Risk Management of Manitoba Soils

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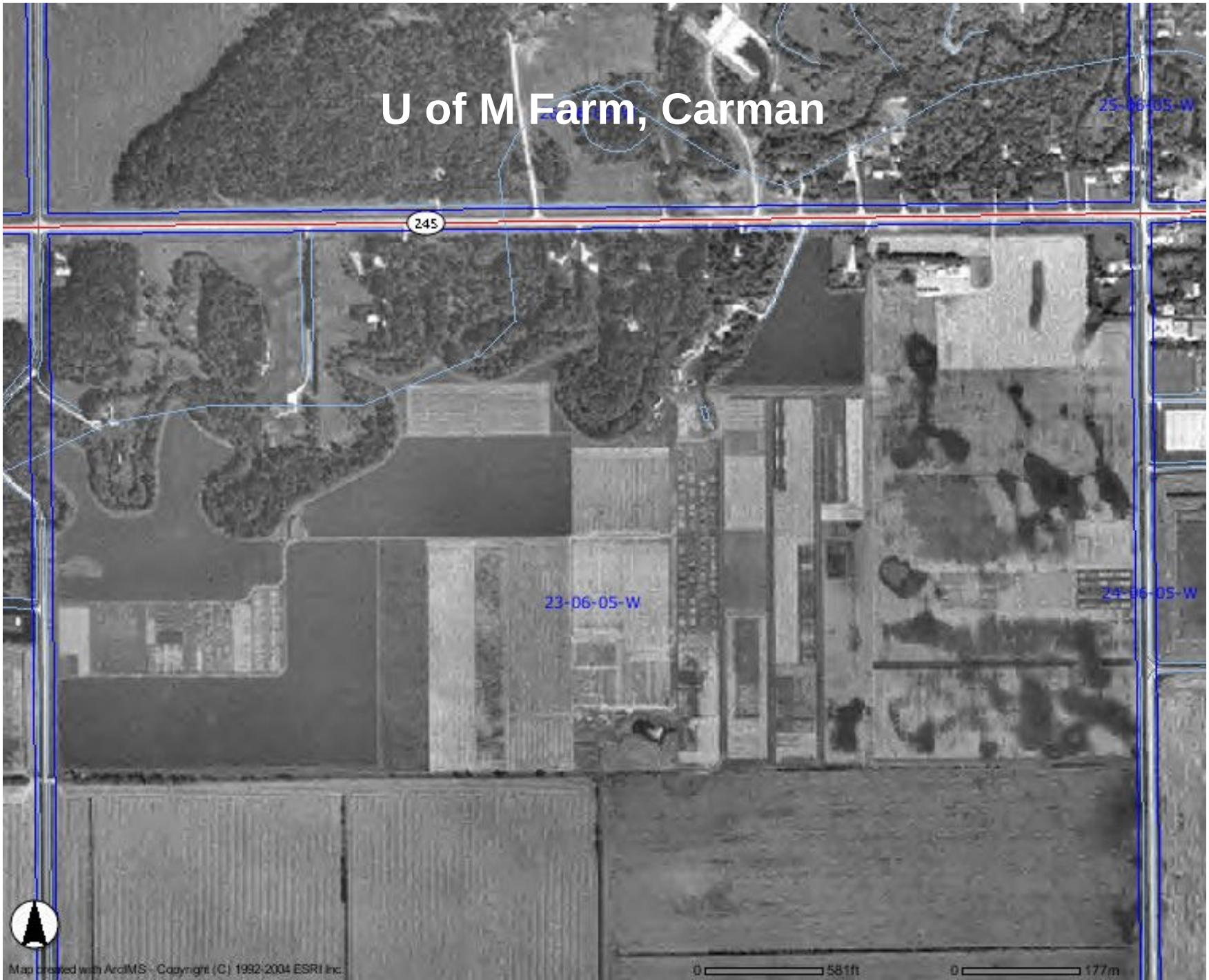
Following the Livestock Production Example

