ProDairy
For Professional Dairy Farmers

RUMEN8
Easy dairy & beef cattle diets

NEADAP
Netherlands East African Dairy Partnership

Importance of forage quality to raise dairy cow profitability and lower the carbon footprint

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Low carbon and climate resilient livestock in EA

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Adaptation strategies

1. Use animal genetics that fit the environment, e.g. Girolande

Mitigation strategies

2. Harvest grass and most fodder crops* in an early stage of growth

    # 2. Raises profitability; slightly lowers g CH_4/day and tremendously lowers g CH_4/L

3. Balance diets and lower Forage/Concentrate ratio (provided it raises profit)

4. Use additives that lower production of enteric methane (g CH_4/day)

    4.1 E.g. 3-NOP, Nitrate (also supplies NPN to low-N diets) and lipids (also supplies ME)

    Only consider # 4 after financially more lucrative strategies # 1, # 2 and # 3

* Maize is to be harvested in the dough ripe stage and legumes in flowering stage or later

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Adaptation: Genotype by environment interaction

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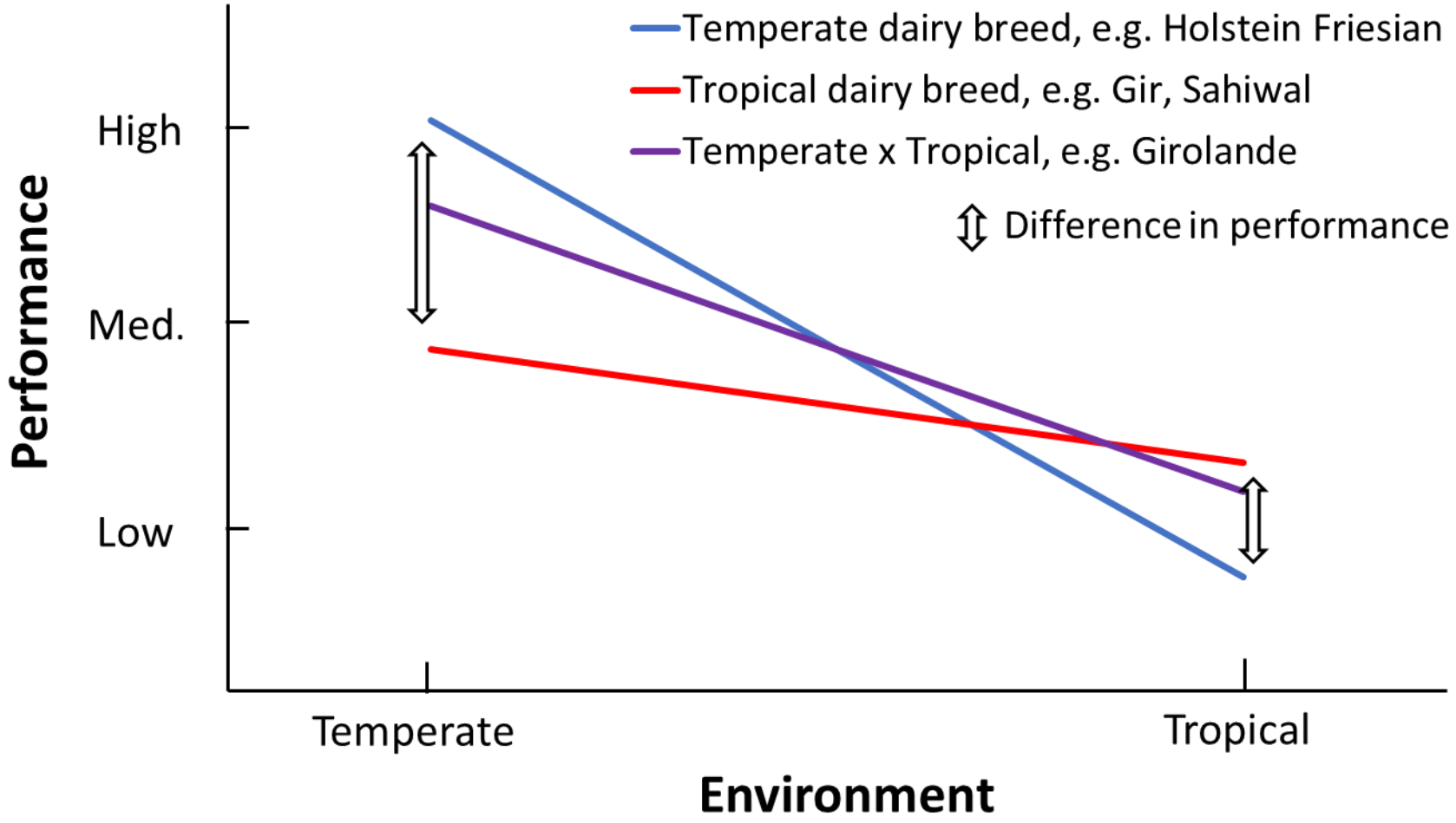
Girolande: 5/8th HF, 3/8th Gir

