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BETTER TOGETHER.

AN ECONOMIC EVALUATION OF CROP AND CROP/ANNUAL LEGUME PASTURE ROTATION SYSTEMS IN THE SWARTLAND, WESTERN CAPE, SOUTH AFRICA

6th World Conference on Conservation Agriculture
Winnipeg

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Introduction

- Cereal production since 1700's
- Monoculture
  - Wheat/holiday/wheat/holiday
- Break crop oats or fallow

- Land improvement scheme 70's and 80's
  - limited success
- Introduction of different crop rotation systems for the Swartland – 1996
- Long-term trial at Langgewens
  - Benefits of including alternate crops
  - No-till

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Trial layout and systems tested

Systems

Cash Crop systems

- 1. Monoculture (control)
- 2. Wheat – wheat – wheat – canola
- 3. Wheat – lupin – wheat – canola
- 4. Wheat – lupin – canola – Wheat

Crop/pasture systems

- 5. Wheat – Medic – Wheat – Medic
- 6. Wheat – Medic/Clover – Wheat – Medic/Clover
- 7. Wheat – Medic – Wheat – Canola
- 8. Wheat – Medic/Clover(saltbush) – Wheat – Medic/Clover (saltbush)

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Layout

- 50 ha
- 8 systems
- 2 reps
- Randomly allocated
- Minimum till up to 2002
- No-till
- **All crops of each system in the soil each year**

- Yield and economic comparison between systems on per ha basis
- Data set from 2002 to 2012
- Excluded 2003 due to total drought