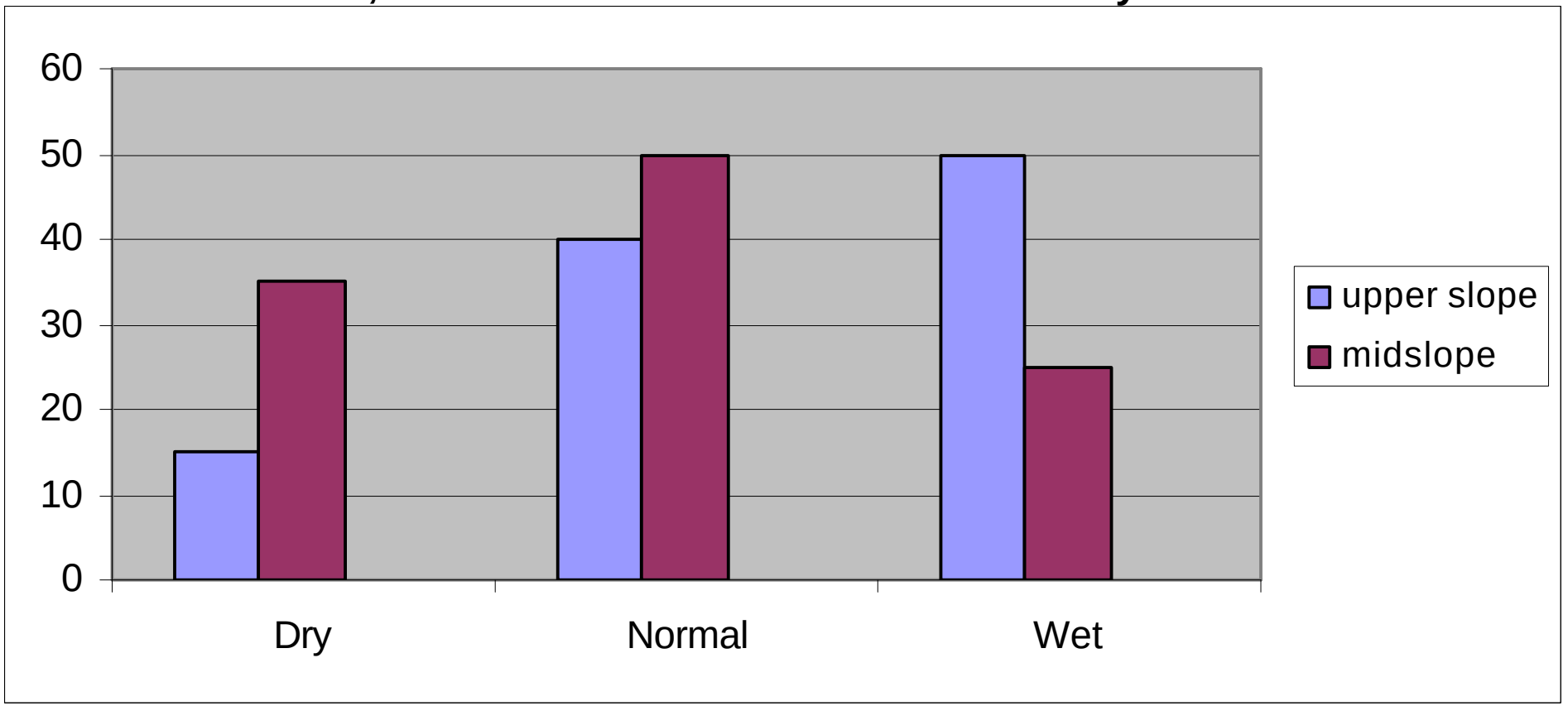
- Every animal must “pay” for itself
- Every *acre* in the field/farm must “pay” for itself
- Otherwise, productive acres subsidize less productive/non-productive acres (inputs, taxes, labour, etc.)
- Puppy example:


