

# Infosheet #19 Field Crop Management

This infosheet provides background to Worksheet #19 of the *Environmental Farm Plan Workbook*. It outlines options you could adopt to address problem areas in your operation. In most cases you'll need more information before implementation: please refer to the resource materials listed in the infosheet, and consult OMAF Environmental Farm Plan (EFP) Technical Advisors.

All options are classed as Actions or Compensating Factors. Actions address the areas of concern identified, and will change the EFP rating to (3) or Best (4). Compensating Factors are alternatives that will adequately address the concerns, but will not change the rating in the EFP worksheets.

## Crop Rotations

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ISSUE	WHAT CAN YOU DO?
<b>19-1 Rotation for soil protection (coverage for all fields)</b> Exposed soil is at high risk of erosion, especially over winter. The best defence is to provide soil surface cover for as long as possible.	<b>OPTION #1 – ACTION</b> <b>Plant more perennial crops (grasses and legumes):</b> <ul style="list-style-type: none"><li>increase the amount of land in perennial forages including pastures – the land is covered for a longer time and therefore protected - especially important for high risk situations such as steep slopes or highly erodible soils</li><li>perennial or over-wintering cover crops should be grown at least two years out of five</li><li>if not fed on farm, a market for the perennial forage will be required in order for this to be an acceptable option.</li></ul> <b>OPTION #2 – ACTION</b> <b>Plant overwintering cover crops:</b> <ul style="list-style-type: none"><li>select cover crops that won't interfere with next year's crop growth</li><li>time planting to allow sufficient growth, but late enough so that the cover crop does not go to seed</li><li>perennial or over-wintering cover crops should be grown at least two years out of five</li><li>manage cover crops to use existing equipment as much as possible.</li></ul> <b>OPTION #3 – ACTION</b> <b>Plant winter cereals:</b> <ul style="list-style-type: none"><li>winter cereals (e.g., winter wheat) can offer excellent soil protection, provided they are planted early enough to allow time for sufficient ground cover establishment.</li></ul>

#### **OPTION #4 – COMPENSATING FACTOR**

##### **Use residue management systems (no-till, reduce till):**

- aim to leave at least 20% crop residue on the soil surface after planting.

##### **FOR MORE INFORMATION:**

*Agronomy Guide For Field Crops*, OMAF Publication 811

Best Management Practices Books: *Field Crop Production*, Order No. BMP 02, pp. 22-30; *Soil Management*, Order No. BMP 06, pp. 55-56

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#### **19-2 Rotation for soil building**

Some crops return more organic matter to soil than others. Soil-building crops include perennial forages and crops that produce good root systems and are harvested only for their seed.

#### **OPTION #1 – ACTION**

##### **Include soil-building crops in your rotation (on at least 50% of land base):**

- rotate with soil-building crops, e.g., winter cereals and perennial forages – likewise, grain corn and spring cereals with the straw/stover spread will help build soil
- rotate soil-building crops in conjunction with soil-depleting ones to maintain soil structure and organic matter.

#### **OPTION #2 – COMPENSATING FACTOR**

##### **Return organic matter to the soil:**

- if organic matter is not replaced by adding crop residues or manure, the soil's fertility and structure will decline
- organic matter can be returned by leaving residue in the field, adding manure or growing green manure such as red clover, buckwheat, etc.

#### **OPTION #3 – COMPENSATING FACTOR**

##### **Use reduced tillage system including no-till, reduced till and ridge tillage:**

- these practices result in slower breakdown of crop residue
- adding organic matter will still be important.

**FOR MORE INFORMATION:**

*Agronomy Guide For Field Crops*, OMAF Publication 811

*Organic Farming in Ontario*, OMAF Factsheet Order No. 98-029

Best Management Practices Books: *Field Crop Production*, Order No. BMP 02, pp. 25-27; *Soil Management*, Order No. BMP 06

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**19-3 Rotation for pest management  
(weeds, diseases, insects)**

Pests are reduced when their host crop is not present in the field. Weed vigour can be reduced by rotations with more competitive crops. Weeds are easier to control in fields with crop species differing from the weed type (grass vs. broadleaf).