- SAS used for analysis

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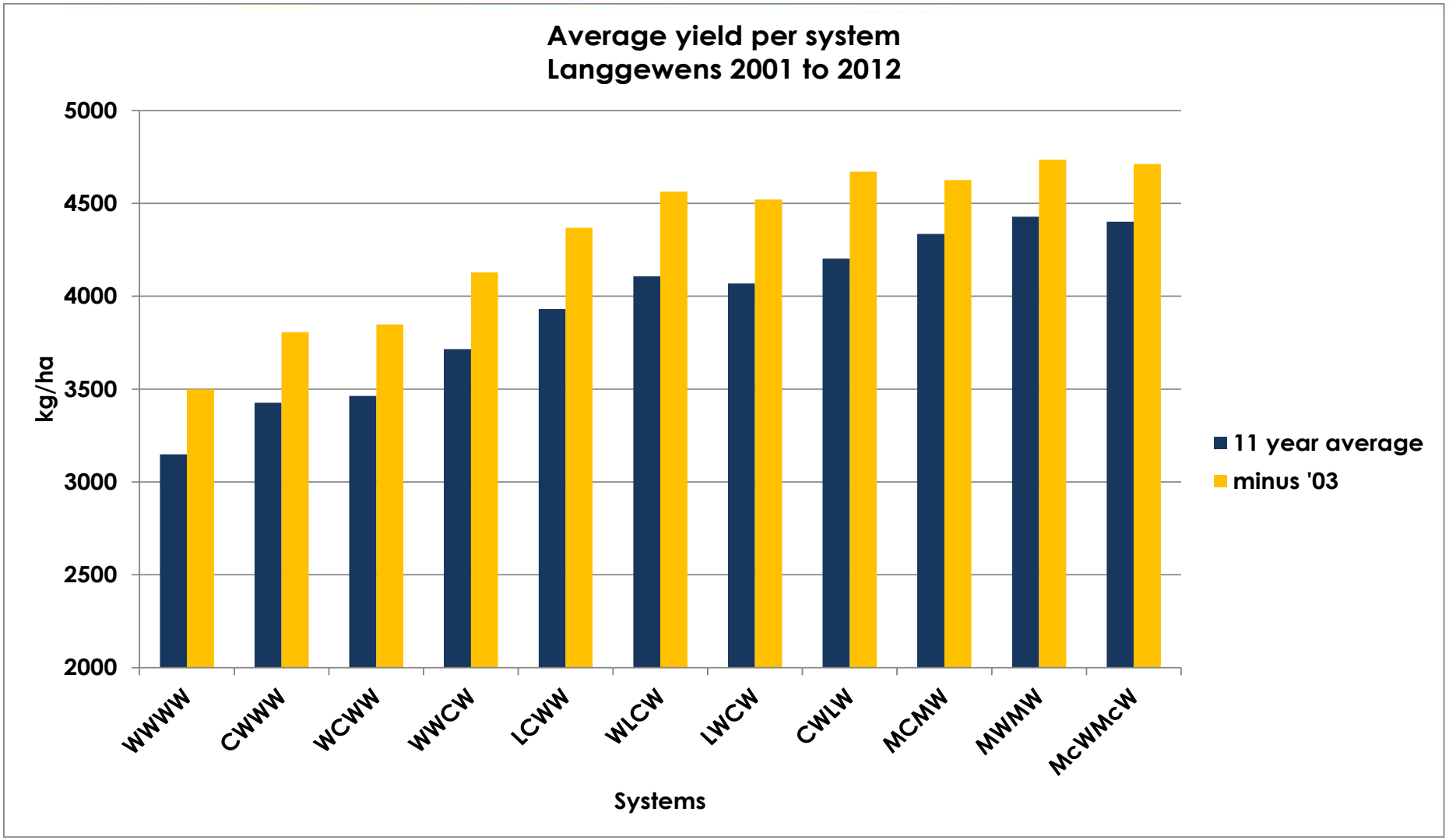
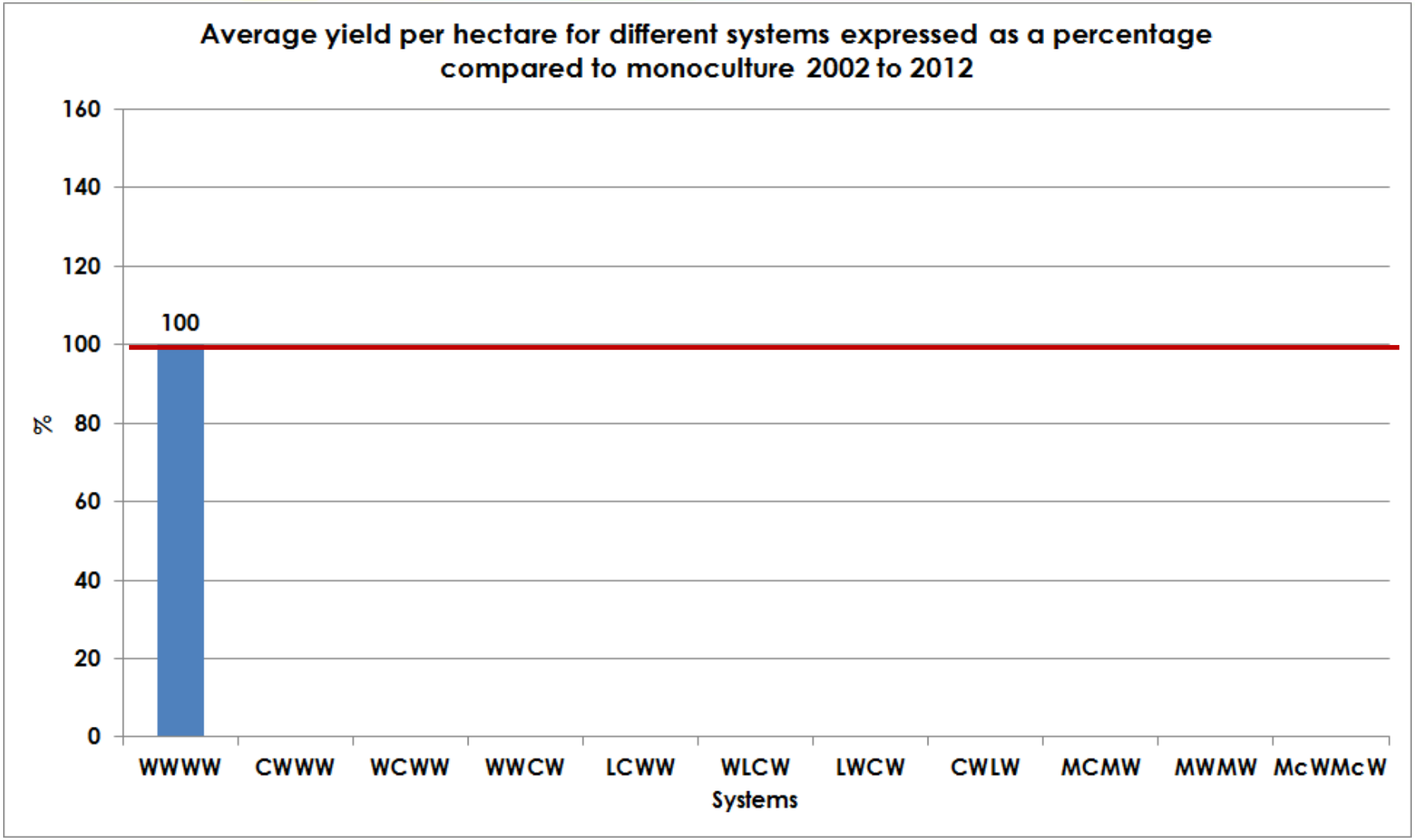
Results