U of M Farm, Carman
245
23-06-05-W
0
581ft
0
177m

Crop Yield Potential and Variability with Landscape and Moisture

HRS wheat, bu/ac

Break even yield = 43 bu/ac



Management “Tools”

- Crop Type/Variety
- Crop Rotation
- Drainage
- Seeding date, seeding rate
- Tillage System
- Amount, timing of inputs

- ***How would you adjust the above “tools” to manage various risks?***

Effect of Delayed Planting (MASC)

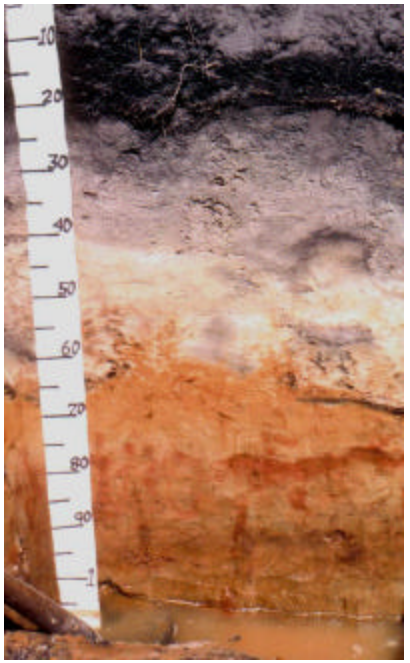
Planting Date	% Yield Reduction			
	Corn	Canola	Flax	Peas
1st week May	-	-	-	-
2nd week May	5	-	-	5
3rd week May	10	5	5	15
4th week May	20	10	15	20
1st week June	30	20	25	30

Soil Types Most Susceptible to Excess Water are soils with:

- Clay layer somewhere in the profile
- *Poor* or *imperfect* internal drainage ("gleyed" properties, reducing cond's)
- A water table close to the surface

- Identified by the agriculture capability modifier "W" (wetness limitation)
  - e.g. Class 2W, 3MW, 5W, etc.

Soil Drainage (all sandy soils)

Rapid	Well	Imperfect	Poor
			
Shilox	**Stockton**	**Long Plain**	**Lelant**
Ag. Cap. 5M	**Ag. Cap. 4M**	**Ag. Cap. 3MW**	**Ag. Cap. 6W**

