Tiakina Te Whenua Tiakina Te Moana

Proof of Concept: Frei Dairy Case Study

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Bio*Ag* & Frei Dairy Case Study (2009-2012)

- **3 Year Southland Dairy Case Study – DNZ monitor farm**
- **Proof of Concept - BioAg Agronomic System**

Key outcomes

- ❑ **Increased pasture quality & resilience**
- ❑ **Significant Nitrogen Input Reduction**
- ❑ **Increased Clover Performance**
- ❑ **DM to Milk Solids feed efficiency – less DM per kgMS**
- ❑ **Sustained Production**

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Farm Details – as at February 2014

- Situated between Riversdale and the Hokonui ranges
- 8 yr. development to 174ha (Nov 2012) milking platform 142ha 09-2012
- 94ha run off

- System 2 – DNZ Classification = 5 – 15% supplementation each end of season
- Dry land (non-irrigated)

- Friesian herd
- 358 cows peak season, 74 R2, 110 R1, 110 bull calves
- Consistently produce 1.5kgMS/day/cow every season

- Kaweku and Dipton soil types
- Rainfall 900mm - 30yr average. Dry Nov-Dec; Feb-Mar

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Soil & Pasture Fertility Inputs

	2009	2010	2011	Comments
Nitrogen kgN/ha	*21	*16.2	Nil	*SOA & Calcium Nitrate
Nitrogen (effluent muck)	8 m3/ha	8 m3/ha	8 m3/ha	Applied to 50ha only
Phosphate kgP/ha	23 (RPR)	18 (Viafos)	*20-35 (RPR)	*Applied early October
Potassium kgK/ha	*33	*17	*17	Very Low base levels *SOP
BioAg Soil & Seed	9ltr	8ltr	6 – 7ltr + *3ltr	*1/3rd farm only in autumn
Magnesium	4		3.5	Magnesium Sulphate
Trace Elements	B, Cu	Zn	B, Cu, Zn	Very low starting levels
BioAg Roots & Shoots foliar	3ltr x 1	2.5ltr x 2	2.5lt x 1	

Key Points

- ❑ Reduced N
- ❑ Reduced Solubles
- ❑ Specific Input to feed soil and plant biology
- ❑ Trace elements amended

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N:P:K:S Inputs [kg/ha]

Prior Year

	2009	2010	2011	2012	2013	2014
N	70 Urea	21	16.2	0	5	3 - 6
P	36 DAP	23 RPR	18 Viafos	27.5 RPR	22	15 (MAP sol)
K	0	3 SOP	17 SOP	17SOP	39 SOP	14 SOP
S	40	6	3	3	18	6