Yield



Yield: rotation vs monoculture



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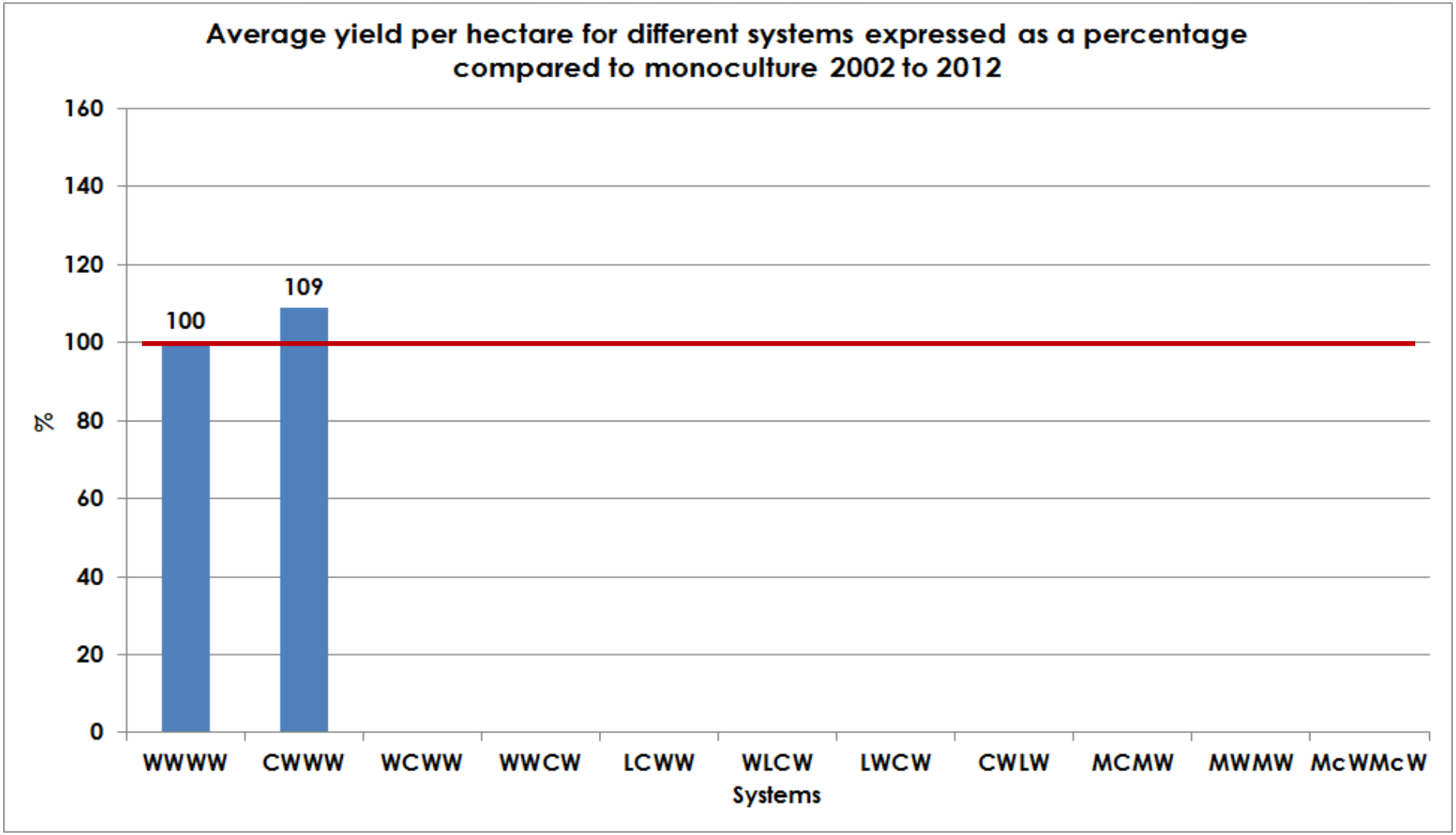
Yield: rotation vs monoculture



