Starting Over: Pasture Establishment and Renovation

Rationale

The majority of people in the United States work in a city or urban center. However, many of these same people prefer a rural atmosphere and lifestyle. This has resulted in numerous small acreages surrounding urban centers. Often, the owners of these small acreages have no agricultural background and would benefit greatly from some agricultural training. It is not unusual to see pastures that are overstocked and overgrazed. Good management practices would help maximize the productivity of their pastures and minimize any adverse environmental impacts.

Pastures can serve as a great renewable resource if managed properly. Inefficiently managed pastures can strip the land, increase erosion, and add to ground and surface water contamination. Pasture establishment and renovation may be the best option to increase productivity and reduce erosion. An added benefit is that healthy pastures are much more aesthetically pleasing. The purpose of this lesson is for pasture owners to understand why establishment and renovation are important in improving their pastures both for animal nutritive value as well as cost efficiency. The techniques used and influencing factors will be discussed. Selection of the forage type(s) is critical in developing a good and productive pasture. Characteristics of forages and their uses will be presented.

Objectives

Participants will:

1. Learn to identify their pasture needs in reference to pasture establishment and/or renovation.
2. Learn different techniques for pasture establishment.
3. Discuss the costs associated with different methods of pasture establishment.
4. Examine factors that should be considered prior to renovation.
5. Learn about some individual forage plants, their characteristics, advantages and disadvantages.

Starting Over: Pasture Establishment and Renovation– Lesson Plan

Time	Section	Goal	Activity	Instructor
20 min	Introduction	Participants gain a clear understanding of the need to know more about forages and forage establishment. Participants learn terminology.	Questions from Lessons 1, 2 and 3 of this Module will lead into a discussion of the current conditions of participants' pastures. Would renovation help? Look at pictures of pastures in local area. Would renovation help these pastures? Has renovation helped these pastures? • Introduction • Forage establishment • Factors to consider prior to renovation • Plant characteristics • Characteristics of individual grasses and legumes	Answer questions from Lessons 1, 2 and 3. Local pictures of pastures that need attention or before and after pictures of pasture renovation would be helpful here. Pose the question "Why do we plant forages vs. just letting a natural environment grow?" PowerPoint slides 1-8
60 min	Forage establishment	Discuss following factors: • Seeding guidelines • Seeding methods • Seeding rates • Costs	Learn why proper planting time and seed placement are critical. Examine size of seed and "baby" plants. Explain that they have limited energy supplies, and relate this to establishment and renovation. Realize that seeding for pasture establishment can be done in many different ways. Learn how to calculate Pure Live Seed (PLS) and understand how it affects planting rate. Realize that pasture establishment and renovation is not cheap, but the increased pasture yield will compensate for this initial cost. Consider equipment resources. Are there places that rent the necessary equipment? Are there people who will do custom work on small pastures? Identify some of the sources that are available in your area and ask participants if they know of any local custom contractors.	Discuss which planting time is most appropriate for your area. Look at size of forage seed and seedlings. Discuss seeding options and available seeding resources. Show how to calculate PLS. Use PLS Calculations Activity Sheet and Sample Seed Tags for PLS Calculations Information Sheet Run through some examples and determine the cost of establishment. Use the Cost of Establishment and Renovation Activity Sheet. Estimate the cost of feed during establishment. Use custom machinery costs for your area from NRCS if available, or use "Doane's Custom Rate Guide." PowerPoint slides 9-41
15 min	BREAK	BREAK	BREAK	BREAK

Starting Over: Pasture Establishment and Renovation – Lesson Plan (continued)

Time	Section	Goal	Activity	Instructor
20min	Factors to consider prior to establishment and/or renovation	Participants recall their goals before renovating.	Discuss why soil type, climate, and the type of animal should determine forage selection. Consider available land. Have participants look at their pasture inventories. Do they have a place to put animals while renovating a pasture? Can they set up a rotational grazing system? Do they have water sources available in each paddock?	Using a soil survey, look up average first and last frost dates. Show participants how they can determine their soil type and its characteristics They should have this information from Module 2. This section will need to be tailored to your area and the participants' interests. Please review the participants' pre-registration sheets. PowerPoint slides 42-49
20 min.	Plant characteristics: grasses & legumes; plant mixtures	Participants should gain understanding of the different growth habits of grasses and legumes and how these growth habits and patterns affect forage selection. Participants learn the advantages and disadvantages of using a plant mixture in pasture renovation.	Show plants that display growth habits. Forage plants would be desirable, but many weeds also have the same growth habits. What do they think would make a good mixture?	Show potted grasses and legumes from Module 5, Lesson 1, How Grass Grows, if still available. Optional additional handouts: "How Pasture Plants Grow" and "Guide for Year-Round Forage Supply." See lesson plan for download information. PowerPoint slides 50-60
30 min.	Individual plant characteristics	Learn characteristics of some of the popular grasses and legumes for proper forage selection.	Examine characteristics of individual plants. This will probably be a refresher from Module 5, Lesson 1, How Grass Grows, for most participants.	Potted grasses and legumes used in Module 5, Lesson 1, if available. Forage Species Adaptation Information Sheet PowerPoint slides 61-98
15 min	Summary, question and answer period	Summary, question and answer session and homework assignment.	Homework • Determine if your pasture requires improvement • Determine your goals for the improvement or renovation • Determine the best and most cost-effective method to achieve your goals • Determine the best plants to use for your area and for your goals	PowerPoint slides 99-100

