Dryland Farming: A Viable Option for Formerly Irrigated Land?

G.A. Peterson
Soil and Crop Sciences
Colorado State University
Objective today

• Examine options for dryland farming in areas of CO that are now irrigated

1. Dryland Experiments conducted - 20 years
2. Review results from data base
3. Generalize and apply results to Front Range of Colorado
Limitations to Dryland Farming

- Lack of precipitation
- Precipitation distribution
- Precipitation form
- Soil properties
  - Water infiltration rate
  - Water holding capacity
Colorado
Annual Precipitation

- Ranges from 8 to 18” per year
- Distribution
  - Summer dominant (Eastern Plains)
  - Uniform distribution (Western Slope)
Dominant Precipitation Patterns in Colorado

The graph shows the monthly precipitation patterns for the Eastern and Western slopes of Colorado. The x-axis represents the months from January to December, while the y-axis represents inches of precipitation. The yellow line indicates the precipitation on the Eastern slope, and the red line indicates the precipitation on the Western slope. The graph highlights that the precipitation patterns vary significantly between the two slopes throughout the year.
Field Experiment

Diverse Cropping System

Herbicidal weed control

No-till Planting

Slope Gradient

Sterling, Stratton & Walsh
Cropping Systems

Wheat - Fallow (WF)

Wheat-Corn-Fallow (WCF)

Wheat-Corn-Millet-Fallow (WCMF)

Opportunity (Continuous)

Perennial Grass
Annualized Grain Yield

Grain Yield - Lbs/A

W-F

W-C-F

W-C-M-F

75% increase

Cropping System
Annualized Total Biomass

Total Biomass; Lbs/A

90% increase

WF  WCF  WCMF
Cropping System

[Includes forages]
Opportunity
Residue Cover with No Tillage is Critical!!
What Dryland Farming Systems are Feasible For the Front Range?

What Crops Will Fit and Where?
Eastern CO Precipitation Distribution Relative to Crop Water Need

Inches

Month

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

- Wheat
- Corn
- Proso
- Forages
How Do Precipitation Distributions Compare Within Colorado?
Precipitation Distributions on Eastern Slope of Colorado

Inches

Month

Stratton
Klausner [Prospect Valley]
Greeley
Brighton
4N of Keenesburg
Summer Grain Crops Not a Good Fit for Front Range

- Front Range July and August rainfall less than in eastern CO
- Spring and early summer rainfall greater on Front Range than in Eastern CO
- Wheat and other cool season plants (forages) more likely to be successful than summer crops
What Options Do We Have for the Front Range?
Need Systems that Fit
Wetter Spring & Dryer Summer

Compare water budget
to your climate

Check your climate records
System Options

• Grain Crop Rotations like:
  Wheat- Wheat [Clearfield]-Fallow
  Wheat-Fallow

• Grain-Forage Crop Rotations like:
  Wheat-Hay millet-Fallow
  Wheat-Hay millet-Wheat-Fallow
  Wheat-Triticale-Fallow
  Wheat-Wheat-Austrian winter pea

• Forage Crop Rotations like:
  Triticale-Hay millet-Fallow
  Oat hay-Hay millet-Fallow
  Oat hay-Triticale-Hay millet
  Oat hay-Triticale-Austrian winter pea
New Wheat Technology

• “Clearfield” Technology -
  Grassy weed control in winter wheat
  Weeds controlled: Downy brome
  Volunteer rye
  Jointed goatgrass

• Wheat varieties “Above” & Bond CL resistant to herbicide called “Beyond”

• Especially useful in systems like:
  Wheat-Wheat-Fallow
  Wheat-Wheat-Forage-Fallow
Conclusions

• Dryland cropping on Front Range less productive than eastern CO
• Forage systems most ideal
• Grain crop systems dependent on wheat and other cool season plants possibly Austrian pea etc.
• Plan cropping systems around local precipitation distribution
Questions ??