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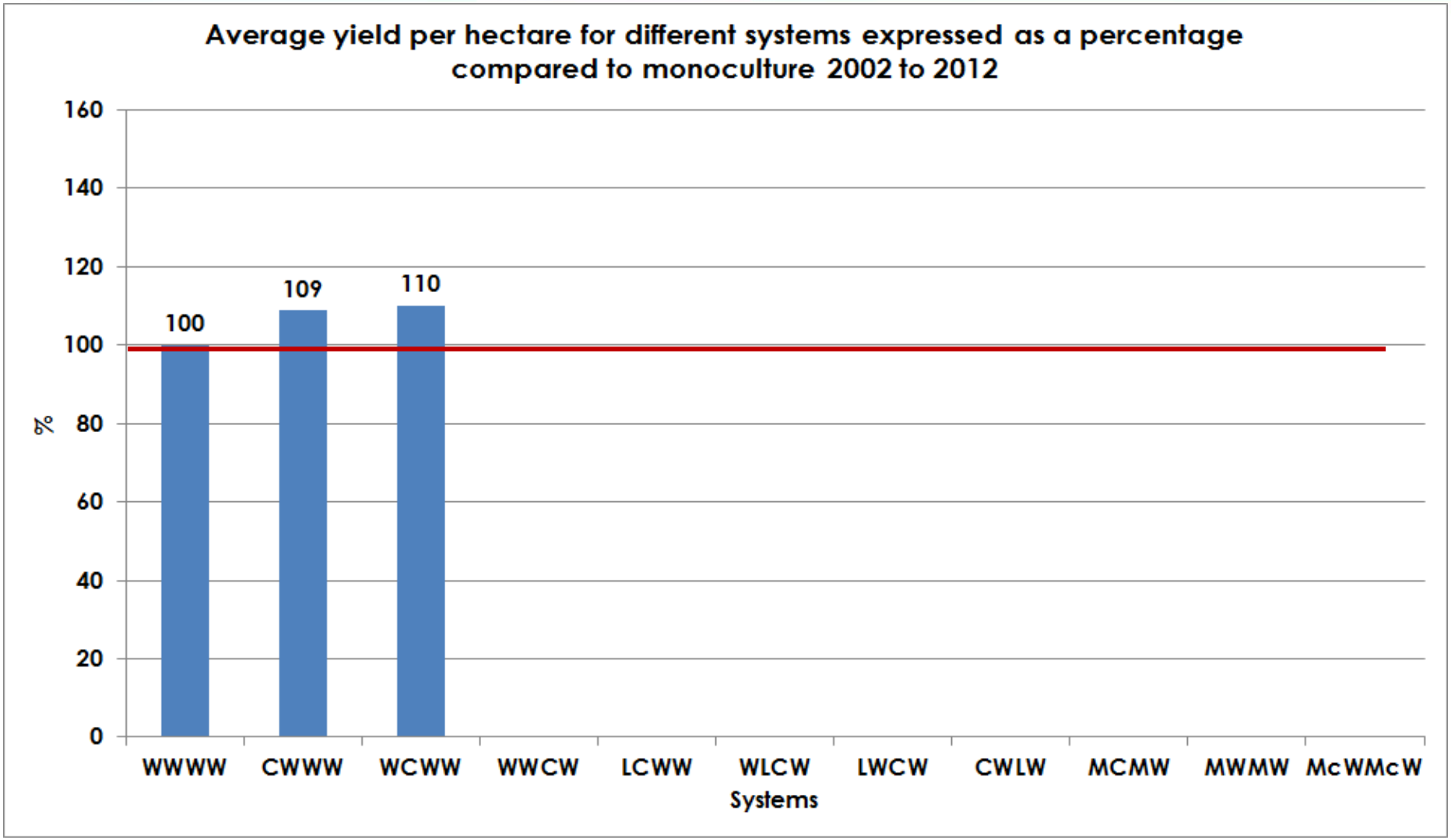
Yield: rotation vs monoculture