Examples of “W” Soils

Joyale

Clay loam

Imperfect

2W

Glenella

Loam over clay

Imperfect

2W

Glenmoor

Silty clay

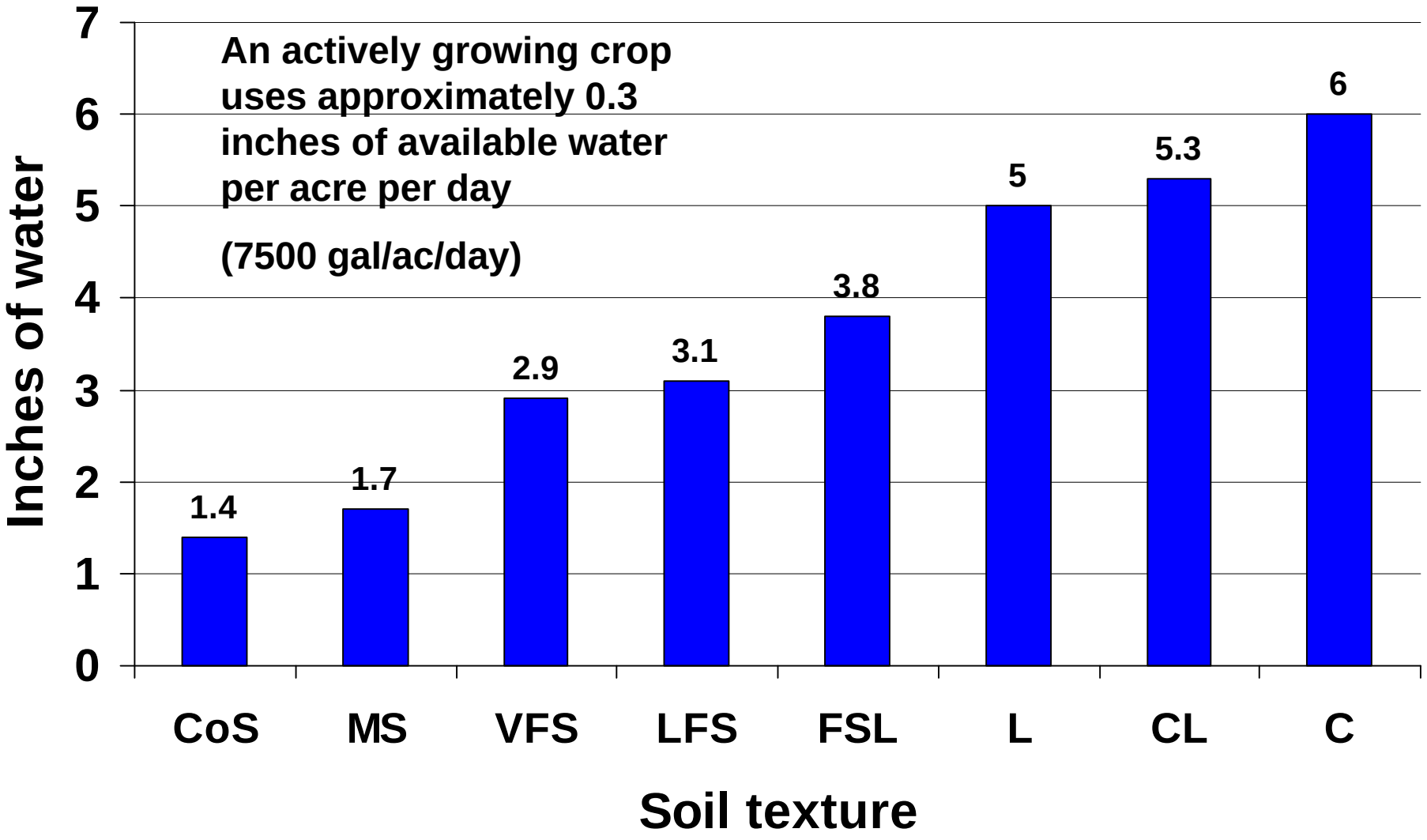
Poor

5W

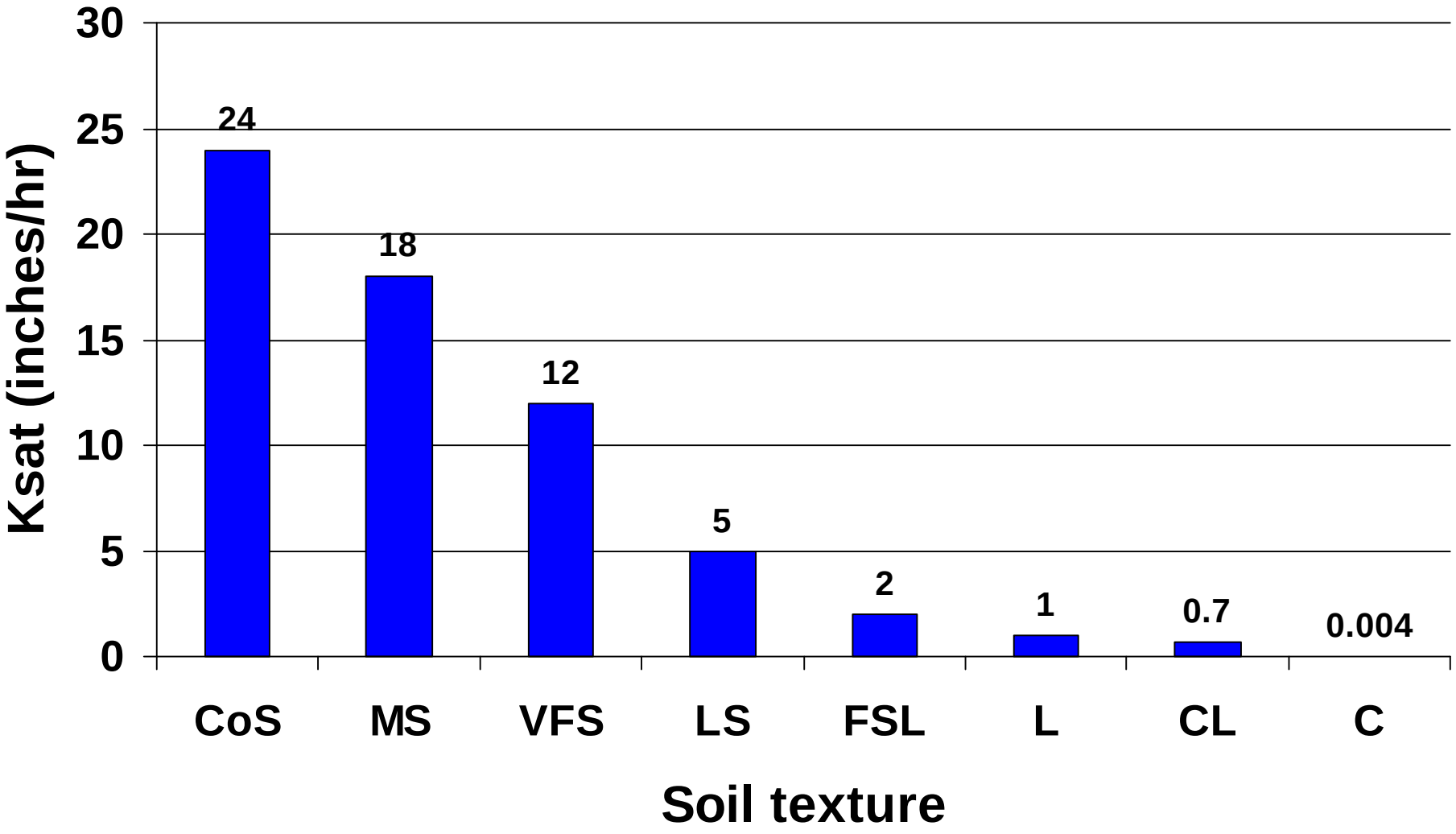
What We Can Do

- Excess Moisture (W)
  - **drainage**
  - **improve infiltration**
  - **increase soil organic matter**
  - **cropping choices (oats, soybeans,reed canarygrass, birdsfoot trefoil)**
- Lack of Moisture (M)
  - **conserve moisture**
  - **reduce evaporation**
  - **trap snow**
  - **reduce tillage**
  - **increase soil organic matter**
  - **cropping choices (cereals, peas, millet, crested wheatgrass)**

