Dutch dairy farms in a post quota era

economic and environmental consequences

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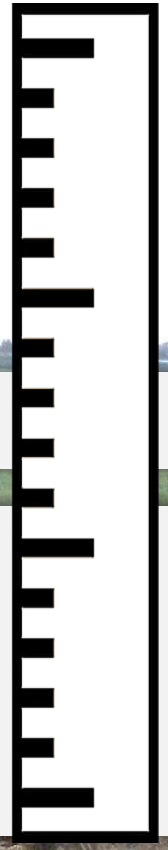
For quality of life

Klootwijk et al., 2016. Dutch dairy farms after milk quota abolition. Journal of Dairy Science. *In press*

Aim

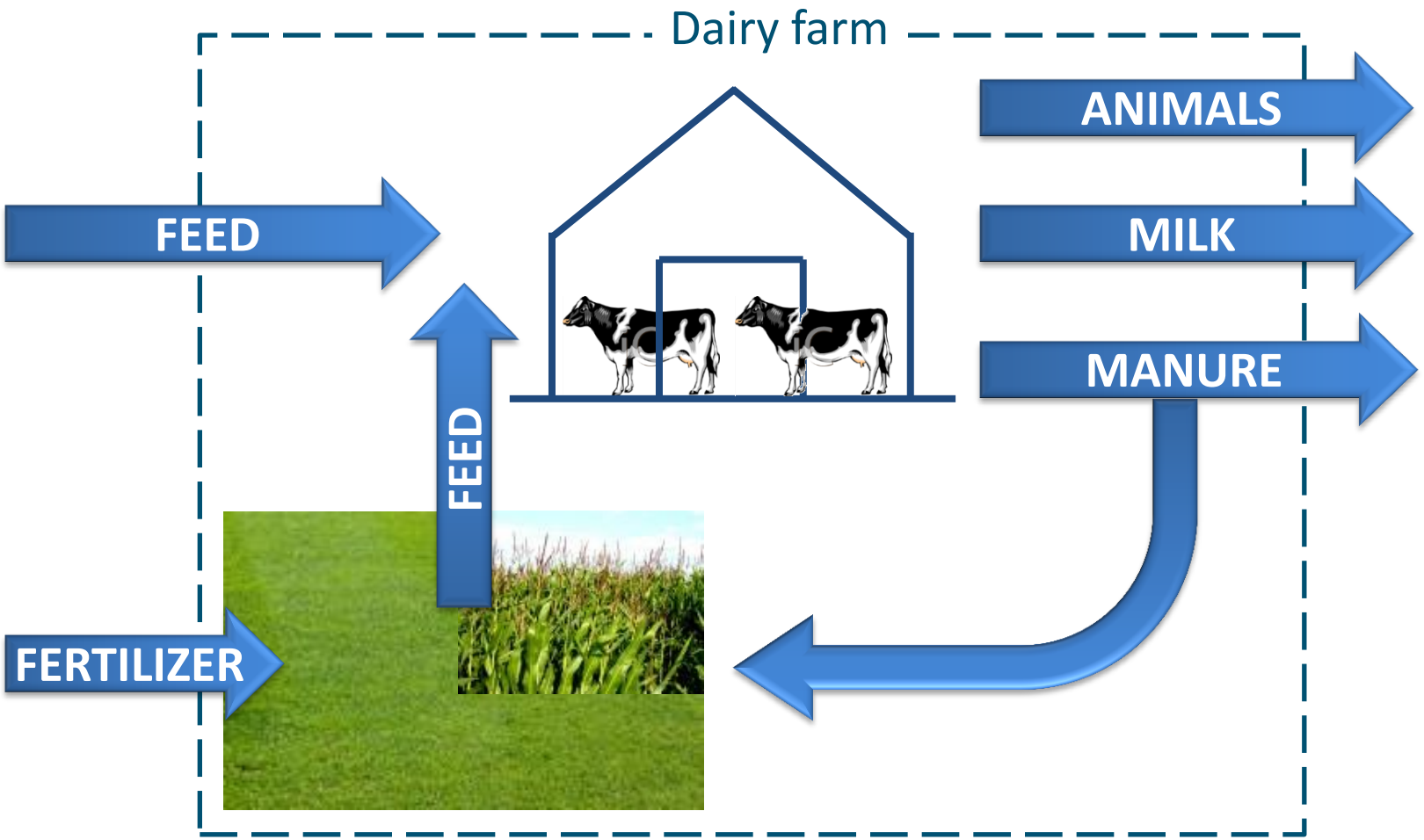
From milk quota... **to phosphate quota!**