Living On the Land

Module 5, Lesson 4

Starting Over: Pasture Establishment and Renovation

Materials/supplies to be requested from participants before class starts

1. Notebooks with forms and exercises completed to date, especially data from Lessons 1 and 2 of this module.
2. Calculator, paper, writing utensils, rulers, etc.

Materials/supplies needed for class

1. Flip chart and markers (or dry-erase board, chalkboard or overhead projector)
2. Overhead or PowerPoint computer projection system
3. Pointer
4. Refreshments

Local resources needed for class

1. Pictures of pastures in local area that need attention.
2. Soil survey manuals for local area.
3. Forage seed tags (or use handout with copies of tags included in packet).
4. List of equipment resources available for rent from NRCS office, etc. (if available in your area).
5. Custom machinery costs for your area. As an alternative, use “Doane’s Agriculture Report for Custom Work.”
6. Forage seeds and seedlings.
7. Information on grasses and legumes grown in your area not covered in slide presentation.
8. Potted plants - grasses and legumes that grow in your area – from Module 5, Lesson 1: How Grass Grows

Background information for instructors

Please review Lessons 1, 2 and 3 of this module.

Handouts needed for participants

1. Pure Live Seed Calculations Activity Sheet
2. Sample Seed Tags for Pure Live Seed Calculations Information Sheet
3. Cost of Establishment and Renovation Activity Sheet
4. Forage Species Adaptation Information Sheet

Starting Over: Pasture Establishment and Renovation

Handouts needed for participants (in addition to lesson handouts)

1. Custom machinery costs for your area and equipment resources. Are there places that they can rent equipment? Are there people who will do custom work on small pastures? Identify some of the resources that are available in your area.
2. Alternatively, use "Doane's Agriculture Report for Custom Work", http://www.doane.com
3. Iowa State University Extension, 1999, How Pasture Plants Grow, http://www.extension.iastate.edu/Publications/PM1791.pdf
4. Iowa State University Extension, 1998, Guide for Year-Round Forage Supply, http://www.extension.iastate.edu/Publications/PM1771.pdf

Web sites for further information

Agricultural Information Network, http://www.aginfonet.com

Colorado State University Cooperative Extension, http://www.colostate.edu

Colorado State University Cooperative Extension Small Acreage Management, http://www.ext.colostate.edu/sam/

Forage Information Systems, http://forages.oregonstate.edu/index.cfm

Kansas Wildflowers and Grasses, http://www.kswildflower.org

Montana State University Extension Publications, http://extn.msu.montana.edu/publications.asp

National Forage and Grasslands Curriculum, http://forages.oregonstate.edu/nfgc/default.cfm

NRCS Grazing Lands, http://www.glti.nrcs.usda.gov

NRCS Plant Characteristics and Plant Guide Service, http://plants.usda.gov/gallery.html

North Dakota State University Extension Service, http://www.ext.nodak.edu

Oklahoma Forages Home Page, http://forage.okstate.edu/index.htm

Purdue University Forage Information Service, http://www.agry.purdue.edu/ext/forages/links.htm

University of California Sustainable Agriculture Research and Education Program, http://www.sarep.ucdavis.edu

Pure Live Seed Calculations Activity Sheet

Pure live seed (PLS) = Percent purity x Percent germination

Percent purity is the percentage of seed that is the desired forage seed.

Percent germination is the percentage of seed that germinates when planted.

Seed required to achieve desired seeding rate = Desired seeding rate / PLS

Example: Alfalfa seed
Desired seeding rate = 12 lbs per acre
Germination = 85 percent
Purity = 96 percent

Seed Type	Desired Seeding Rate Per Acre	Germination (percent)	Purity (percent)	Pure Live Seed (PLS) (percent)	Desired Seeding Rate / PLS (percent)	Seed Needed per Acre
Example: Alfalfa	12 lbs	0.85 (85 percent)	0.96 (96 percent)	0.816 (81.6 percent)	12 lbs per acre / 0.816	14.7 lbs

