Risk Management and Fumigation Choice in Florida Tomato Production

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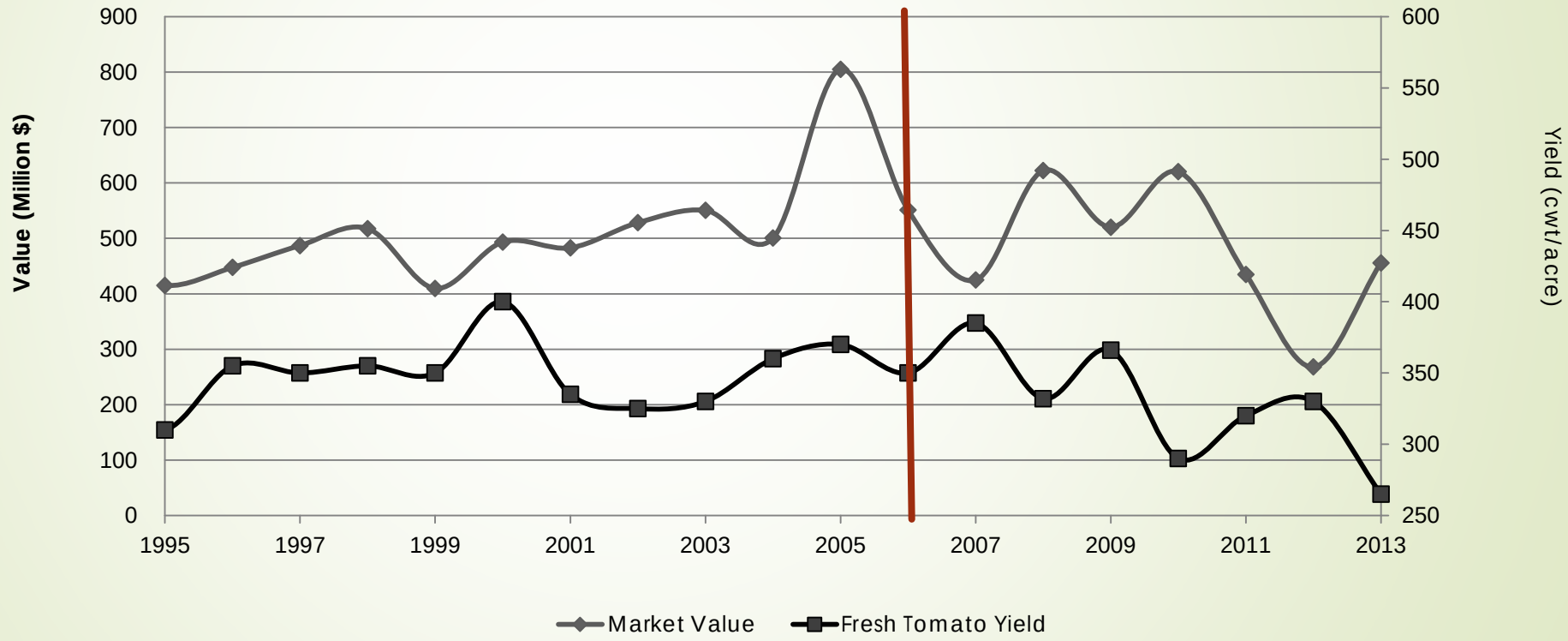