Evaluate consequences of quota abolition and Dairy act:

- Farm structure and management
- Labour income
- Nitrogen and phosphate surplus
- Greenhouse gas emissions

Dairy farm model



Model objective: maximize labour income

N & P balance

GHG module

Method

Typical farm before quota abolition

Exclude milk quota, include Dairy act

Optimize farm plan: maximize labour income

Difference economic & environmental performance

Typical Dutch dairy farm

2014

milk quota

679 ton yr^{-1}

vs

2016

no milk quota

Dairy Act

4841 kg P_2O_5 yr^{-1}

Base

Stable capacity:	83 cows
Milk production:	8,160 kg cow^{-1} yr^{-1}
Farm land:	50 hectares
Milk price:	355 € ton^{-1}

FADN, 2015; KWIN-V, 2014

Options

Increase stable capacity	*€ 558*	*cow^{-1} yr^{-1}*
Purchase phosphate quota	*€ 2.10*	*kg $P_2O_5^{-1}$ yr^{-1}*
Process manure surpluses	*€ 13*	*kg $P_2O_5^{-1}$ yr^{-1}*
Purchase additional land	*€ 1187*	*ha^{-1} yr^{-1}*

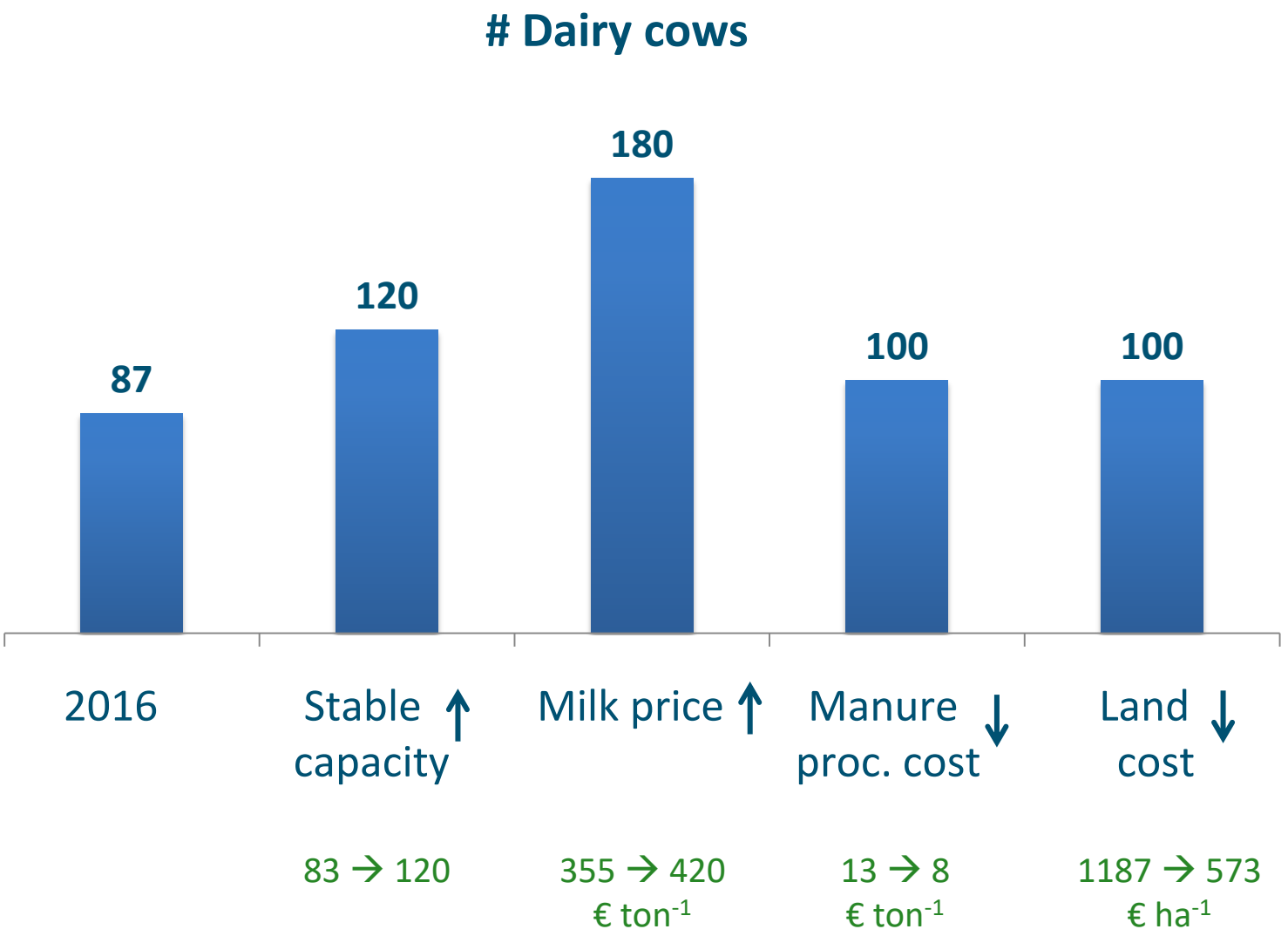
KWIN-V, 2014

Results

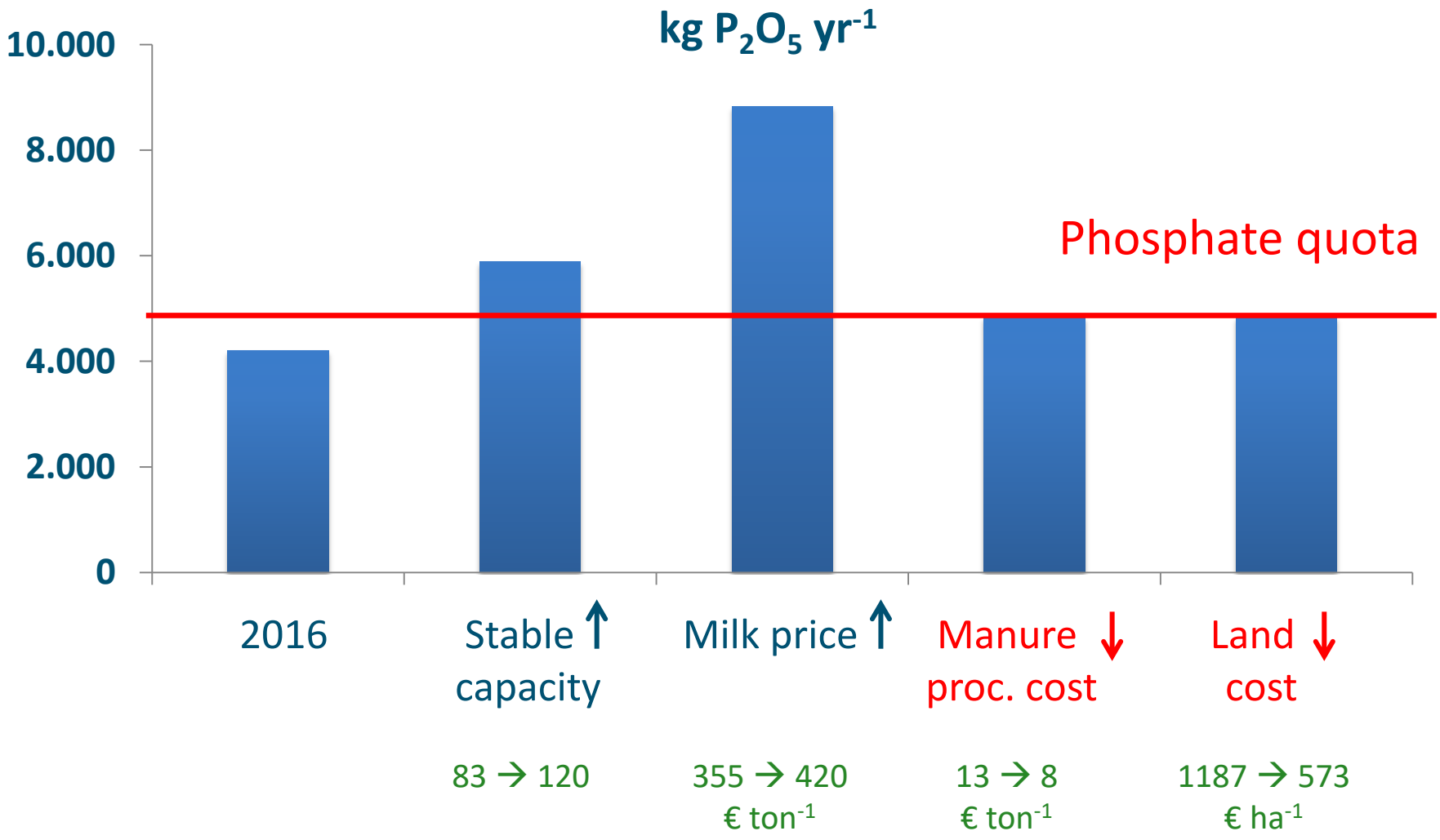
		2014	2016
Farmland	ha	50	50
Dairy cows	#	83	87
Milk production	ton yr^{-1}	679	707
Farm intensity	kg milk ha^{-1} yr^{-1}	13,578	14,130
Manure production	kg P_2O_5 yr^{-1}	3990	4200*
Labour income	€ yr^{-1}	10,343	10,848

