

Possibilities for a specific breeding program for organic dairy production



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Dairy production

- Organic dairy production
 - Management practices & labelling of products
 - Breeding animals originate mostly from conventional production
 - Specific regulations for breeding
 - Embryo transfer is not allowed
- Conventional dairy production
 - Embryo transfer
 - Breeding goal: economic values mostly based on conventional dairy production
 - Nordic Total Merit index

Aim

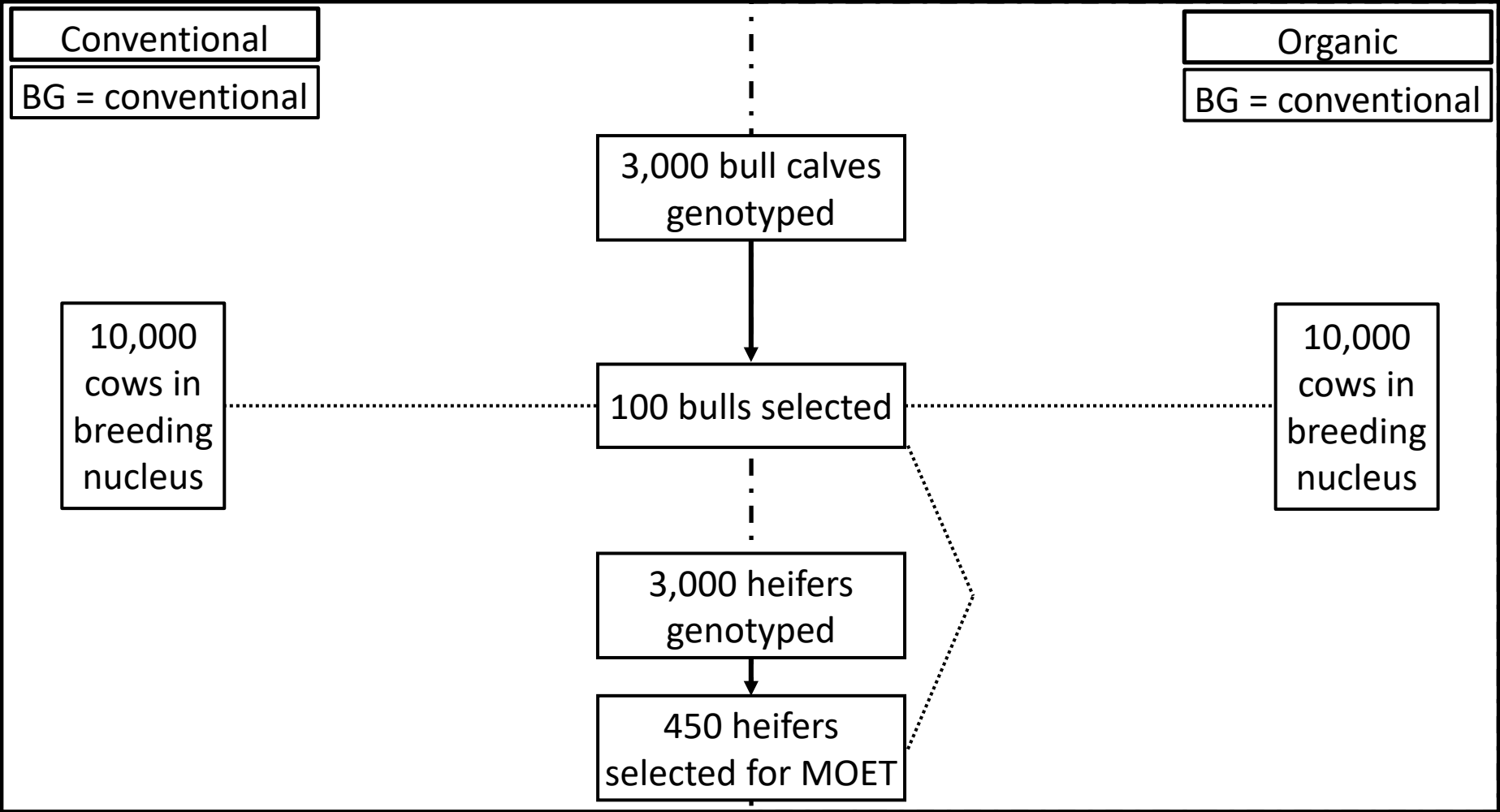
- Assess different environment-specific breeding strategies for organic dairy production
 - Breeding goal differences
 - Embryo transfer
 - Selection of conventional bulls