**OPTION #1 – ACTION****Rotate the crop species planted:**

- for every four times the field is planted, select different crop types at least three of the times, e.g., corn, beans, small grains, forages
- adopt a crop rotation that reduces the chance that the same crop species will be planted twice consecutively.

**OPTION #2 – COMPENSATING FACTOR FOR PERENNIAL FORAGES****Change the crop environment to keep weeds, insects and diseases in check:**

- timely harvest, clipping, pest monitoring.

**FOR MORE INFORMATION:**

Best Management Practices Book: *Field Crop Production*, Order No. BMP 02, pp. 32-34

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**Residue Crop Management****19-4 Planting and tillage equipment**

Residue acts as a blanket and must be spread evenly to prevent problems during seeding. At least 20% residue cover is required for a conservation tillage program.

**OPTION #1 – ACTION****Modify equipment to handle increased residue levels:**

- existing planters and drills can handle 20-30% residue levels with very little modification
- examine the equipment's ability to allow residue to flow through tillage discs/tines, seed/fertilizer openers or implement frame and wheels, and improve the spacing where required.

**OPTION #2 – ACTION****Purchase new equipment that can handle residue situations:**

- when buying replacement equipment, consider its ability to handle 20% or higher residue levels.

### **OPTION #3 – COMPENSATING FACTOR**

#### **Reduce the number of times the field is worked prior to planting:**

- with each tillage pass, more crop residue is incorporated into the soil, leaving more of the surface exposed to erosive forces
- reducing the number of passes leaves more of a protective surface residue cover.

### **OPTION #4 – COMPENSATING FACTOR**

#### **Change to a rotation that protects the soil:**

- perennial or winter cover crops are grown two out of five years.

#### **FOR MORE INFORMATION:**

Best Management Practices Books: *Field Crop Production*, Order No. BMP 02, pp. 42-110; *Soil Management*, Order No. BMP 06, pp. 55-56

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### **19-5 Residue management at harvest**

Harvesting is the first step in a crop residue management system. Harvesting equipment should be adjusted to leave a uniform layer of residue cover.

### **OPTION #1 – ACTION**

#### **Spread straw evenly at harvest time:**

- ensure that the harvest operations spread the straw and chaff uniformly across the full width of the combine header
- factory or after-market straw and chaff spreader options are available for most combines.

### **OPTION #2 – ACTION**

#### **Remove residue from windrow:**

- in the event that the residue is not spread it should be baled off
- a rotation that builds the soil organic matter should be practised in this situation.

### **OPTION #3 – COMPENSATING FACTOR**

#### **Change to a crop rotation that protects the soil:**

- perennial or winter cover crops are grown two out of five years.

#### **FOR MORE INFORMATION:**

Best Management Practices Books: *Field Crop Production*, Order No. BMP 02, page 18; *Soil Management*, Order No. BMP 06

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## Conservation Cropping

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### 19-6 Soil surface disturbance during no-till planting and/or fertilizer application

In a no-till system, planting and fertilizer application are the only operations which disturb the soil. Minimizing the band width of original soil surface physically worked up by the soil openers reduces water/wind erosion, moisture loss, weed seed germination and fuel consumption.

#### OPTION – ACTION

##### Modify equipment to minimize the band width of original soil surface physically worked up by the soil openers to reduce the soil and residue disturbance:

- use ripple or narrow-fluted coulters which do a better job of cutting through the trash, and generally do not throw as much soil out of the seed slot than the wider versions
- offset the tillage coulters to set them closer together
- use a single disk opener with a narrow angle of soil opening
- use narrow shank hoe opener
- use a straight blade coulters of sufficient diameter to cut residue in front of the fertilizer applicator knife

### 19-7 Cropping on long sloping fields

Water erosion can be reduced by alternating less erosion-prone crops with more erosion-prone ones in strips across the slope, or on contour. Up-and-down slope systems increase erosion. Cross-slope systems allow water to move downslope safely with minimal erosion.