Soil texture and available water in 2 feet of soil

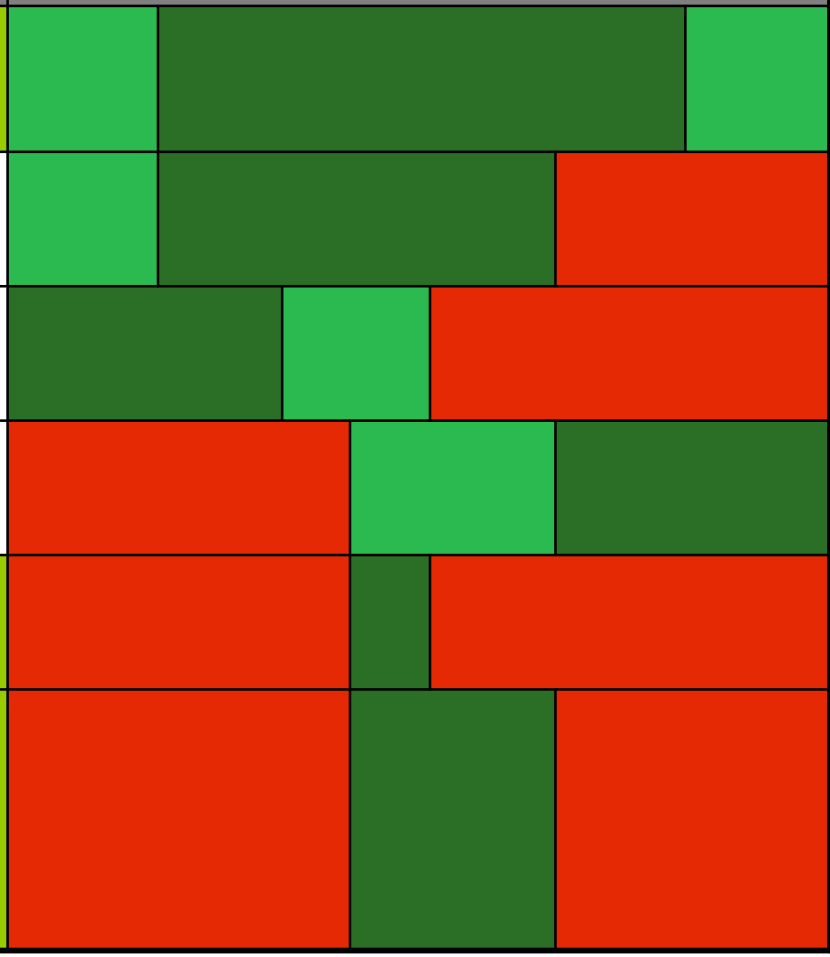


Relationship between soil texture and saturated hydraulic conductivity



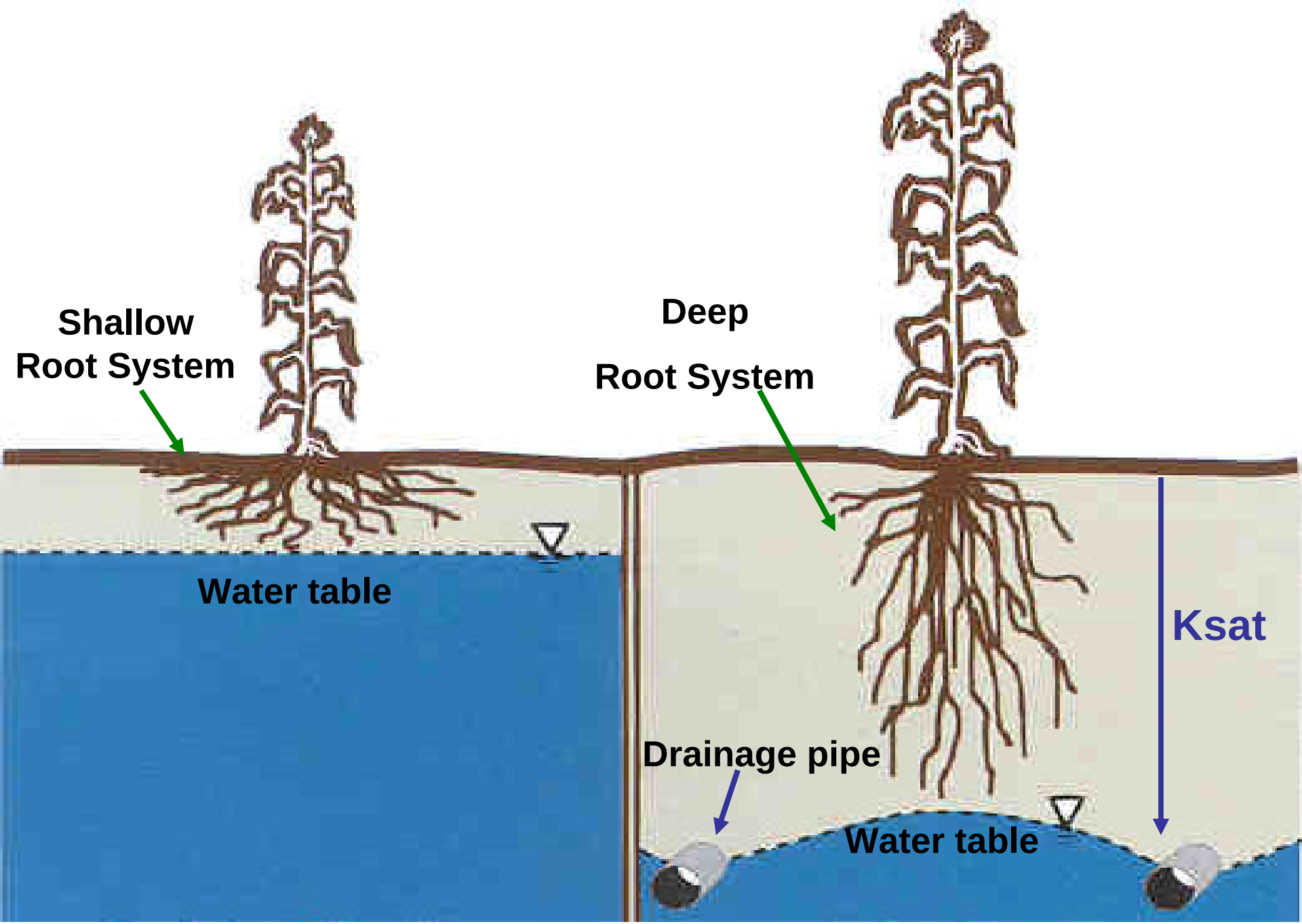
Soil Type vs. Moisture

Soil Type (Ag Cap)	Texture	Drainage	AWHC To 3 ft	Growing Season Conditions Dry Moist Wet
Class 1 soil	Loam Clay loam	Well	10”	
RIV (2W)	Clay	Imperfect	11”	
OBO (3W)	Clay	Poor	11”	
SCK (4M)	Sand	Well	5”	
ASS (3MW)	Sand	Imperfect	5”	
ASS (3MW) with tile drainage	Sand	Imperfect	5”	



Benefits of Tiling Wet Sands

	Untiled	Tiled
Soil moisture in root zone	***Saturated throughout***	***Field capacity above tile, saturated below tile***
Potential for water uptake by crop	***Negligible***	***Full***
Oxygen availability	***Negligible***	***Full***



Adapted from: Agricultural Drainage publication series, Issues and Answers by L. Busman & G. Sands