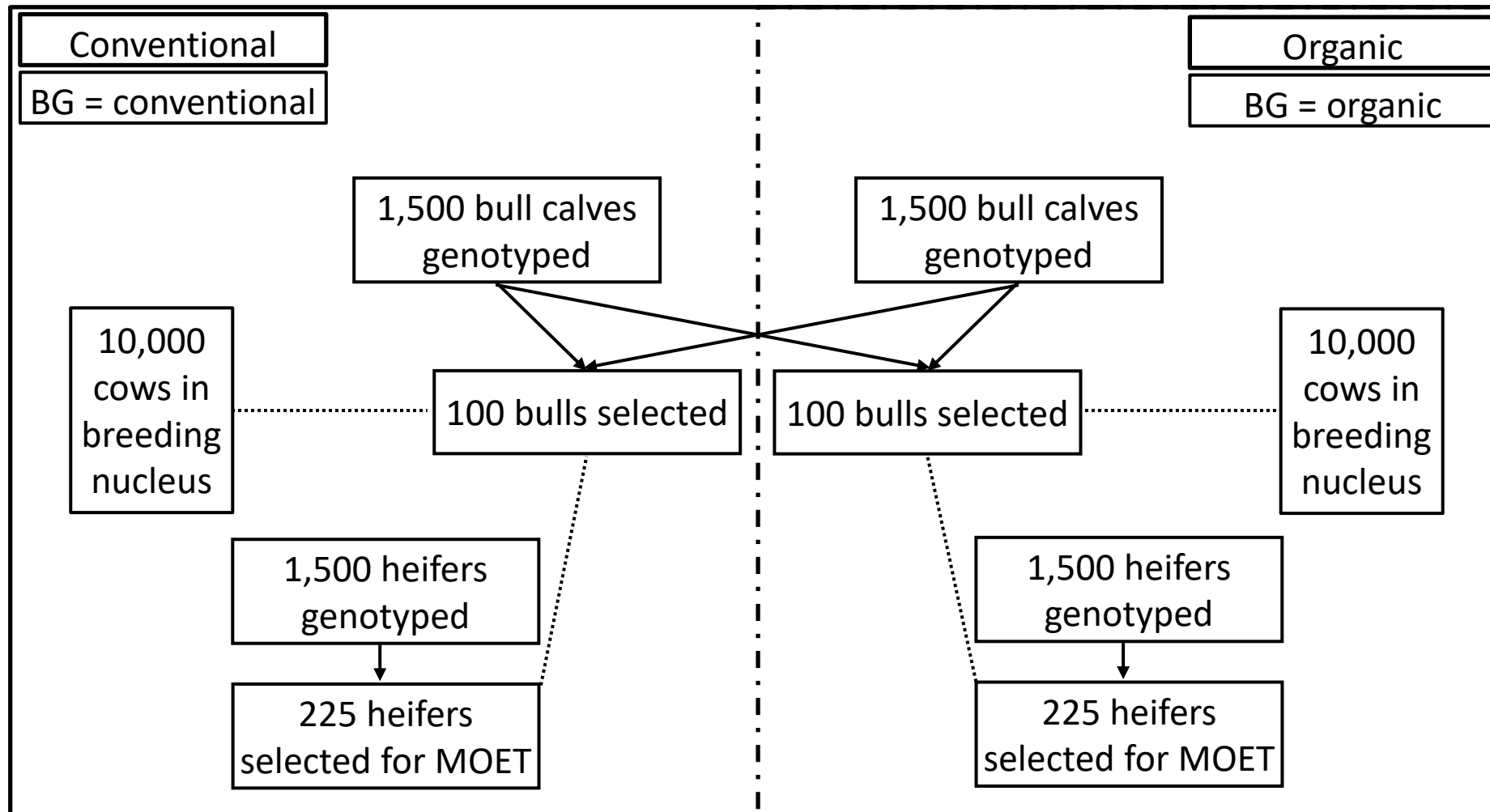
Methods

- Breeding goal
 - Traits: milk production, mastitis, cow fertility
 - Economic values for Holstein
 - NTM conventional and NTM organic
 - Match correlations sub-index NTM
- GxE estimates from Denmark (Liu et al., 2019)
- Five scenarios