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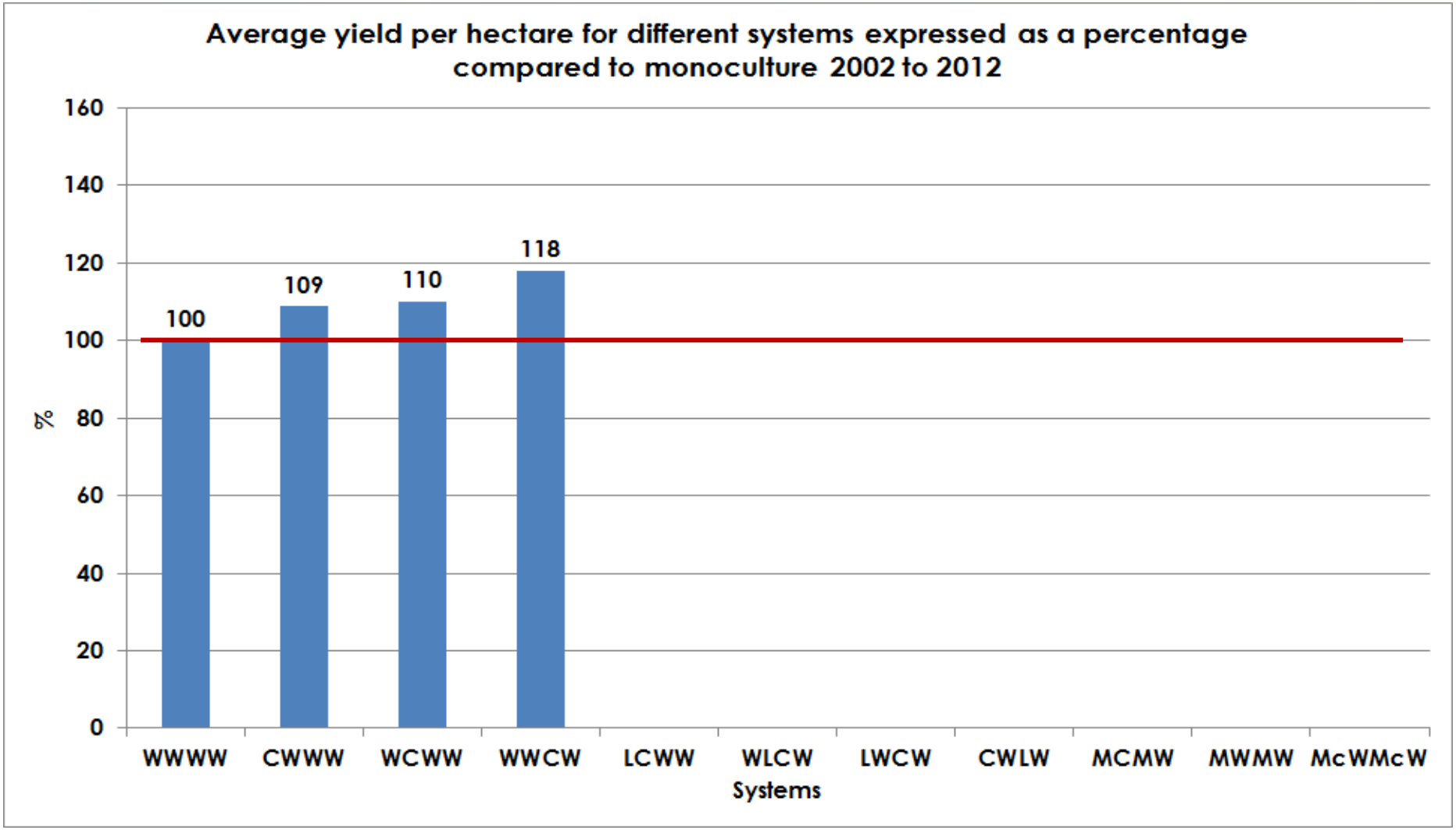
Yield: rotation vs monoculture



