Saved feed in NTM

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Saved feed in NTM why?

- Feed costs the biggest variable costs at dairy farms
- Saved feed is a hot topic internationally in cattle breeding – effect on market share
- Saved feed has a positive climate impact – a positive signal to the society

Introduction to Saved feed

EBV(Saved feed) =
EBV(Maintenance) + EBV(Metabolic)

Calculation of economic value

Value of Saved feed – same value if it is:

- due to less feed for maintenance
- due to less feed for production (metabolic efficiency)

Currently

- Breeding value based on maintenance, only

Economic value of maintenance

The standard TMI-model for dairy is used by

- **Analyzing the effect of changing cow weight**

In the TMI-model the effect is:

- **Reduced feed intake for maintenance of cows**
- *Reduced carcass weight of slaughtered cows – can be omitted*
- *Reduced weight at first calving including heifer maintenance and requirement for growth – can be omitted*

Basic model includes only reduced weight of cows

Feed intake for maintenance

Based on metabolic body weight (MBW = $BW^{0.75}$)

Consequence: +10 kg BW require more maintenance feed in JER than in HOL
÷10 kg BW save more maintenance feed in JER than in HOL

Changing MBW by 1 unit has the same effect on feed intake across breeds and countries

Value of MBW only influenced by feed prices

- **Highest in FIN**
- **Nearly similar in DNK and SWE**

Value of 1 kg BW also depend on average weight

Value of reducing cow weight

	€/MBW change	€/BW change
DNK RDC	3.73	0.56
DNK HOL	3.73	0.56
DNK JER	3.73	0.63
SWE RDC	3.84	0.58
SWE HOL	3.84	0.58
FIN RDC	4.22	0.64
FIN HOL	4.22	0.63

Assumptions
Feed prices and slaughter value

	Concentrates €/kg	Roughage €/SFU	*Cows, beef €/kg carcass*
DNK	0.243	0.147	*2.77*
SWE	0.243	0.157	*3.63*
FIN	0.250	0.179	*2.24*

Assumptions: Cow weights

	Weight at 1st calving, kg	Weight at 2nd calving, kg	Mature body weight, kg
RDC	565	610	655
HOL	590	635	680
JER	375	403	430

Including reduced carcass weight of cows and weight at 1st calving

Lower weight of slaughtered cows

- **Lower carcass weight – lower income**
- **Lower value of reduced weight**

Lower weight at 1st calving (But unchanged age at 1st calving)

- **Lower requirement for growth and maintenance of heifers**
- **Higher value of reduced weight**

In total: Value of reducing weight is slightly increased

Conclusion:

Average value per breed across countries of 1 kg change of BW

	Only Maintenance
RDC	0.59 €/kg BW
HOL	0.59 €/kg BW
JER	0.63 €/kg BW

Next step:

- **Transformation to value per index unit**
- **Relative value compared to other traits of the NTM**
- **Relationship to other traits of the NTM**

Later

- *Including breeding value for metabolic efficiency*

Weights in NTM – adding Saved feed

	HOL	RDC	JER
Yield	0.90	1.02	0.83
Growth	0.08	0.10	0.00
Fertility	0.36	0.36	0.26
Birth	0.14	0.11	0.04
Calving	0.14	0.10	0.07
Udder health	0.30	0.26	0.44
General health	0.14	0.11	0.14
Frame	0.00	0.00	0.00
Feet & legs	0.05	0.06	0.07
Udder	0.18	0.26	0.15
Milkability	0.09	0.11	0.09
Temperament	0.04	0.03	0.03
Longevity	0.06	0.06	0.09
Claw health	0.10	0.07	0.04
Young stock surv.	0.13	0.19	0.10
Saved Feed	**0.18**	**0.23**	**0.18**

Effect of Saved feed in NTM

- **The results is based on GEBVs for bulls born in 2017**
  - **RDC 2557 bulls**
  - **HOL 3118 bulls**
  - **JER 930 bulls (born 2017+2018)**

Effect of Saved feed in NTM

Correlations between Saved feed and NTM sub-traits

	HOL		RDC		JER	
	Saved feed	Yield	Saved feed	Yield	Saved feed	Yield
Fertility	0.16	-0.34	0.08	-0.20	0.19	-0.31
Birth	0.28	-0.10	0.48	-0.06	0.02	-0.03
Calving	-0.15	-0.09	0.03	-0.02	-0.03	0.06
Udder health	0.02	-0.15	-0.08	-0.10	0.10	-0.21
General health	0.15	-0.21	0.10	-0.14	0.04	-0.10
Longevity	0.17	-0.16	0.14	0.05	0.12	-0.06
Claw health	0.13	-0.11	0.31	-0.10	0.21	-0.10
Young stock	0.23	-0.05	0.28	0.01	-	-
Saved feed	-	-0.18	-	-0.17	-	-0.25

