Evaluation of Eliminating Fall-Timed, SubSoil Tillage in Processing Tomato Production

in California's lower Sacramento Valley

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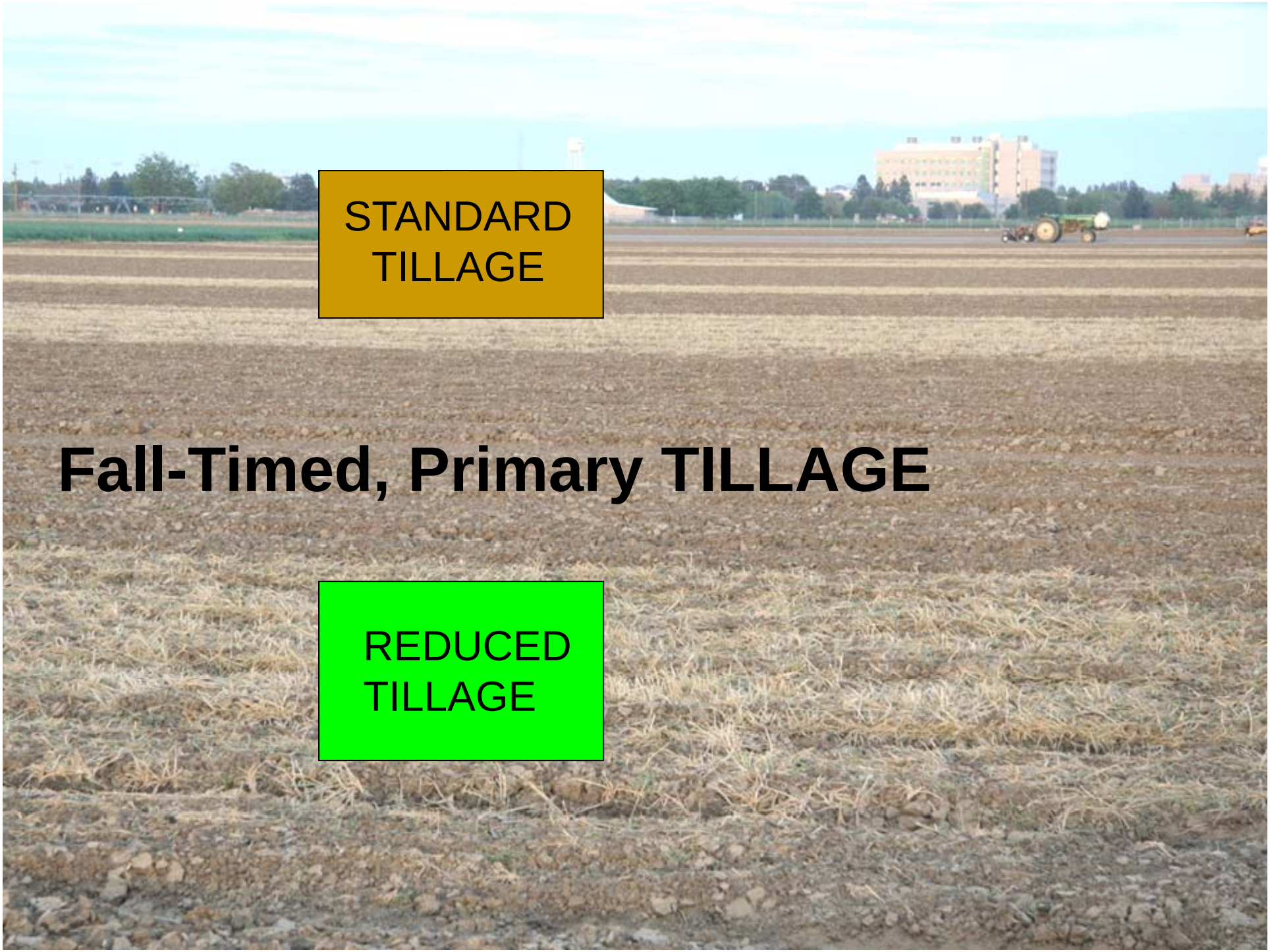
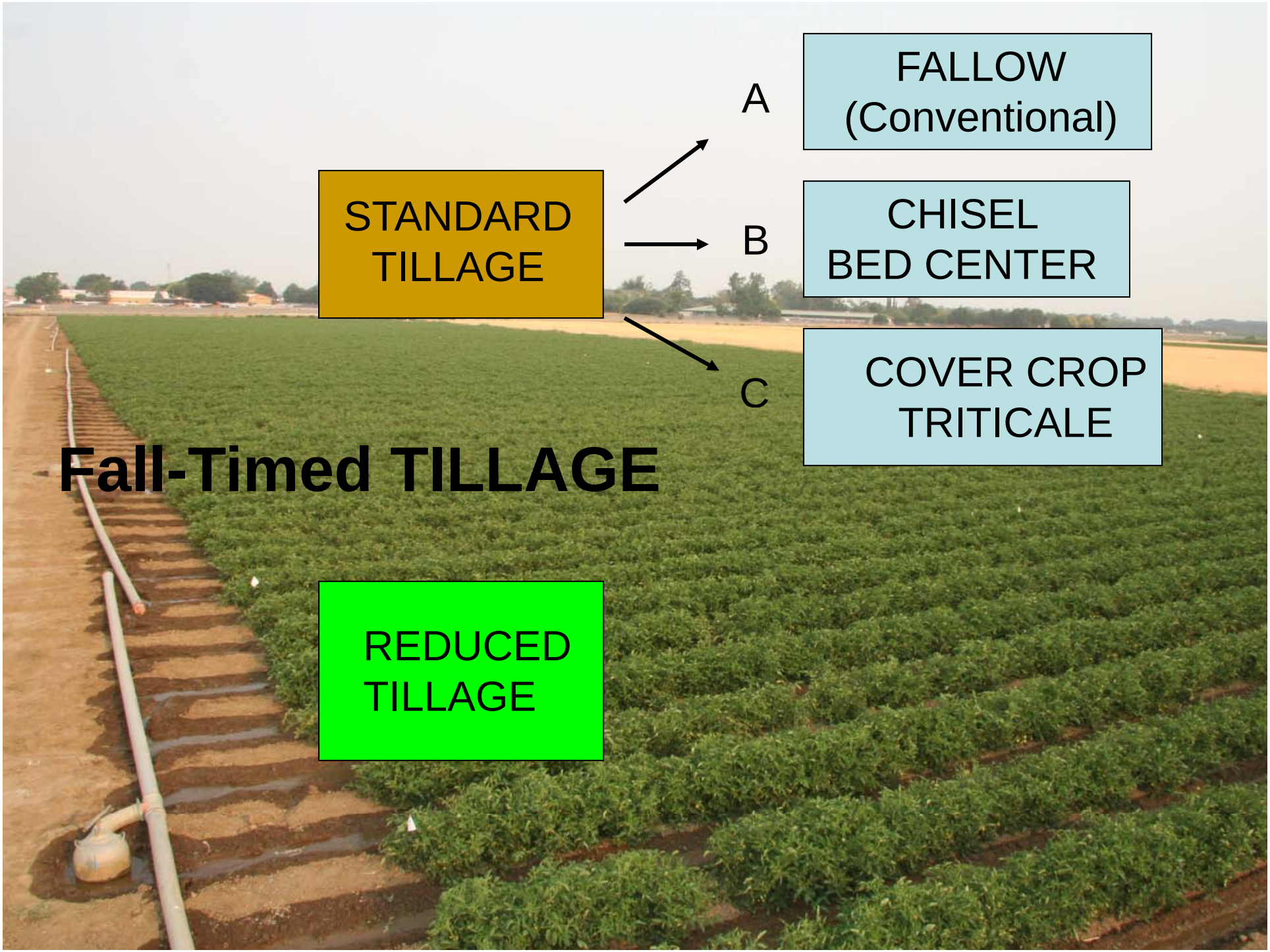
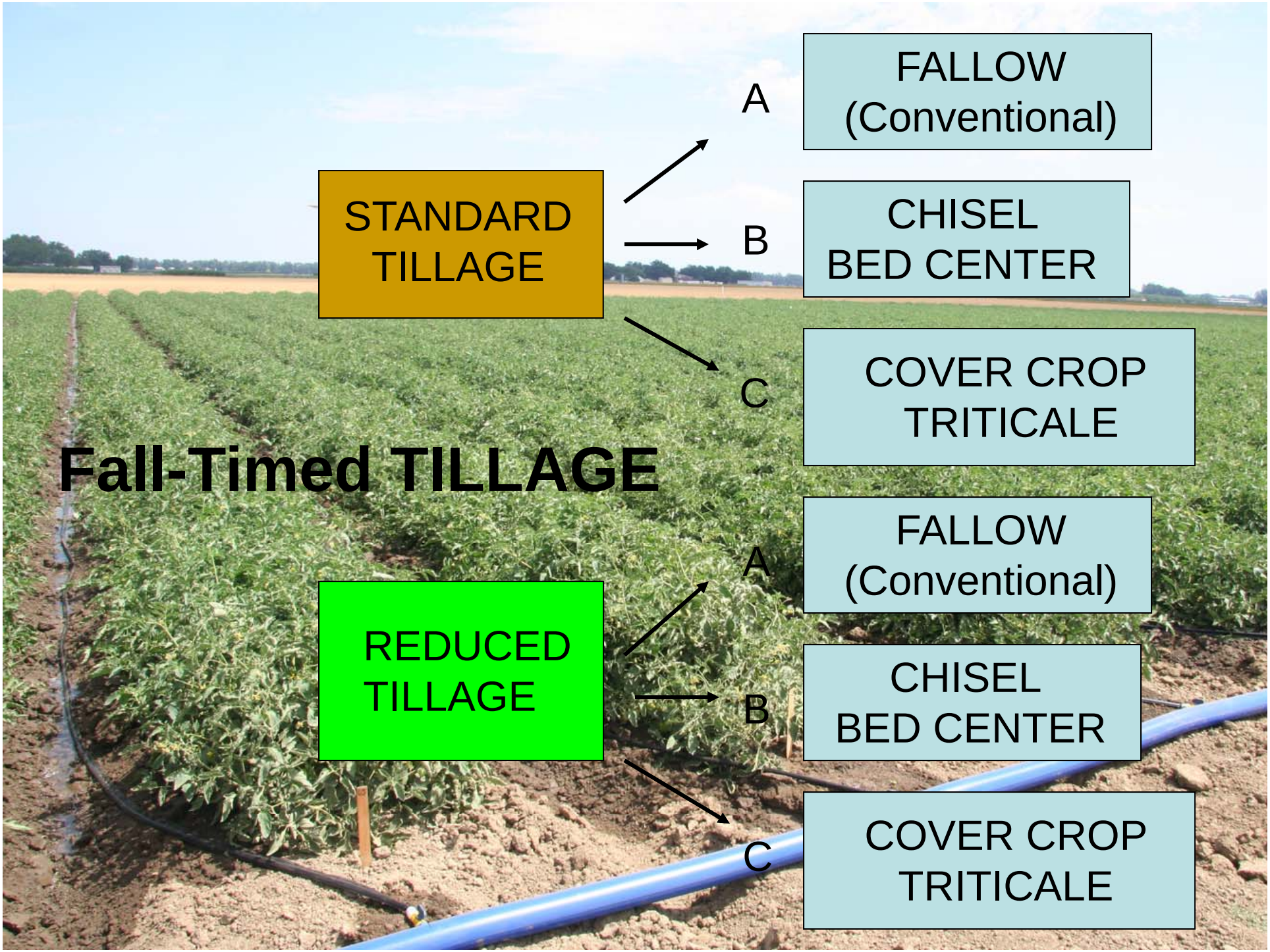
Approaching No-Till:
Fresh Market tomatoes
w/ buried drip irrigation
Major Challenges for Processing Tomato Growers:
✓ Furrow irrigation w/ high residue
✓ Weed control w/out cultivation
✓ Mechanical harvest w/ residue & minimally disturbed soils