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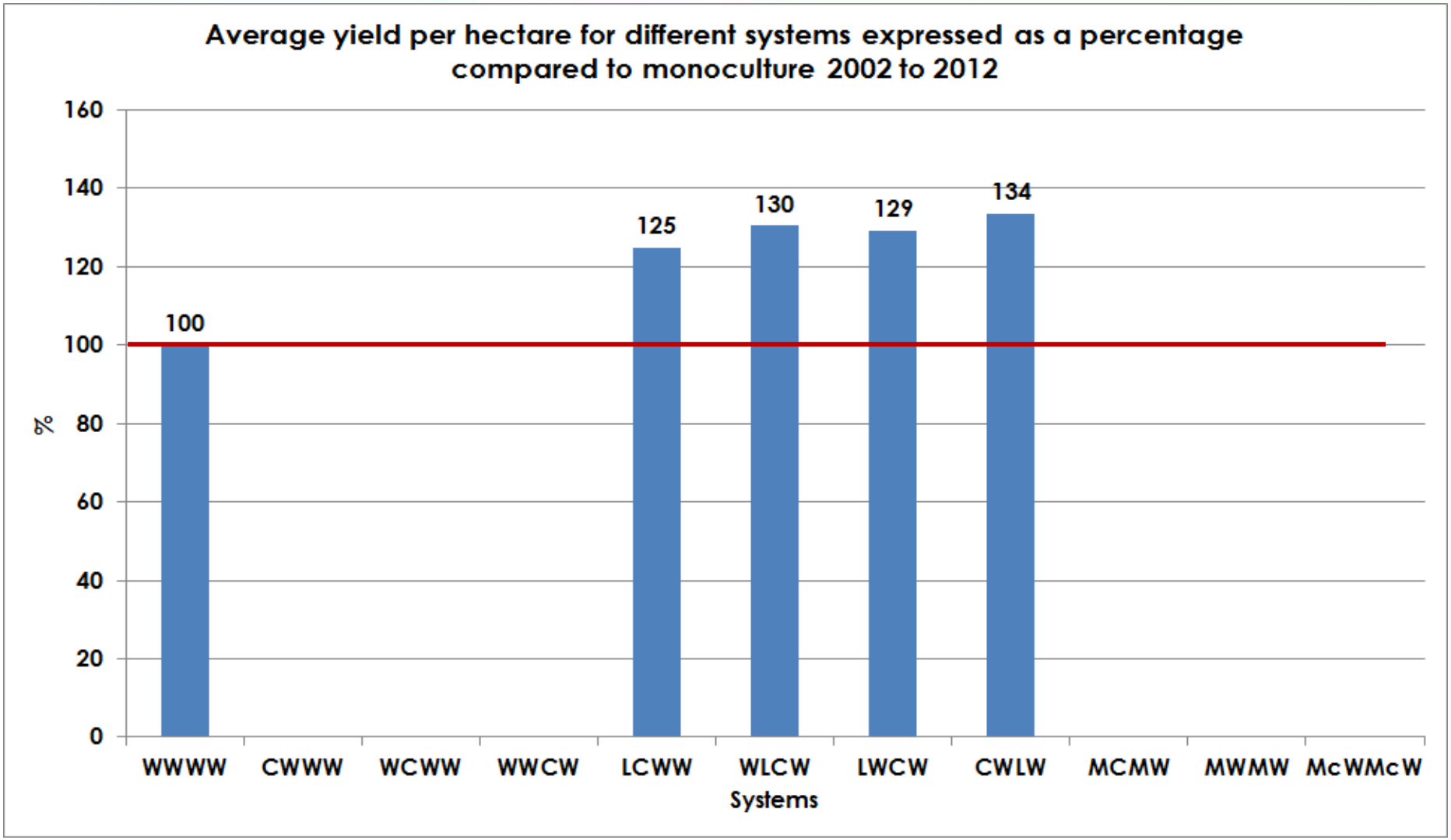
Yield: rotation vs monoculture