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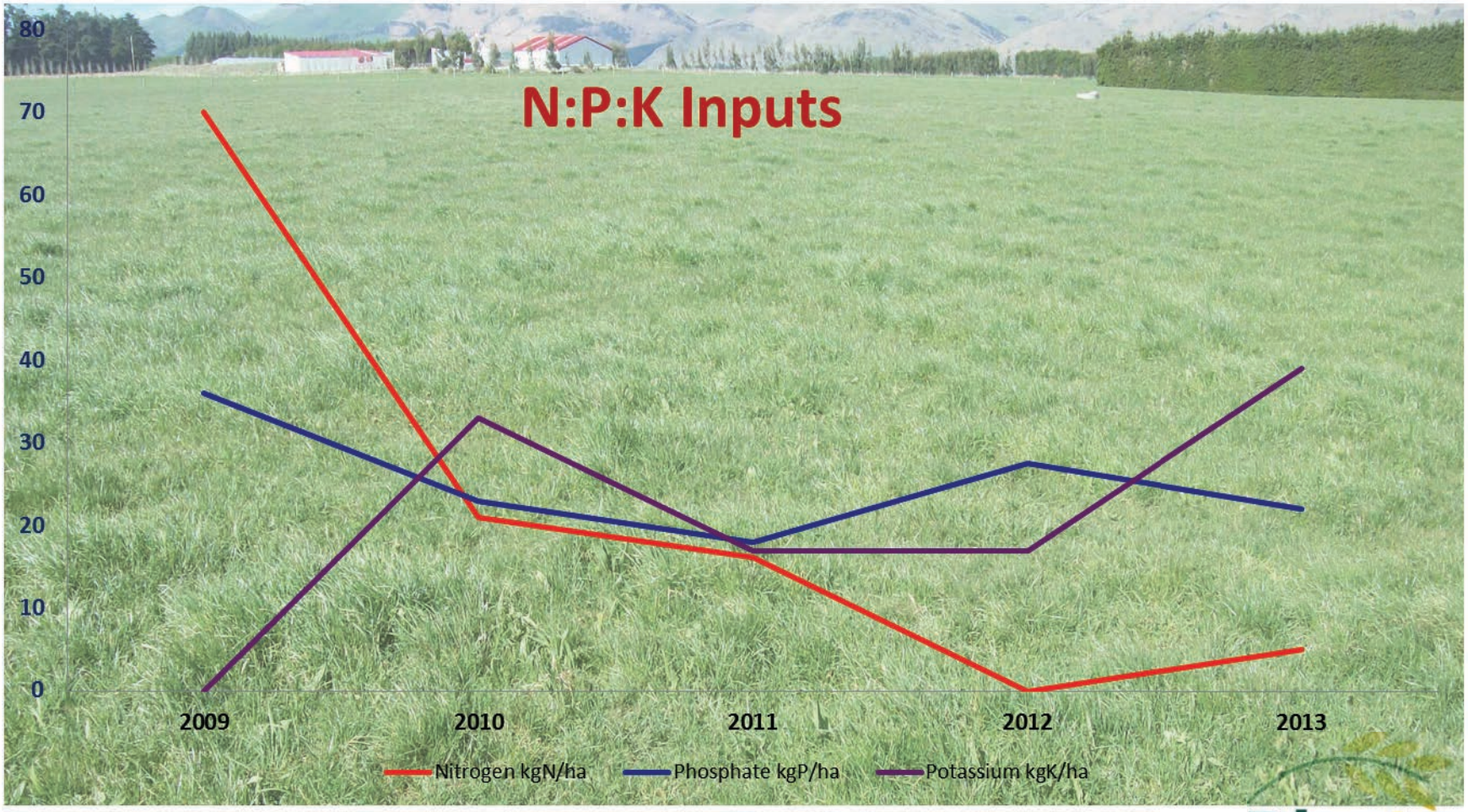
N:P:K:S Inputs [kg/ha]