Sample Seed Tags for Pure Live Seed Calculations Information Sheet

KIND & VARIETY: Red Top

LOT: 54.3174A

PURE: 94.88%	GERM & HARD: 90%
CROP: 10%	GERMINATION: %
INERT: 4.56%	HARD: %
WEEDS: 0.46%	TESTED: 10-92
ORIGIN: ID	NET WT: 2 #
NOXIOUS WEEDS: none	PO#:

A.V. Seeds, INC. 4625 Colorado Blvd
Denver, Colorado 80216

KIND & VARIETY: Big Bluestem

LOT: BR-955B

PURE: 59.87%	GERM & HARD: 76%
CROP: 0.88 %	GERMINATION: %
INERT: 39.23%	HARD: %
WEEDS: 0.02%	TESTED: 8-92
ORIGIN: MO	NET WT: 2 #
NOXIOUS WEEDS: none	PO#:

A.V. Seeds, INC. 4625 Colorado Blvd
Denver, Colorado 80216

Cost of Establishment and Renovation Activity Sheet

Instructor: Estimate the cost of establishment and renovation per acre for your area. Use Doane's Custom Machinery Rates Guide or local machinery costs. Outline the necessary tillage steps and their cost. Add in the cost of seed and fertilizer. Discuss other costs, such as loss of use of pasture while renovating. Below is a sample calculation:

TILLAGE

Moldboard plow	$24.00 / acre
Disk	$10.00 / acre
Apply fertilizer	$ 5.00 / acre
Disk (incorporate fertilizer)	$10.00 / acre
Harrow	$ 7.00 / acre
Harrow	$ 7.00 / acre
Planting(conventional)	$ 9.50 / acre
Tillage cost	$72.50 / acre

SEED
Alfalfa, $3.25 / pound @ 15 pounds / acre = $48.75 / acre

FERTILIZER
80 pounds / acre @ 0.45 / pound = $36.00 / acre

TOTAL

Tillage cost	$72.50 / acre
Seed cost	$48.75 / acre
Fertilizer cost	$36.00 / acre
TOTAL COST	$157.25 / acre

Your Calculation

TILLAGE: _____

_____

_____

_____

SEED: _____

_____

_____

FERTILIZER: _____

_____

OTHER COSTS: _____

_____

_____

TOTAL: _____

Forage Species Adaptation Information Sheet

Species	Partial Flooding	Severe Flooding	Moderate Salinity	Severe Salinity	Moderate Acidity	Moderate Alkalinity	Good Moisture, Poor Drainage	Good Moisture, Good Drainage	Semi-moist	Semi-dry	Dry	Very Dry	Winter* Hardiness	Shade Tolerance
Cool-season Grasses														
Basin wildrye	X		X		X	X		X	X	X	X		XXX	
Crested wheatgrass	X		X		X	X				X	X		XXX	
Intermediate wheatgrass	X		X		X			X	X	X	X		XXX	
Kentucky bluegrass	X				X		X	X	X				XXX	
Meadow bromegrass					X			X	X	X	X		XXX	X
Orchardgrass					X			X	X				XX	X
Perennial ryegrass	X		X		X	X		X	X					
Reed canarygrass	X	X	X		X	X	X	X					XXX	
Russian wildrye			X	X		X				X	X	X	XXX	
Siberian wheatgrass	X		X			X				X	X	X	XXX	
Slender wheatgrass			X	X		X		X	X	X			XX	X
Smooth brome	X		X		X	X		X	X	X			XX	
Tall fescue	X		X	X	X	X	X	X	X				XXX	
Tall wheatgrass			X	X	X	X	X	X					X	
Timothy	X				X	X	X	X	X				XXX	X
Western wheatgrass	X		X			X	X	X	X	X	X		XXX	X

* X = moderate winter hardiness; XX = good winter hardiness; XXX = excellent winter hardiness

Forage Species Adaptation Information Sheet

Species	Partial Flooding	Severe Flooding	Moderate Salinity	Severe Salinity	Moderate Acidity	Moderate Alkalinity	Good Moisture, Poor Drainage	Good Moisture, Good Drainage	Semi-moist	Semi-dry	Dry	Very Dry	Winter* Hardiness	Shade Tolerance
Warm-season Grasses														
Alkali sacaton	X	X	X	X		X			X	X	X		X	
Big bluestem					X			X	X	X			X	
Indiangrass			X		X	X	X	X	X	X	X		X	
Little bluestem					X	X		X	X	X	X	X	X	X
Sideoats gramma			X		X	X		X	X	X			X	
Swicthgrass	X		X		X	X		X	X	X	X		XX	X
Sudan			X		X	X		X			X			
Legumes														
Alfalfa			X	X		X		X	X	X	X	X	XX	
Alsike clover	X	X			X		X	X	X				X	
Birdsfoot trefoil		X			X		X	X	X	X			X	
Cicer milkvetch	X	X	X			X				X	X		XXX	
Red clover	X		X		X	X		X	X	X			XX	
Sainfoin			X		X	X	X	X	X	X	X		XX	
Strawberry clover	X		X	X	X	X	X	X	X				X	
Subterranean clover	X	X			X		X	X	X	X	X		XX	X
Sweetclover	X	X	X		X	X		X	X	X	X		XX	
White clover	X		X		X	X	X	X	X				XX	
* X = moderate winter hardiness; XX = good winter hardiness; XXX = excellent winter hardiness														

Starting Over: Pasture Establishment and Renovation Glossary

Annual: Plant that completes its life cycle, growing from a seed to producing seed, in one growing season.