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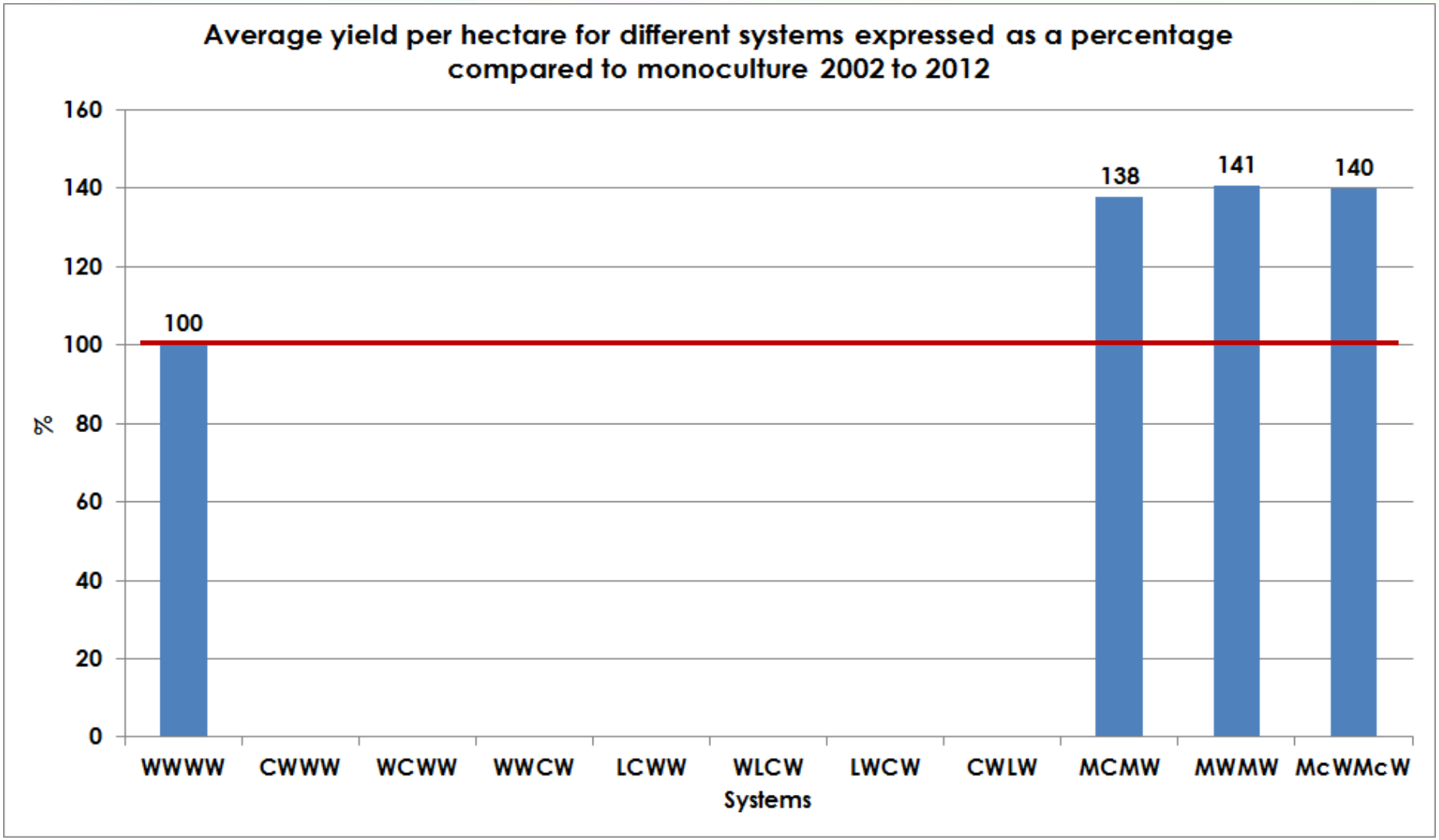
Yield: rotation vs monoculture