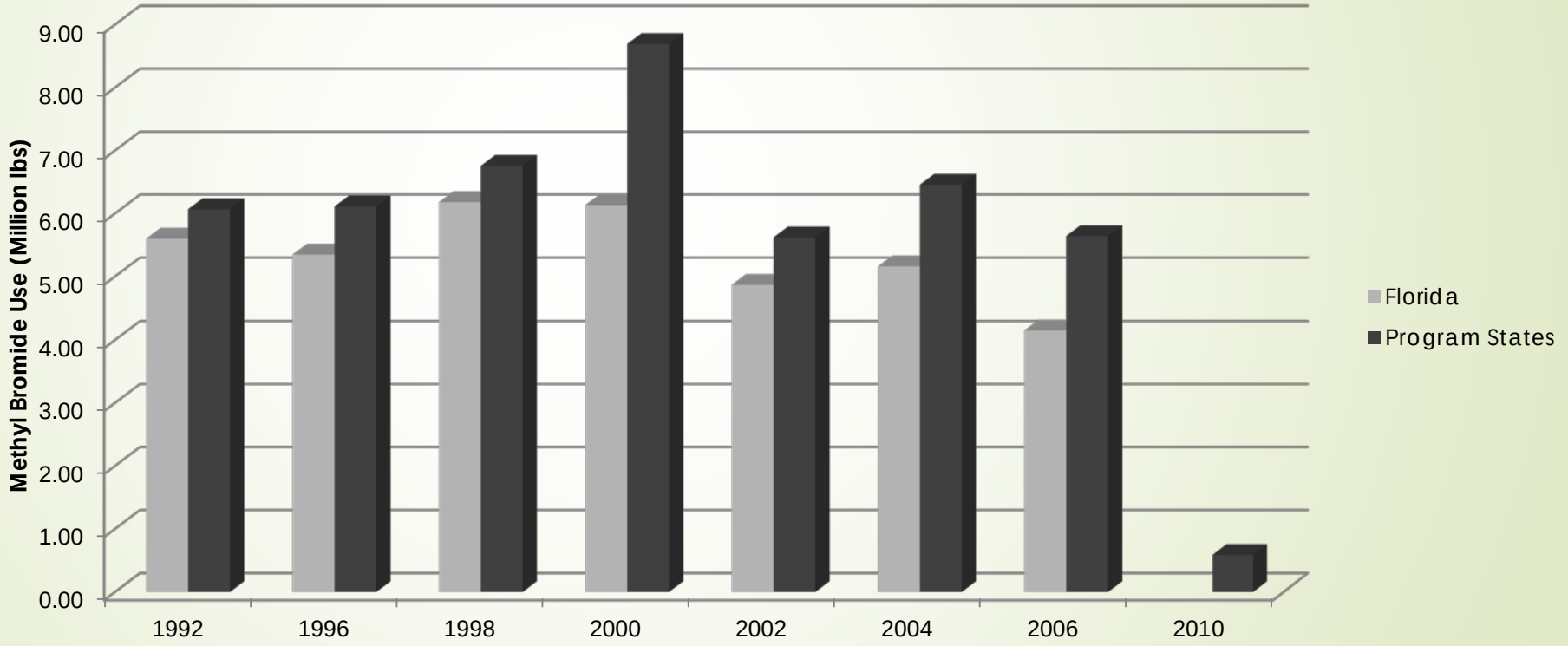
Fresh tomato market value and yield for Florida's fresh tomatoes, 1995-2013 (USDA-NASS 2014a).