** Equals phosphate application room*

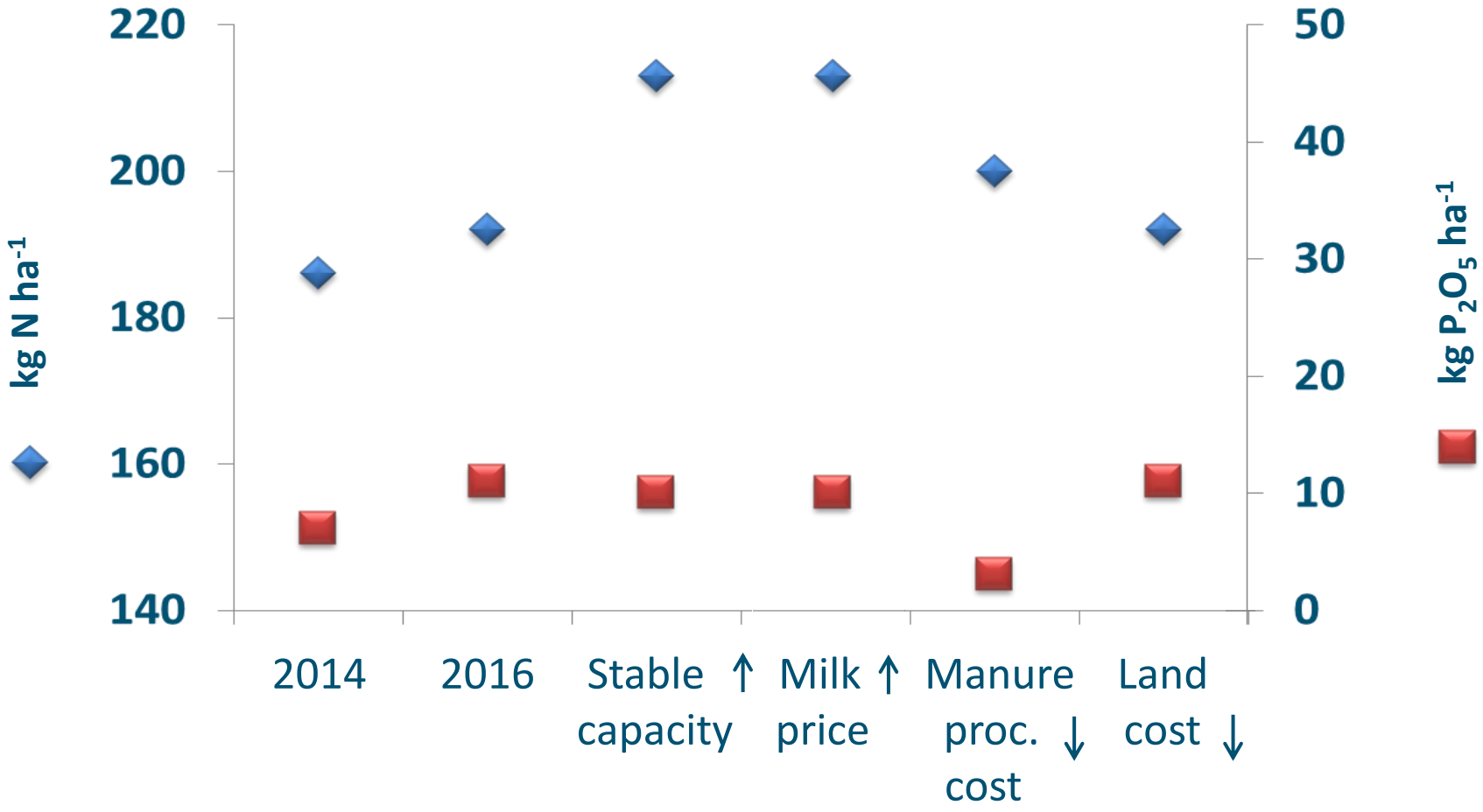
Sensitivity analysis



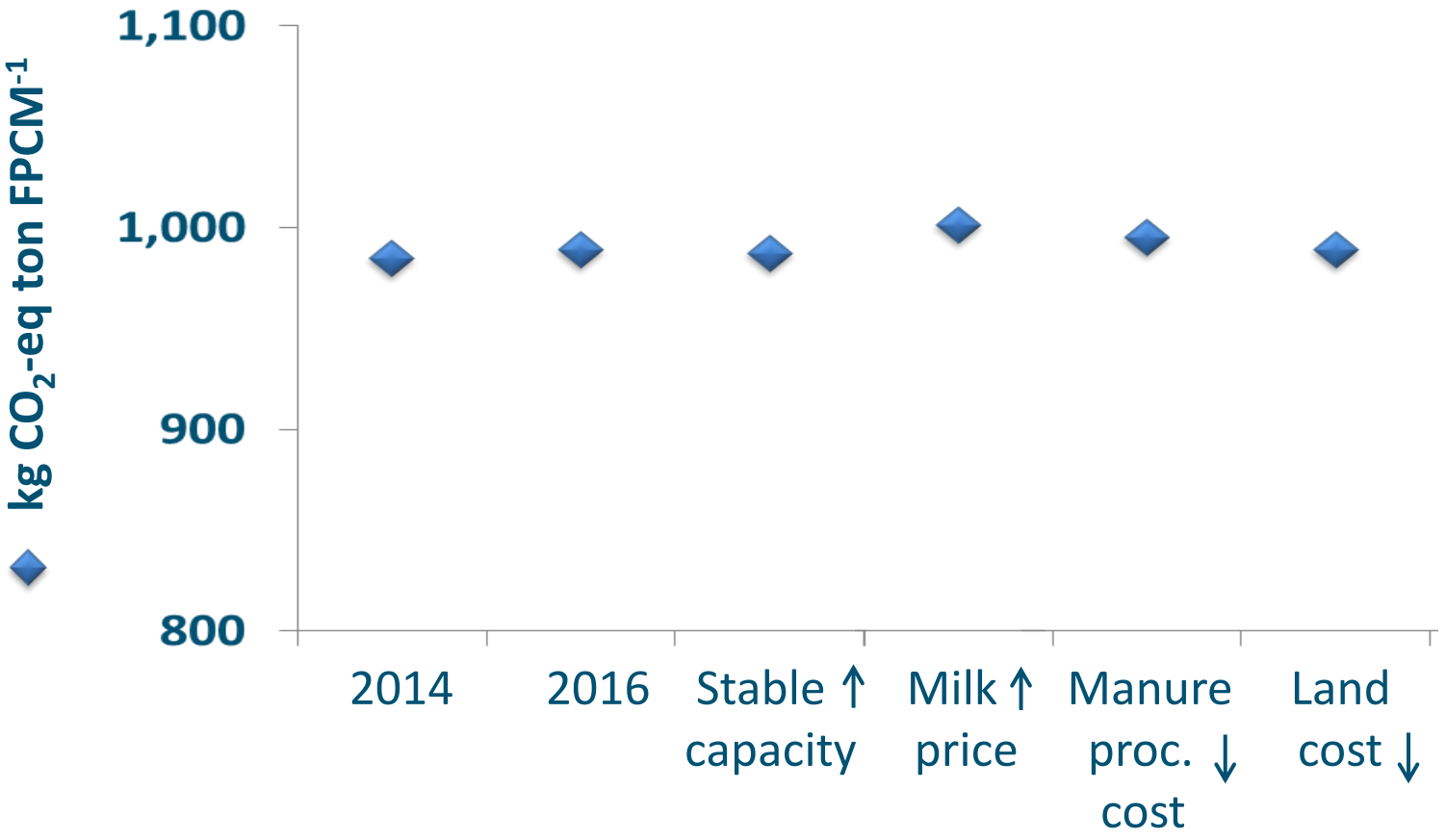
Sensitivity analysis



Environmental impact



Environmental impact



Conclusions

- Increasing number of cows profitable until manure processing or land purchases is required (current prices!)
- Phosphate quota limiting factor only when cost manure processing or land decrease
- Within phosphate quota, growth of about 15% possible by increasing phosphate use efficiency
- Slight increase in N and P surplus per hectare; similar GHG emissions per unit milk; increase total GHG emissions

New Dutch manure policy will likely limit farm intensity up to an increase of 4-15%

PhD course

Awarded the WIAS education prize for best PhD course in 2015

Environmental impact assessment of livestock systems

13-17 February 2017

Animal Production Systems, Wageningen University, the Netherlands

Imke de Boer, Wageningen University

Pierre Gerber, FAO

Martin Persson, Chalmers University

Oene Oenema, Wageningen University

and others

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Sensitivity analysis

	Higher stable capacity	Higher milk price	Higher farm productivity	Lower costs manure processing	Lower land costs
Farmland	56	84	50	50	58
Dairy cows	120	180	107	100	100
Intensity	17,440	17,440	19,191	16,331	14,130
Manure production	5884	8826	5376	4841	4841
Manure processing	608	1191	608	424	0
Labour income	2369	81,914	32,227	11,354	14,569

Sensitivity analysis