Effect of Saved feed in NTM

Correlations between NTM and NTM sub-traits

	HOL		RDC		JER	
	Curr. NTM	SF NTM	Curr. NTM	SF NTM	Curr. NTM	SF NTM
Fertility	0.25	0.27	0.26	0.28	0.07	0.10
Birth	0.17	0.22	0.18	0.30	0.02	0.02
Calving	0.23	0.20	0.20	0.20	0.15	0.15
Udder health	0.33	0.34	0.34	0.30	0.43	0.44
General health	0.27	0.29	0.21	0.22	0.29	0.29
Longevity	0.42	0.45	0.44	0.45	0.38	0.40
Claw health	0.22	0.24	0.15	0.24	0.06	0.08
Young stock	0.17	0.20	0.22	0.28	-	-
Saved feed	-0.06	0.12	-0.02	0.25	-0.12	0.08

Effect of Saved feed in NTM

Correlations between Saved feed and NTM sub-traits

	HOL		RDC		JER	
	Saved feed	Yield	Saved feed	Yield	Saved feed	Yield
Yield	-0.18	-	-0.17	-	-0.25	-
Growth	-0.13	0.08	-0.32	0.10	0.04	0.02
Frame	-0.83	0.28	-0.78	0.19	-0.77	0.26
Legs	0.20	-0.07	0.41	-0.01	0.28	-0.08
Udder	-0.23	-0.15	-0.29	-0.12	-0.12	-0.26

Effect of Saved feed in NTM

Correlations between NTM and NTM sub-traits

	HOL		RDC		JER	
	Curr. NTM	SF NTM	Curr. NTM	SF NTM	Curr. NTM	SF NTM
Yield	0.66	0.63	0.69	0.63	0.70	0.66
Growth	0.09	0.06	0.03	-0.06	0.09	0.10
Frame	0.05	-0.10	-0.04	-0.26	0.11	-0,04
Legs	0.11	0.14	0.21	0.31	0.15	0.21
Udder	0.23	0.19	0.23	0.14	0.22	0.20
Saved feed	-0.06	0.12	-0.02	0.25	-0.12	0.08

Effect of Saved feed in NTM

Correlations between NTM and NTM sub-traits

Summary:

- **Saved feed and frame (strongly related to the size of the cow) is strongly negatively correlated**
- **Saved feed and yield is slightly unfavorable correlated**
- **Saved feed and udder is slightly unfavorable correlated**
- **Saved feed is in general positively correlated to longevity and health traits**

Effect of Saved feed in NTM

Correlations between NTM and single traits

Summary:

- **Saved feed and yield is slightly unfavorable correlated, and the slight negative correlations holds for all 3 yield traits**
- **Saved feed is positively correlated to daily gain and slightly negative to carcass conformation**

Effect of Saved feed in NTM

Correlations between Saved feed and single traits

	Holstein	RDC	Jersey
Frame	**-0.83**	**-0.78**	**-0.77**
Stature	-0.79	-0.80	-0.83
Body Depth	-0.58	-0.53	-0.57
Chest width	-0.57	-0.55	-0.60
Dairy form	-0.38	-0.13	-0.23
Top line	-0.18	0.08	-0.13
Rump width	-0.46	-0.55	-0.54
Rump angle	-0.13	0.03	-0.12

Effect of Saved feed in NTM

Correlations between NTM and single traits

Note:

- **Saved feed and stature is strongly unfavorable correlated.**
  - **30 SF NTM units progress (8 years) in SF NTM will lead to cows being genetically 1.0-1.5 cm lower than today.**
  - **This must be compared with that the genetic progress in stature has been over 10 cm from 1990-2020.**

Effect of Saved feed in NTM

Correlations between Saved feed and single traits

	Holstein	RDC	Jersey
Udder	**-0.23**	**-0.29**	**-0.10**
Fore udder attach.	-0.17	-0.18	-0.08
Rear udder height	-0.14	0.13	0.03
Rear udder width	-0.28	-0.04	-0.18
Udder support	-0.11	-0.01	0.08
Udder depth	-0.23	-0.23	-0.08
Teat length	-0.08	-0.23	-0.20
Teat thickness	-0.13	-0.21	-0.19
Teat plac front	-0.09	0.00	0.07
Teat plac back	-0.13	0.04	0.10
Udder balance	-0.06	-0.03	-0.01

Effect of Saved feed in NTM

Correlations between NTM and single traits

Note:

- **Saved feed and udder is slightly unfavorable correlated**
  - **30 current NTM units progress → +6.9 index Udder depth. (=0.4 point on the linear scale from 1 to 9)**
  - **30 SF NTM units progress → +4.2-6.0 index units udder depth. (= 0.2-0.3 point on the linear scale from 1 to 9).**
- **Selecting after SF NTM the positive genetic progress for udder depth a bit lower than achieved by current NTM.**
  - **The difference in genetic progress corresponds to 0.1-0.2 point on the linear scale (1-9).**

Saved feed in NTM?

- Proposed economic weight for Saved Feed:
  - Prepared for including metabolic eff.
  - Increase of genetic progress with SF NTM of 2-3 % (compared to current NTM)
  - Does not include all economic effects of maintenance
- Group discussion are we ready to include Saved feed in NTM?

Saved feed in NTM why?

- Feed costs the biggest variable costs at dairy farms
- Saved feed is a hot topic internationally in cattle breeding – effect on market share
- Saved feed has a positive climate impact – a positive signal to the society