Methyl Bromide use estimates for fresh tomatoes in Florida and program states, 1992-2010 (USDA NASS, 2014b)



Relative effectiveness of various soil fumigant alternatives to methyl bromide for nematode, soilborne disease, and weed control in Florida

	Relative Pesticidal Activity		
Fumigant	Nematode	Disease	Weed
1) Methyl Bromide 50/50	Good to Excellent	Excellent	Fair to Excellent
2) Chloropicrin2	None to Poor	Excellent	Poor
3) Methyl Iodide	Good to Excellent	Good to Excellent	Good to Excellent
4) Metam Sodium	Erratic	Erratic	Erratic
5) Telone® II	Good to Excellent	None to Poor	Poor
6) Telone® C17	Good to Excellent	Good	Poor
7) Telone® C35	Good to Excellent	Good to Excellent	Poor to Fair
8) Pic-Clor 60	Good to Excellent	Good to Excellent	Poor to Fair
9) Metam Potassium (Kpam)	Erratic	Erratic	Erratic
10) Dimethyl Disulfide	Good to Excellent	Good to Excellent	Poor to Excellent

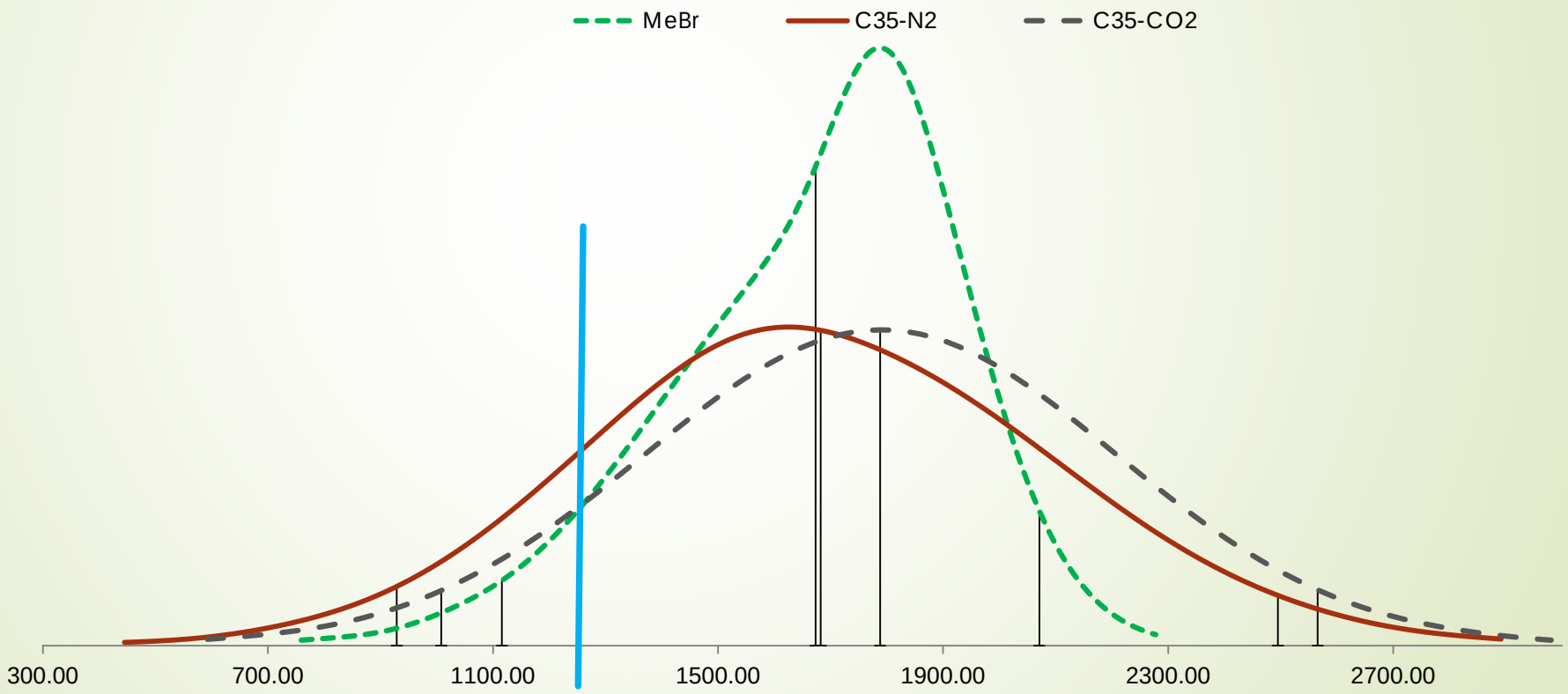
Notes: The table is adjusted from the University of Florida extension study on MBr alternatives (Noling et al. 2012).