Biennial: A plant that completes its life cycle in two years. First year growth consists of low growing leaves; the second year growth includes flowers and seeds.

Bloat: Swelling of the abdomen in grazing animals, most commonly caused by animals consuming too much high quality, lush legumes or lush young grasses.

Bunchgrass: Grass that propagates by seed and basal tillering only (no rhizomes); forms clumps, not sod.

Cool-season grass: Grass species adapted to rapid growth during the cool, moist period of the year; this type of grass is usually dormant during the hot weather.

Cultivar: Refers to a specific variety within a plant species.

Establishment: Planting a pasture where there is no existing pasture.

Frost seeding: Seeding in winter directly on the soil surface; freeze-thaw action will cover the seed to about the right depth.

Germination: The physical and chemical changes that take place as a seed starts to grow and develop into a plant.

Legume: Plant of the pea family, generally has the ability to fix nitrogen from the atmosphere into the soil, where it becomes available to plants.

Pasture: Ground or field suitable for grazing.

Perennial: Plant that lives for three or more years, even though some perennials die down to the ground each year..

Pure live seed (PLS): Term used to express the percentage of desired plant species that will actually germinate in a given sample of seed.

Renovation: Series of actions that lead to a long-term change in the botanical composition of a pasture.

Rhizome: Underground stem, usually horizontal, capable of producing new shoots and roots at the nodes.

Sod: Top few centimeters of soil permeated by and held together with plant roots.

Sod-forming grass: Grass that propagates by seed and vegetatively by rhizomes and/or stolons to form a sod.

Species: Refers to the type of plant or animal.

Stolon: Trailing or lateral stem forming at or below the soil surface, capable of rooting and sending up new shoots at the nodes.

Warm-season grass: Grass species that makes its major growth during the warmer part of the year.

Module 5, Lesson 4

Starting Over: Pasture Establishment and Renovation Evaluation

(Circle your answer.) Was this lesson:	**Not at all**	----------→			**Very much so**
Current, up-to-date?	1	2	3	4	5
Understandable?	1	2	3	4	5
Presented in an interesting way?	1	2	3	4	5
Did the program answer any questions you had?	1	2	3	4	5
Did it help you learn how to do new things or how to do something better than you knew before?	1	2	3	4	5
Do you intend to use any of the information from this lesson?	1	2	3	4	5
Overall, was this program worth your time to attend?	1	2	3	4	5

What was the most informative part of this session?

Which part was too technical and why?

Which part was too easy and why?

On which part(s) do we need to spend more or less time?

On which topic(s) would you like more information?

What one practice from this lesson will you implement within a year?

Living on the Land

Starting Over: Pasture Establishment and Renovation Post-class Mini-test

1. T or F A cultivar is a specific variety within a specie.

2. T or F If your pasture is overgrazed, the only solution is renovation.

3. List three benefits to pasture renovation.

   a.
   b.
   c.

4. T or F A firm seedbed for forages will allow footprints to sink only ¼ inch deep.

5. List three ways to prepare the seedbed for planting.

   a.
   b.
   c.

6. T or F It's essential to apply nitrogen fertilizer during partial renovation.

7. How many weeks of growth must seedlings have before killing frost?

8. List four reasons why forage seedlings fail during the germination to emergence period.

   a.
   b.
   c.
   d.

9. T or F Pure stands are preferable because they are more competitive against weeds.

10. T or F No-till seeding reduces soil erosion and conserves soil moisture.

Module 5, Lesson 4

Starting Over: Pasture Establishment and Renovation Post-class Mini-test Answer Key

1. T

2. F

3. Three benefits to pasture renovation:

    a. Increased forage productivity
    b. Improved forage quality
    c. Increased animal productivity
    d. Reduced soil erosion
    e. Reduced pollution potential
    f. Looks better

4. T

5. Three ways to prepare the seedbed for planting:

    a. Tillage
    b. Close clipping or grazing
    c. Burning
    d. Non-selective herbicides

6. F

7. 6 weeks

8. Four reasons why forage seedlings fail, germination through emergence:

    a. Hard seed
    b. Cold temperatures
    c. Improper planting depths
    d. Seed dries out before adequate root system has developed
    e. Crusted soil surface
    f. Toxicity

9. F

10. T