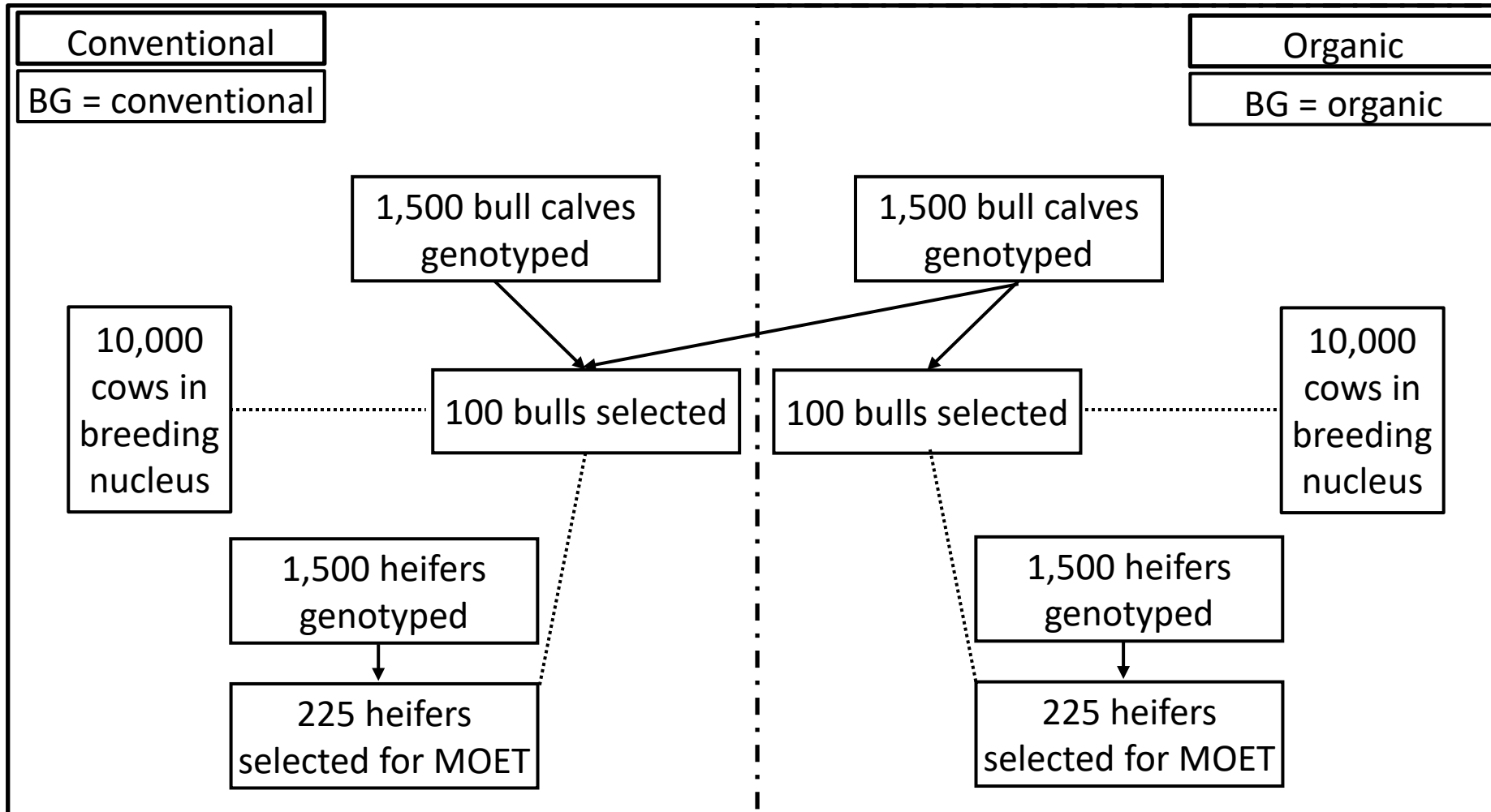
Current scenario



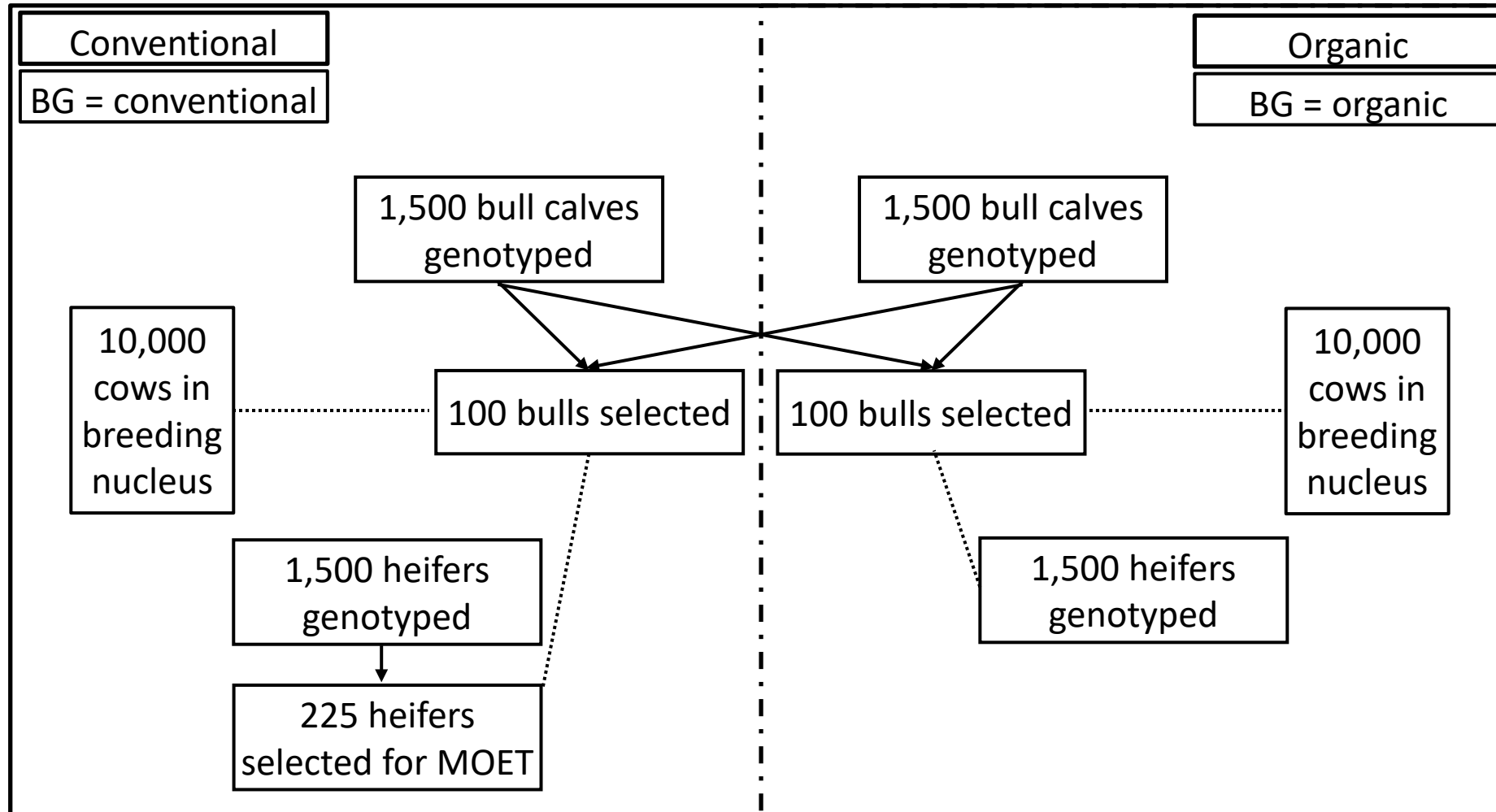
Organic breeding goal



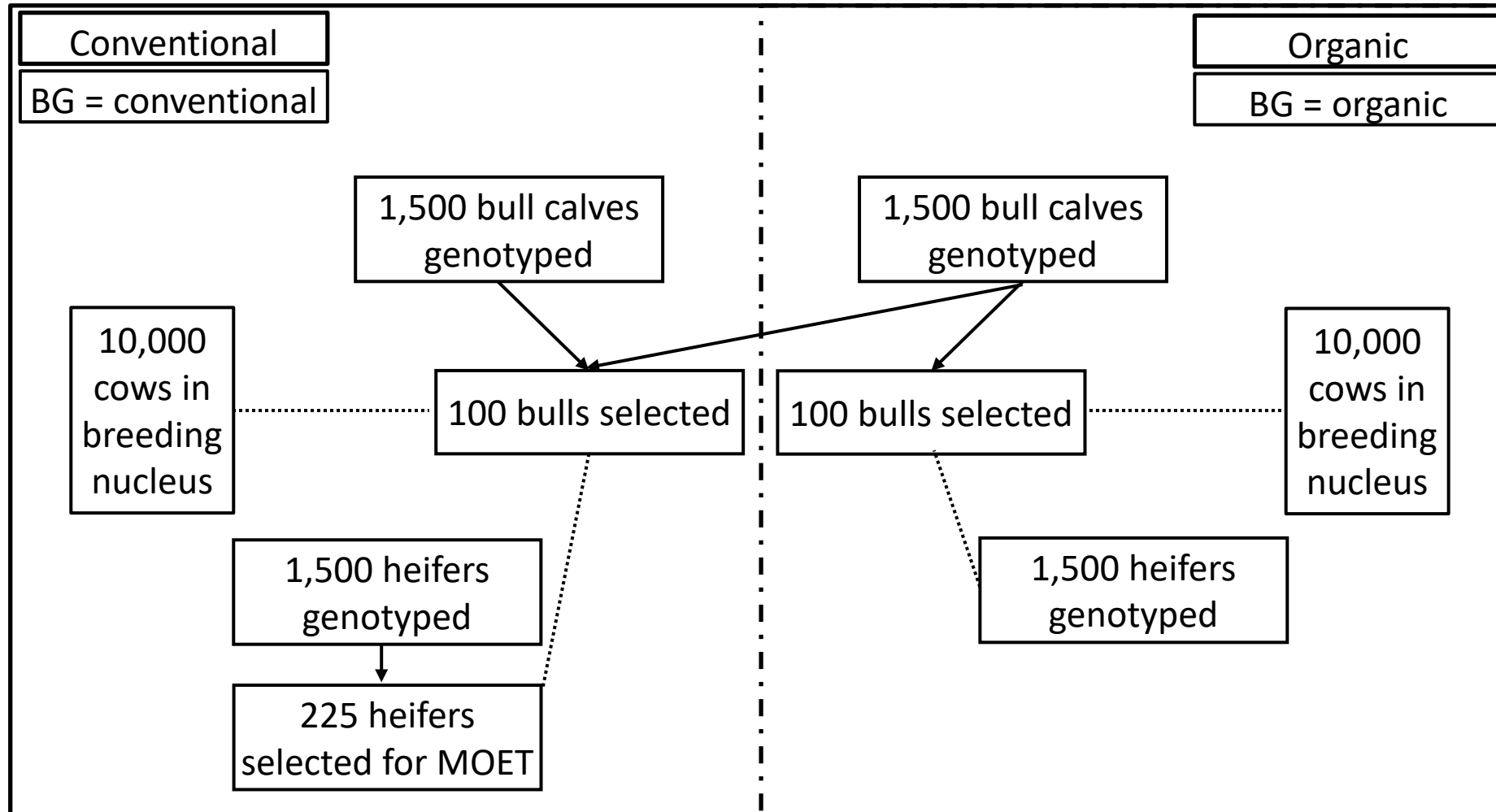
Within



No MOET



Strict



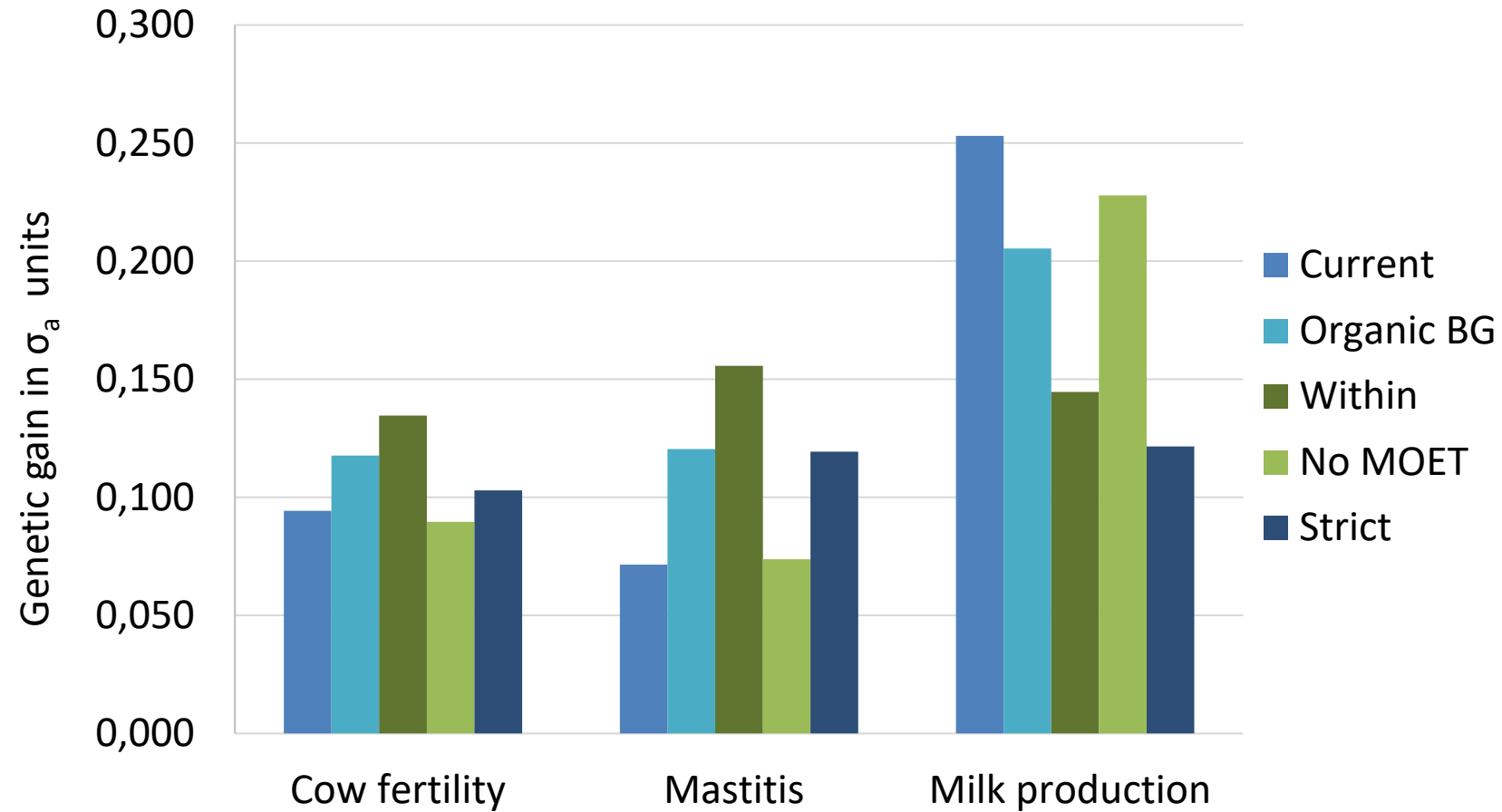
Relative genetic gain in aggregate genotype

Scenario	Breeding goal	MOET	Selection of conventional bulls
Current	Conventional	Yes	Yes
Organic BG	Organic	Yes	Yes
Within	Organic	Yes	No
No MOET	Organic	No	Yes
Strict	Organic	No	No

Relative genetic gain in aggregate genotype

Scenario	Breeding goal	MOET	Selection of conventional bulls	Genetic gain
Current	Conventional	Yes	Yes	100
Organic BG	Organic	Yes	Yes	101
Within	Organic	Yes	No	96
No MOET	Organic	No	Yes	93
Strict	Organic	No	No	76

Genetic gain per trait



Conventional bulls selected

Scenario	Percentage of selected bulls originating from conventional environment
Current	54%
Organic BG	37%
Within	0%
No MOET	72%
Strict	0%

Conclusions

- Specific organic breeding goal similar genetic gain in aggregate genotype
- Genetic gain on trait level more 'organic'
- No MOET and/or no selection of conventional bulls: lower genetic gain in aggregate genotype
- No MOET: direction of selection 'conventional'
 - Tradeoff between not using embryo transfer and desired direction of genetic change

Recommendations

- Implement specific breeding goal in organic dairy production
- Consider no selection of conventional bulls
 - Collaboration with other organic populations
- Alternative for embryo transfer?
 - Genotype more animals (in small populations)
 - No real alternative