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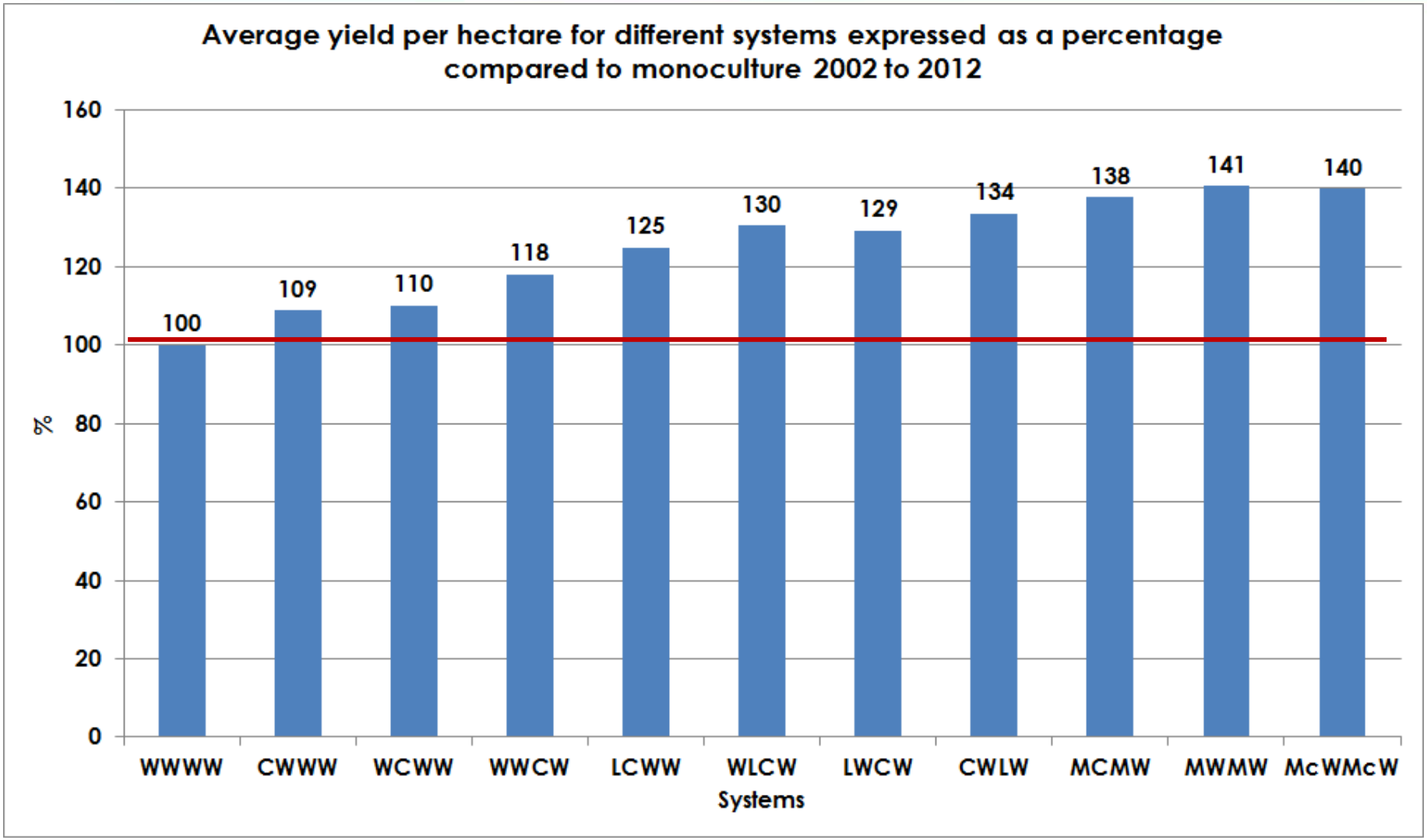
Yield: rotation vs monoculture



Total average farm wheat yield per system

System	Ave wheat yield kg/ha	Farm ha under wheat	Ave wheat total ton/farm	Ranking
WWWW	2 854^{cd}	100	2 283.2	1
WWWC	3 158^{c}	75	1 894.8	2
WLWC	3794^{ab}	50	1517.6	5
WLCW	3664^{ab}	50	1465.6	6
WMCM	4 072^{a}	25	814.4	7
WMWM	3 942^{a}	50	1 576.8	3
McWMcW	3 843^{ab}	50	1 537.2	4

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Farm gross income per system

System	Ave Gross Margin / ha	Total Gross Margin / 800 ha farm	Ranking
WWWW	2022d	1 617 600	7
WWWC	2684c	2 145 600	5
WLWC	3051b	2 440 800	4
WLCW	2495c	1 996 000	6
WMCM	2985b	2 388 000	2
WMWM	2972b	2 377 600	3
McWMcW	3402a	2 721 600	1

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Farm yield vs Gross Income

System	Difference between monoculture and rotation systems	Percentage Improvement
WWWW	-	
WWWC	528 115	33.6
WLWC	823 401	50.9
WLCW	378 112	23.4
WMCM	770 553	47.6
WMWM	760 216	47.0
McWMcW	1 103 959	68.2

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Conclusions

- Inclusion of alternative crops in rotation with wheat improves wheat yield
- Less is more
- Conservation Agriculture = the future for sustainable farming in the Western Cape

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Thank you

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