6
5
1
7
2
4
3
June 21, 2005

N budget (Miami, 2004)

Barley **Cool & moist conditions**

Site (Ag Cap)	2 - untiled (2X)	5 – tiled (2W)	4 - tiled (5W)	6 - untiled (5W)
Start N	42 + 80 = 122 lb/ac	79 + 80 = 159 lb/ac	59 + 80 = 139 lb/ac	34 + 80 = 114 lb/ac
Crop Uptake	96 bu/ac 78 - grain 14 – straw	92 bu/ac 66 – grain 16 – straw	70 bu/ac 64 - grain 21 - straw	63 bu/ac 39 - grain 7 - straw
End N	10	19	56	13
% N Acct'd	84	64	101	52

N budget (Miami, 2005)

Canola **Warm & wet conditions**

Site (Ag Cap)	2 - untiled (2X)	5 – tiled (2W)	4 - tiled (5W)	6 - untiled (5W)
Start N	20 + 90 = 110 lb/ac	34 + 0 = 34 lb/ac	36 + 0 = 36 lb/ac	16 + 0 = 16 lb/ac
Crop Uptake	39 bu/ac 89 - grain 49 – straw	0 bu/ac 0 – grain 0 – straw	0 bu/ac 0 - grain 0 – straw	0 bu/ac 0 - grain 0 – straw
End N	15	70	83	48
% N Acct'd	140	206	231	300