#### OPTION #1 – ACTION

##### Change cropping practice to a strip cropping system:

- cropping can be modified by alternating strips of a row crop with a cereal crop or forage
- alternate forage crop with row crops to reduce the length of the slope of more erosion-prone row cropland
- strip width depends on multiple widths of your equipment.

#### OPTION #2 – ACTION

##### Change cropping practices to a contour cropping and tillage system:

- on slopes (1-8%), contour farming provides good erosion protection
- tillage and planting across the natural slope creates a series of minidams that hold back water until it can soak into the ground
- point rows can be a problem
- examine the use of the less erosion-prone crops.

#### OPTION #3 – ACTION

##### Change cropping practice to contour strip cropping:

- contour cropping can be modified by alternating strips of a row crop with a cereal crop or forage – this practice combines the soil and moisture savings of contouring with the soil-building advantages of a crop rotation

- alternate forage crop with row crops to reduce the length of the slope of the more erosion-prone row cropland
- strip width depends on multiple widths of your equipment.

#### **OPTION #4 – COMPENSATING FACTOR**

##### **Select less erosive crops:**

- limit the field rotation to those crops that provide sufficient surface coverage to reduce the potential for erosion over the growing season
- the trend would be towards narrow-spaced crops.

#### **OPTION #5 – COMPENSATING FACTOR**

##### **Change to a reduced or no-till cropping system:**

- aim to leave at least 20% crop residue on the soil surface after planting.

#### **FOR MORE INFORMATION:**

*Ontario Soil Survey Reports* (listing of soil erodibility for crops)

Best Management Practices Books: *Field Crop Production*, Order No. BMP 02, pp. 112-113;

*Soil Management*, Order No. BMP 06

## **Pasture Management**

### **19-8 Pasture grazing**

Pasture is a very important crop. Forage plants that have been grazed too close are weakened and may die, leaving bare areas that are more susceptible to erosion.

#### **OPTION #1 – ACTION**

**Establish a well-managed or rotational grazing system, especially for highly erodible areas:**

- rotational grazing allows the forage time to re-grow
- a minimum forage height of 2 inches should be maintained
- no visible bare spots – reseed as necessary.

#### **OPTION #2 – COMPENSATING FACTOR**

**Reduce field grazing pressure:**

- clipping as necessary to reduce selective grazing
- to prevent overgrazing, supplemental feed may be supplied
- reduce the number of animals per acre, to a level the pasture can support.

#### **FOR MORE INFORMATION:**

*Pasture Production*, OMAF Publication 19

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## Weed Management

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### 19-9 Seed used

Crop seed supplies are a potential source of weed seeds. Certified and Canada #1 seed have standards to reduce the number of weed seeds in the crop. The *Seeds Act* and Regulations outline the specifications for inspected seed sources and pedigreed seed sample; the *Weed Control Act* (R.S.O. 1990, Chapter W.5) outlines the requirements to control 23 noxious weeds. Both may have a role to play.

### OPTION – ACTION

#### Reduce the opportunity for weed seed to come onto the farm:

- use weed-free seeds and transplants to reduce the potential concerns regarding weed control
- use certified seed wherever possible
- otherwise, use seed that has been tested and cleaned to Canada #1 standard - unless the use of the seed is not legal because seed use is restricted by a technology use agreement or other legal restriction.

#### FOR MORE INFORMATION:

*Weed Control Act*, R.S.O. 1990, Chapter W.5  
*Seeds Act*

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*At the request of the Ontario Farm Environmental Coalition, consisting of Ontario Federation of Agriculture, Christian Farmers Federation of Ontario, AGCare, and the Ontario Farm Animal Council, the following people contributed to the development of Infosheet #19:*

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