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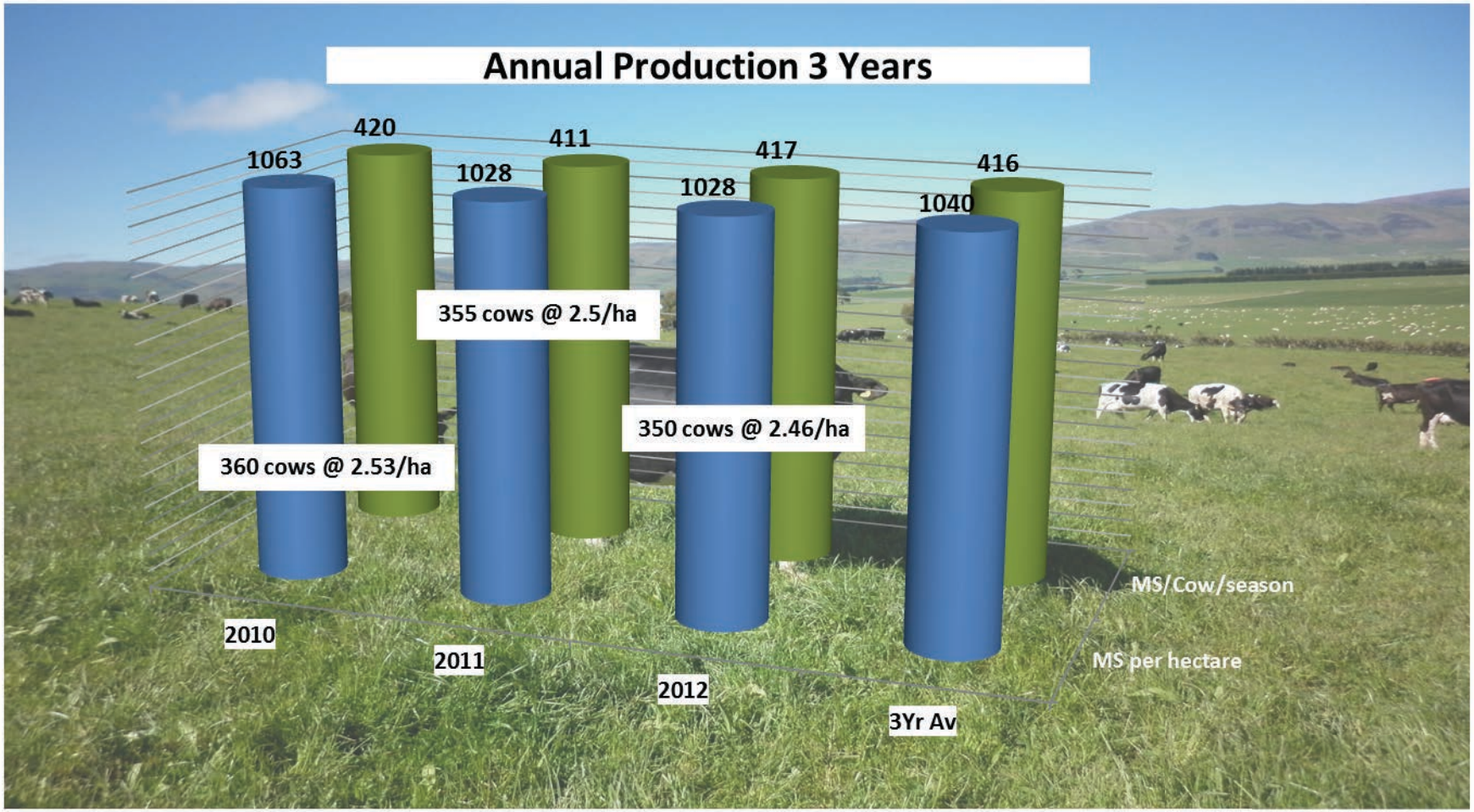
Annual Production [MS per season]

Parameter	2010	2011	2012	Mean [3 yr.]
MS per ha	1063	1028	1028	1040
MS/cow/season	420	412	417	416
S.U. / ha	2.53	2.5	2.46	

Annual Production [MS per season]



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Feed Inputs

	2010	2011	2012
Pasture kgDM/ha/season (DNZ)	7,300	9,100	8,388
Spring supplement - hay	0.5-1kgx40d	—	0.5-1kgx40d
Spring - molasses	*70kg/cow	*170kg/cow	—
Spring - distiller's grain syrup	—	—	30kg/cow
Grass silage	750kg/cow	250kg/cow	200kg/cow
Summer - Alkalage	—	*285kg/cow	
Autumn - Whole crop silage	—	—	150kg/cow
Fodder crop	—	6ha turnips	6 ha turnips

*Alkalage ceased; Molasses only in extreme conditions

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Production [kgMS per 100kgDM/cow]

kgMS per 100kgDM/cow	2010	2011	2012	Mean [3 yr.]
Friesian – *DNZ (500kg BW)	7.27	7.27	7.27	7.27
BioAg Trial – (500kg BW)	11.26	9.05	10.30	10.20
kgDM/season @ 400kgMS/ cow	2010	2011	2012	Mean [3 yr.]
Friesian – *DNZ (500kg BW)	4.73	4.73	4.73	4.73
BioAg Trial – (500kg BW)	3.73	4.54	4.05	4.1

