allow for tree growth and early tending. Plantings can be of one or more species. Common species are Red, White and Jack Pine, Norway and White Spruce, White Cedar and European Larch. Conifers are more suited to planting in open field conditions than hardwoods or shrubs. Intermediate-aged (20–40 years old) plantations are thinned for pulpwood and small sawlogs or fence material. Mature conifer trees (40–100 years) can be harvested for poles and sawlogs.

PURE HARDWOOD

Pure hardwood stands are plantings of deciduous (hardwood) trees. These trees are planted at wider spacings of 3.5 x 2.5 m (10 x 8 ft) than conifer plantings to allow for mowing, cultivation and herbicide application for weed control. Mature hardwoods are harvested for sawlogs and immature trees can be thinned for fuelwood.

MIXED PLANTING

Mixed plantings consist of hardwoods and conifers. Such plantings are selected either for environmental purposes, long-term seed source or to encourage the growth of valuable hardwoods with less maintenance than with pure hardwood stands (e.g. White Pine and Black Walnut; Red or White Pine, and Red Oak). Site selection requires careful attention so as to prevent the “nurse-crop” tree (i.e. conifer) from outgrowing the more valuable hardwood crop tree.

WILDLIFE PLANTING

Wildlife plantings can be any mixture and any design of one or more of the following types of perennial plants: grasses, herbs, shrubs and trees. The intent is to provide as much space, cover, food and water as possible for the desired wildlife species or group (e.g. waterfowl).

How to establish cropland retirement plantings

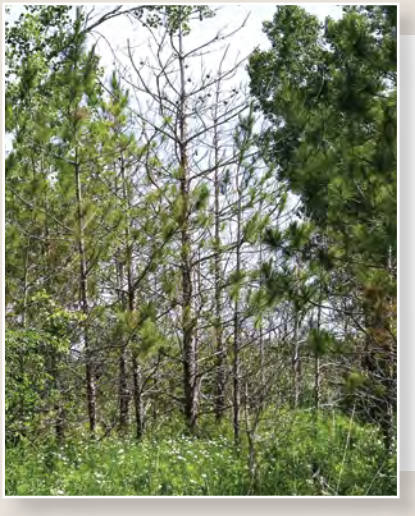
PLANNING

Before you take any land out of production to plant trees, take the time to do some careful planning.

Step 1. Conduct an inventory.

Draw a map or check your farm maps to delineate the areas for retirement – show differences in soil type, site damage (such as compaction, eroded knolls etc.), drainage and slope. Use aerial photos or ortho imagery, soil test results, and anecdotal info from the combine operator at harvest (including crop record maps) wherever possible.

Planning cropland retirement should be a family decision: trees can last a lifetime.



Ignoring soil properties may lead to a failed cropland retirement project. Some problems such as Red Pine dieback don't show up until the trees are 25 years old. Know your soils and match species to the site.

Step 2. Interpret the results.

Look for opportunities – both short- and long-term – and consider the limitations of time, money, soil type and condition.

Step 3. Examine and select options.

Choose options that fit with your goals, values, needs, budget and objectives. Make sure species match soil and site conditions.

Step 4. Design and Implement.

Seek technical advice when designing plantings and sourcing materials.

Step 5. Evaluate your planting after establishment, and reassess every three to five years.

HOW-TO

Prepare site

- ✓ Remove stone and excessive crop residue that may impede tree planting.
- ✓ Control weeds if hardwoods are to be planted. Use burndown and soil-sterilant herbicides.

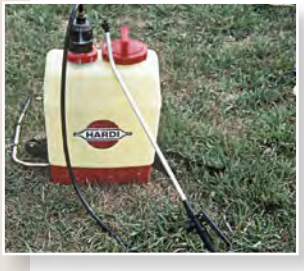
Plant stock

- ✓ Keep all woody stock cool and moist. Avoid excessive exposure to wind and sun.
- ✓ Carry stock in a pail with water at time of planting.
- ✓ Use "T" or "L" planting methods.
- ✓ Plant trees to root collar. Before you move on, ensure trees are straight.
- ✓ Tamp soil around collar to eliminate air spaces around roots.

Maintain planting

- ✓ Water trees during droughts right after planting.
- ✓ Control weeds for first two to four years after planting.
- ✓ Thin or remove poor quality trees to make room for better quality ones.
- ✓ Prune highly valuable trees.

Roots are especially fragile. Keep cool and moist, dip in water, but do not soak or they may drown. Even brief exposure to warm dry winds can kill roots.



Using a backpack sprayer can be an effective method of controlling the vegetation around each tree. A 1-metre radius circle will also help deter rodent "girdling" (injuring the bark) at the base of the tree.

Challenges and considerations

LONG-TERM COMMITMENT – Cropland retirement means taking land out of production for at least one generation. Consider the decision carefully.

COSTS – Technical assistance, tree stock, establishment and maintenance can be costly. Some conservation authorities and agencies like Trees Ontario offer tree planting programs.

NUISANCE WILDLIFE – There are times when the establishment of natural areas attracts nuisance wildlife that can cause crop damage in adjacent fields.For more information, see the BMP book: *Fish and Wildlife Management*.

SOIL CONDITIONS – Some species have exacting soil and site requirements. Others cannot survive severely degraded soil conditions. A soil and species mismatch can be costly and frustrating. Check your soils or ask local conservation authority staff for assistance.

SEEDLING EXPOSURE – Young plants growing in open and exposed conditions are subjected to drying and temperature extremes. Allowing sod crops between rows to grow to maturity while controlling weed growth around young woody plants is one method to protect newly planted stock.

Newly planted stock is at the mercy of the elements. Seedling survival rates increase with management practices such as site preparation, emergency irrigation and weed control.

If you want to plant forages only, please see the BMP Soil Health factsheet *Perennial Systems.*

For more details about establishing trees on fragile and marginal lands, please see the BMP book *Establishing Tree Cover.*

For more information

ONTARIO MINISTRY OF AGRICULTURE, FOOD AND RURAL AFFAIRS

Many sources of supplementary information are available.

Below are some suggestions to get you started. Most can be found online at **ontario.ca/omafra** or ordered through ServiceOntario.

- Publication 811, *Agronomy Guide for Field Crops*
- Publication 611, *Soil Fertility Handbook*

Best Management Practices Series

- *Buffer Strips*
- *Controlling Soil Erosion on the Farm*
- *Cropland Drainage*
- *Establishing Tree Cover*
- *Field Crop Production*
- *Soil Management*

Environmental Farm Plan (4th ed.) and EFP Infosheets

- #15, *Soil Management*
- #19, *Field Crop Production*
- #21, *Stream, Ditch, and Floodplain Management*
- #22, *Wetlands and Wildlife Ponds*
- #23, *Woodlands and Wildlife*

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