Holstein Brahman cross



Mitigation: Harvest grass and most fodder crops in early growth stage*

- Best strategy that raises milk yield & profit and enormously lowers CH_4/L
- Balance diet for ME, CP, Forage/Concentrate, etc.
- Use ‘tropicalised’ diet formulation software and feeding tables
- Ideally use feed analyses

* Maize is to be harvested in the dough ripe stage and legumes in flowering stage or later

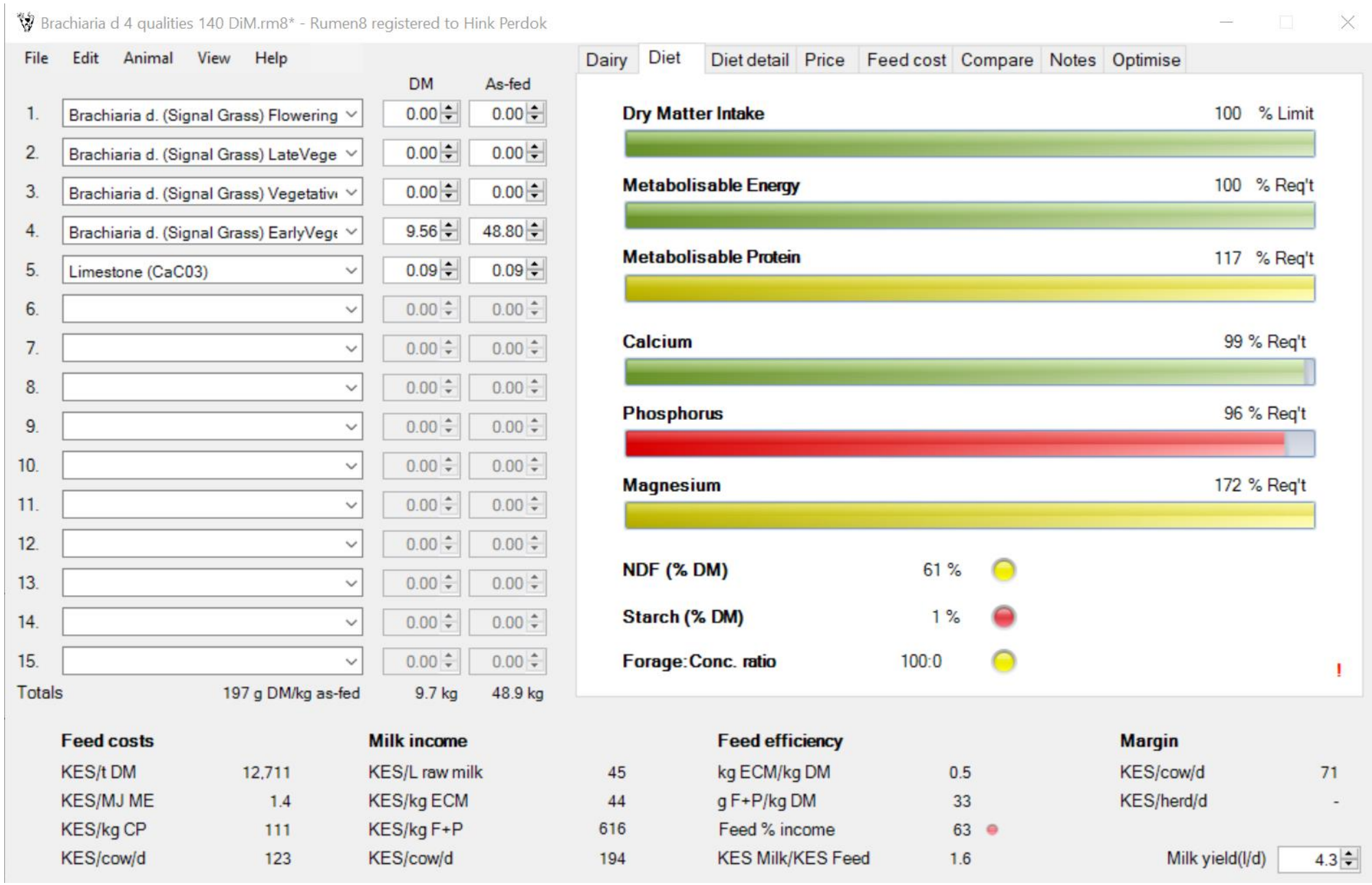
Background to simulation using Rumen8 software