Summary Yield Results of Field Studies for 2011-2012 and 2012-2013 seasons

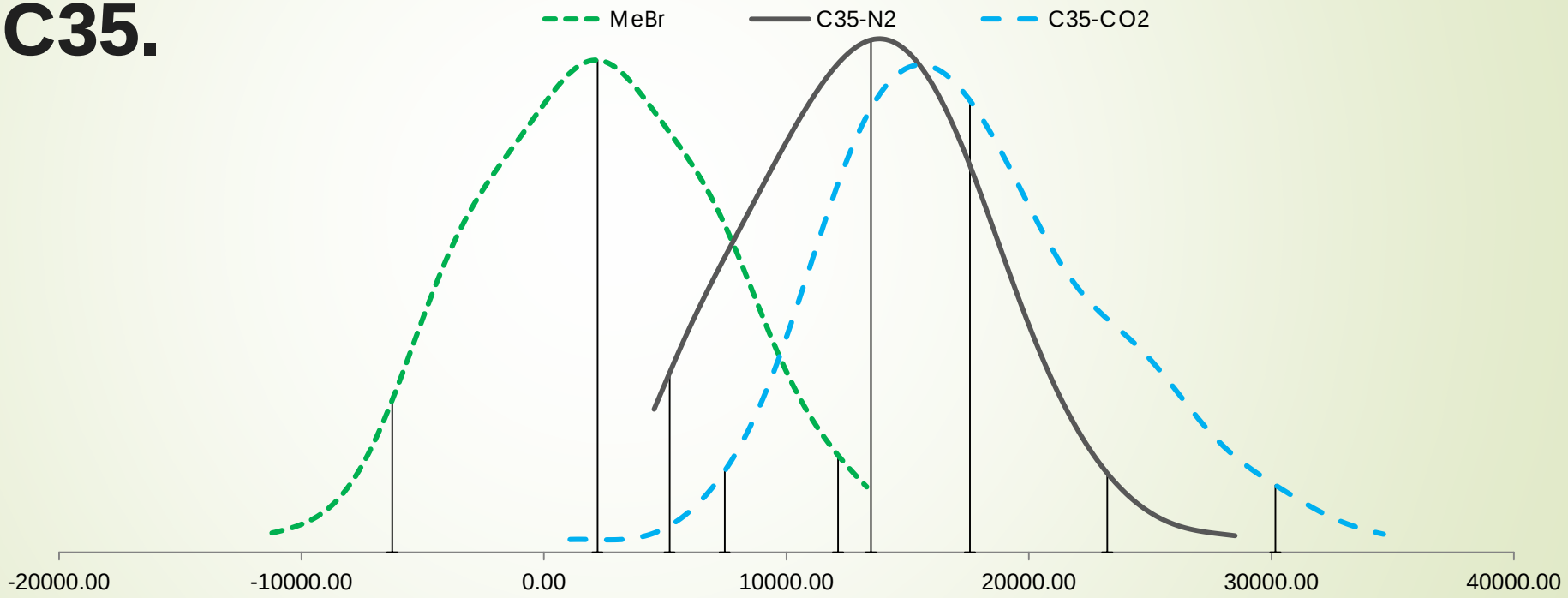
			Marketable Yield (Mean)	Standard Deviation	Marketable Yield (Median)
Treatment	Plastic	Season	(lbs/Plant)		(lbs/Plant)
Methyl Bromide trials					
350 lb 50:50 MBr:Pic*	VIF	2011-12	8.23	1.18	8.41
400 lb 50:50 MBr:Pic	TIF	2012-13	8.37	2.38	8.61
Telone C35 trials					
Full C35 + N2	VIF	2011-12	6.42	1.36	6.33
0.5 C35 + N2	VIF	2011-12	4.94	1.71	4.84
0.3 C35 + N2	VIF	2011-12	3.38	1.84	3.35
0.3 C35 + N2*	TIF	2011-12	8.00	2.27	7.44
0.5 C35 + CO2	VIF	2011-12	5.39	1.85	5.37
0.3 C35 + CO2	VIF	2011-12	4.15	1.65	3.63
0.3 C35 + CO2*	TIF	2011-12	8.74	2.18	8.91
Dimethyl Disulfide trials					
15 GPA 79:21 DMDS:Pic + CO2	TIF	2012-13	7.77	1.73	8.09
25 GPA 79:21 DMDS:Pic + CO2	TIF	2012-13	7.17	1.61	7.12
40 GPA 79:21 DMDS:Pic + CO2*	TIF	2012-13	7.83	1.28	7.69
15 GPA 79:21 DMDS:Pic + N2	TIF	2012-13	6.98	2.18	7.22
25 GPA 79:21 DMDS:Pic + N2	TIF	2012-13	7.46	1.85	7.69
40 GPA 79:21 DMDS:Pic + N2*	TIF	2012-13	8.82	2.24	9.32
Control trials					
Untreated	VIF	2011-12	1.24	0.57	1.16
Untreated	TIF	2011-12	3.66	1.23	3.50
Untreated	TIF	2012-13	5.24	2.78	6.14