CAT


CAT


STANDARD TILLAGE
Fall-Timed, Primary TILLAGE
REDUCED TILLAGE


STANDARD TILLAGE
A
FALLOW (Conventional)
B
CHISEL BED CENTER
C
COVER CROP TRITICALE
Fall-Timed TILLAGE
REDUCED TILLAGE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JOHNSON
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Reduced Fall Tillage Comparison, UC Davis, 2007

Treatment Tillage		Net Yield (Tons/A)
Standard Till	Chisel Center	23.8
Standard Till	none	25.2
Reduced Till	Chisel Center	24.5
Reduced Till	none	24.1
Standard till		25.9
Reduced till		24.3
Probability		NS
	Chisel Center	24.2
	none	24.6
Probability		NS
	Interaction	NS
	%CV	11

- ✓ Similar yield between tillage systems
- ✓ Bed chisel – no response in 1st year
- ✓ Slight reduction in PTAB color, brix, and early plant growth

Reduced Fall Tillage Comparison
Effect on Yield (tons/A)
UC Davis, 2008

	Tillage Method		
	Conventional	Reduced	
Chisel (bed center)	33.5 z	40.1	a
Triticale	32.4 z	27.5	b
Fallow	30.9 z	31.1	b
LSD (@ 0.05)	5.0	7.5	

Soil Penetrometer Measurement (lbs/sq in.)
Preplant, 2009

	(sub plots) in-bed treatment	(Main Tillage Treatment) Standard	Conservation
1	chisel bed center	60	70
2	triticale cover crop	225	207
3	no additional	143	124

Standard tillage	143	
Conservation Tillage	134	
LSD	NS	
Chisel bed center	65	a
triticale cover	216	c
nothing	133	b
LSD 5%	47	
Interaction	NS	

Reduced Fall Tillage Comparison, 2009

Tillage treatment		Marketable yield *tons/A*	Brix	color	pH
1. Conventional		**33.3**	5.84	24.3	4.29
2. Bed tillage		**33.6**	5.83	24.7	4.28
probability		NS	NS	NS	NS
F statistic		0.0	0.0	0.8	0.2
a) chisel bed center		34.1	5.81	24.7	4.26
b) triticale cover crop		33.7	5.83	24.5	4.29
c) fallow		32.6	5.87	24.3	4.29
probability		NS	NS	NS	0.21
	F value	0.3	0.1	0.3	1.9
conventional	chisel	32.7	5.95	24.5	4.26
conventional	triticale	34.0	5.72	24.5	4.30
conventional	fallow	33.2	5.85	23.8	4.30
bed tillage	chisel	35.4	5.67	24.8	4.26
bed tillage	triticale	33.4	5.93	24.5	4.29
bed tillage	fallow	31.9	5.88	24.8	4.28
interaction probability		NS	0.34	NS	NS
LSD @5%		-	-	-	-
	% CV	10	5	3	1

✓Yields similar between reduced & conventional tillage

Reduced Fall Tillage Comparison, 3-year comparison 2007-09

Reduced Fall Tillage Comparison, 3-year comparison

Tillage treatment		*tons/A*	Brix	color	pH
1. Conventional		30.4	5.99	23.8	4.39
2. Reduced tillage		31.1	5.81	24.8	4.40
	probability	NS	NS	0.02	NS
	F statistic	0.1	2.1	10.0	0.1
a) chisel bed center		32.0	5.87	23.8	4.37
b) triticale cover crop		-	-	-	-
c) fallow		29.5	5.93	24.8	4.40
	probability	0.10	NS	NS	NS
	F value	3.2	0.8	1.1	2.0
conventional	chisel	30.7	6.01	23.8	4.38
conventional	triticale	-	-	-	-
conventional	fallow	30.0	5.96	23.7	4.40
bed tillage	chisel	33.3	5.72	25.0	4.39
bed tillage	triticale	-	-	-	-
bed tillage	fallow	29.0	5.91	24.6	4.40
interaction	probability	NS	NS	NS	NS
	LSD @5%	-	-	-	-
	% CV	13	4	3	1

- ✓Reduced tillage produced equivalent yield
- ✓Chiseling bed center may be beneficial with reduced tillage (weakly significant)
- ✓Fruit color may be reduced.

Results: Tillage Trials, UC Davis 2007 - 2009

- ✓ Comparable fruit yields between standard vs. reduced fall tillage.
- ✓ Benefit of single chisel in bed center w/ reduced tillage system?

Future Plans:

Expand testing into grower fields in fall 2010 ?

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T S & L
Ag Seeds Unlimited


TIE UP
2

The End