- Next slide shows summary of data generated with Rumen8
  - Can be downloaded for free: https://www.rumen8.com.au/download/index.html
  - Comes with a default (Australian) and a Tropical Feed Library developed in East Africa
- Simulation was done with 4 growth stages of Brachiaria decumbens
- Fed to 450 kg crossbred cow, 140 days in milk (no liveweight change)
- 57 days pregnant, milk with 4.15% Fat and 3.15% True protein
- DMI estimated from NDF intake of 1.3% of body weight (i.e. 5.850 kg NDF)
- The simulation shows a rapid increase in feed intake, milk yield and profit, and a dramatic drop in methane intensity with increasing digestibility of the forage and diet.

Effect of grass growth stage on milk yield and CH_4 Simplified example based on Brachiaria decumbens

#	Growth stage	CP, g /kg DM	NDF, g /kg DM	ME, MJ /kg DM	DMD %*
1	Flowering/seeding	64	803	6.7	49
2	Late vegetative	91	739	7.5	54
3	Vegetative	118	676	8.3	58
4	Early vegetative	115	606	8.8	61
5	# 4 + 2.8 kg Maize bran	111	561	9.6	66
6	# 4 + 5.5 kg Maize bran & 0.6 kg Cotton seed meal	120	512	10.3	70

* Estimated with DMD = 5.82ME + 9.92 (CSIRO, 2007)



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More details will be shown in a demonstration of the Rumen8 application

Effect of grass growth stage on milk yield and CH_4 Simplified example based on Brachiaria decumbens

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#	Growth stage	CP, g /kg DM	NDF, g /kg DM	ME, MJ /kg DM	DMD %*	DMI kg/d	L /day	CH_4 g/day	CH_4 g/L
1	Flowering/seeding	64	803	6.7	49	7.3	0	313	-
2	Late vegetative	91	739	7.5	54	7.9	0	307	-
3	Vegetative	118	676	8.3	58	8.7	2.0	304	152
4	Early vegetative	115	606	8.8	61	9.7	4.3	301	70
5	# 4 + 2.8 kg Maize bran	111	561	9.6	66	10.5	7.3	292	40
6	# 4 + 5.5 kg Maize bran & 0.6 kg Cotton seed meal	120	512	10.3	70	11.5	10.8	284	26

* Estimated with DMD = 5.82ME + 9.92 (CSIRO, 2007)

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Effect of grass growth stage on milk yield, CH_4 & MAFC Simplified example based on Brachiaria decumbens

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#	Growth stage	CP, g /kg DM	NDF, g /kg DM	ME, MJ /kg DM	DMD %*	DMI kg/d	L /day	CH_4 g/day	CH_4 g/L	MAFC KES/d
1	Flowering/seeding	64	803	6.7	49	7.3	0	313	-	- 17
2	Late vegetative	91	739	7.5	54	7.9	0	307	-	- 34
3	Vegetative	118	676	8.3	58	8.7	2.0	304	152	25
4	Early vegetative	115	606	8.8	61	9.7	4.3	301	70	71
5	# 4 + 2.8 kg Maize bran	111	561	9.6	66	10.5	7.3	292	40	130
6	# 4 + 5.5 kg Maize bran & 0.6 kg Cotton seed meal	120	512	10.3	70	11.5	10.8	284	26	186

KES/tonne as fed: (1) 1,000; (2) 1,500; (3) 2,000; (4) 2,500; Maize bran 32,000; CSM 50,000; Limestone 8,000 and Milk price 45 KES/L

*MAFC = Margin Above Feed Costs

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Thank you for your attention

For more information and training on Rumen8, contact ProDairy (East Africa) Ltd

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