Notes: * represents the top yield performances from trials used in risk analysis.

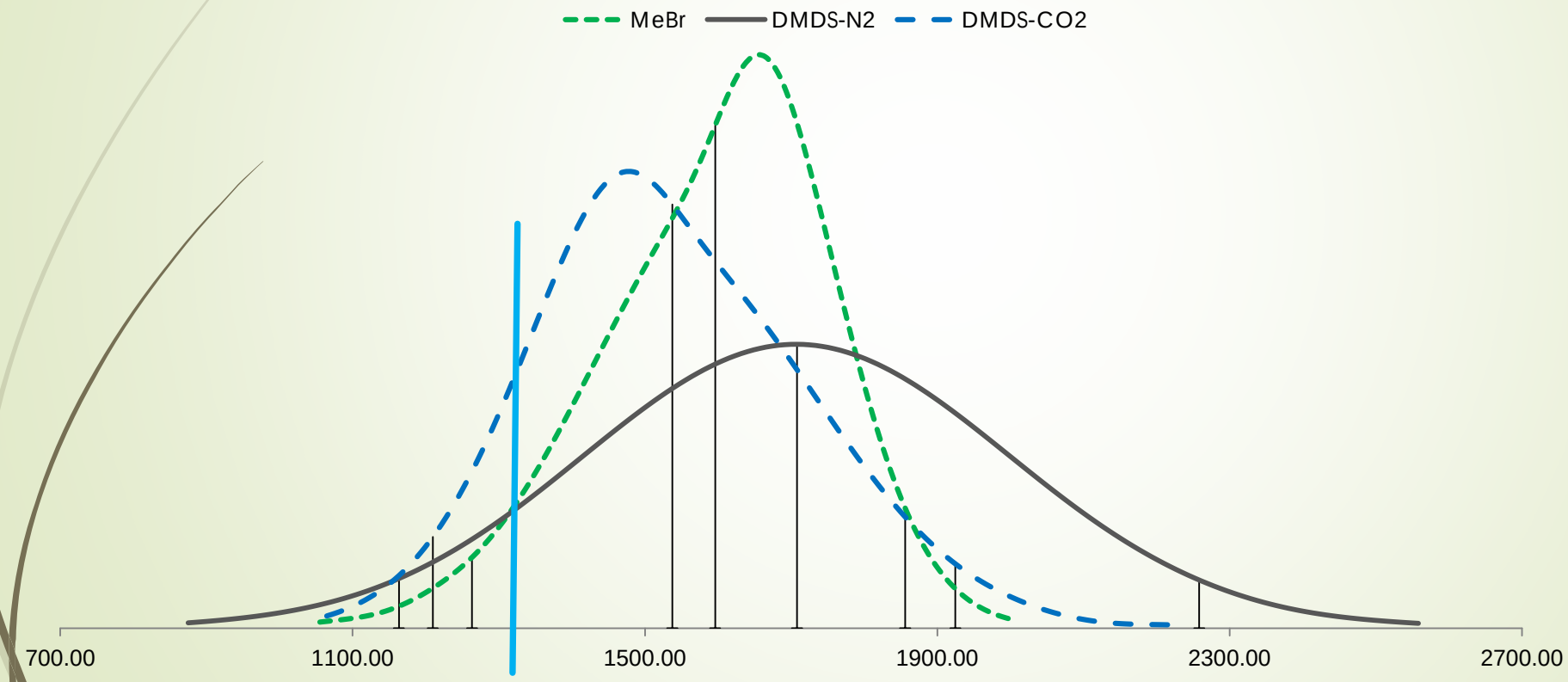
Probability Distribution Function Approximations of tomato yield with MBr and Telone C35.



Probability Distribution Function Approximations of Net Present Values for a 1-Acre tomato farm with MBr and Telone C35.

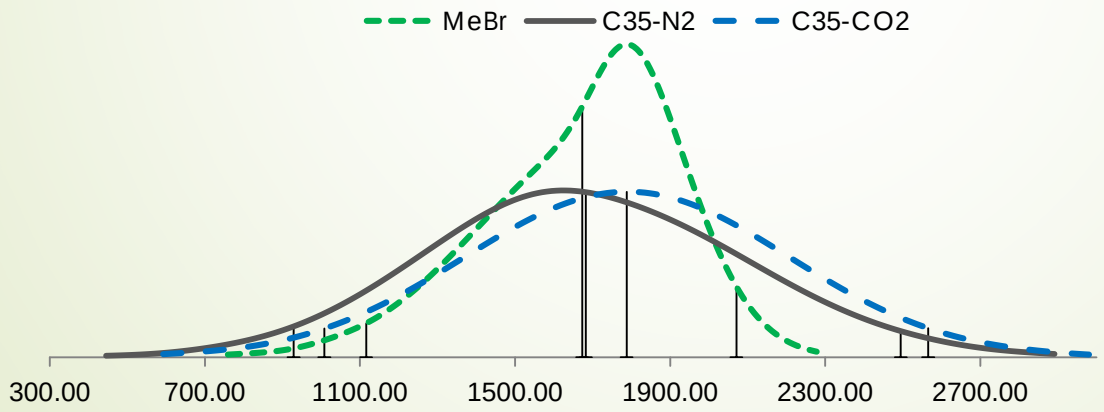


Probability Distribution Function Approximations of tomato yield with MBr and DMDS:Pic



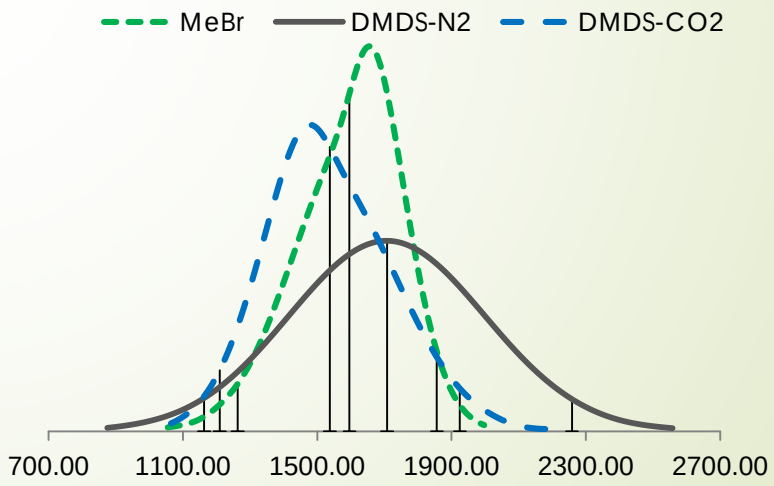
Preferred fumigant alternatives (MBR or Telone C-35) for risk averse and risk taking individuals

	Risk Takers				Risk Averse	
	Low Risk Aversion Coefficient: 0				Upper RAC	0.005
	Name	Level of Preference			Name	Level of Preference
1	C35-CO2	Most Preferred		1	MBr	Most Preferred
2	C35-N2	2nd Most Preferred		2	C35-CO2	2nd Most Preferred
3	MBr	3rd Most Preferred		3	C35-N2	3rd Most Preferred



Preferred fumigant alternatives (MBR or DMDS) for risk averse and risk taking individuals

Risk Takers				Risk Averse		
	Lower RAC	0		Upper RAC	0.005	
	Name	Level of Preference		Name	Level of Preference	
1	DMDS-N2	Most Preferred	1	MBr	Most Preferred	
2	MBr	2nd Most Preferred	2	DMDS-N2	2nd Most Preferred	
3	DMDS-CO2	3rd Most Preferred	3	DMDS-CO2	3rd Most Preferred	



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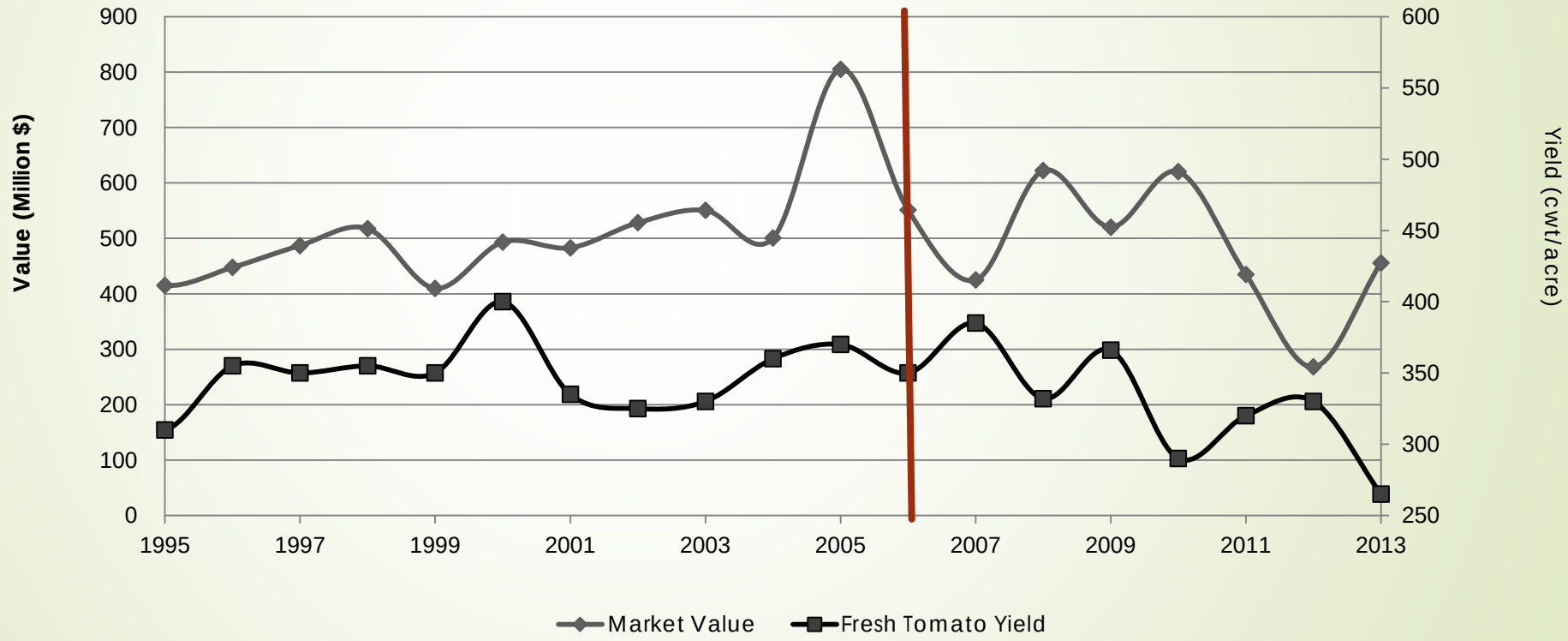

Conclusions

- There is **considerable risk** to producers as they move to alternatives for soil fumigation.
- **Risk averse producers** would prefer to continue using methyl bromide because it results in the least downside risk to producing tomatoes
- **Higher risk-taking individuals** may be willing to switch to alternatives that can result in near similar yields and higher net returns, but they do contain additional risk from increases in the probability of crop failure.
- Alternatives have been identified to replace methyl bromide but they still **cannot replace the risk management provided by methyl bromide**.