*Reference figures obtained from Dairy NZ Facts & Figures Guide

Table: Annual t/DM per cow per season @ 12MJ ME/kg DM

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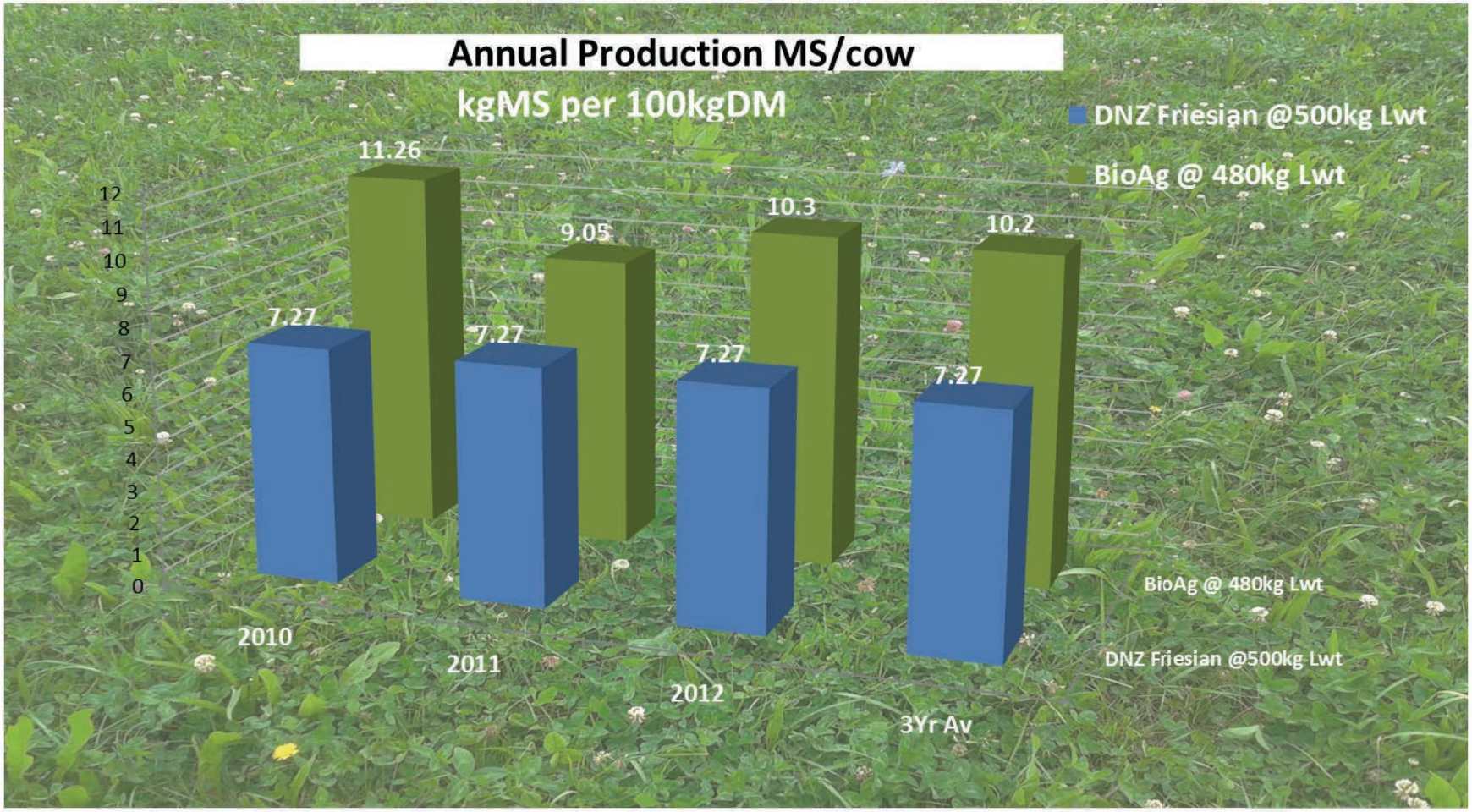
Production [kgMS per 100kgDM/cow]



DM Intake / kg MS [@1.5kg MS/cow/day avge.]

Feed to milk efficiency

	2010	2011	2012
Friesian – DNZ (500kg BW)	14.55	14.55	14.55
BioAg Trial – (500kg BW)	8.69	*11.00	9.71

*2010 Spring blizzard

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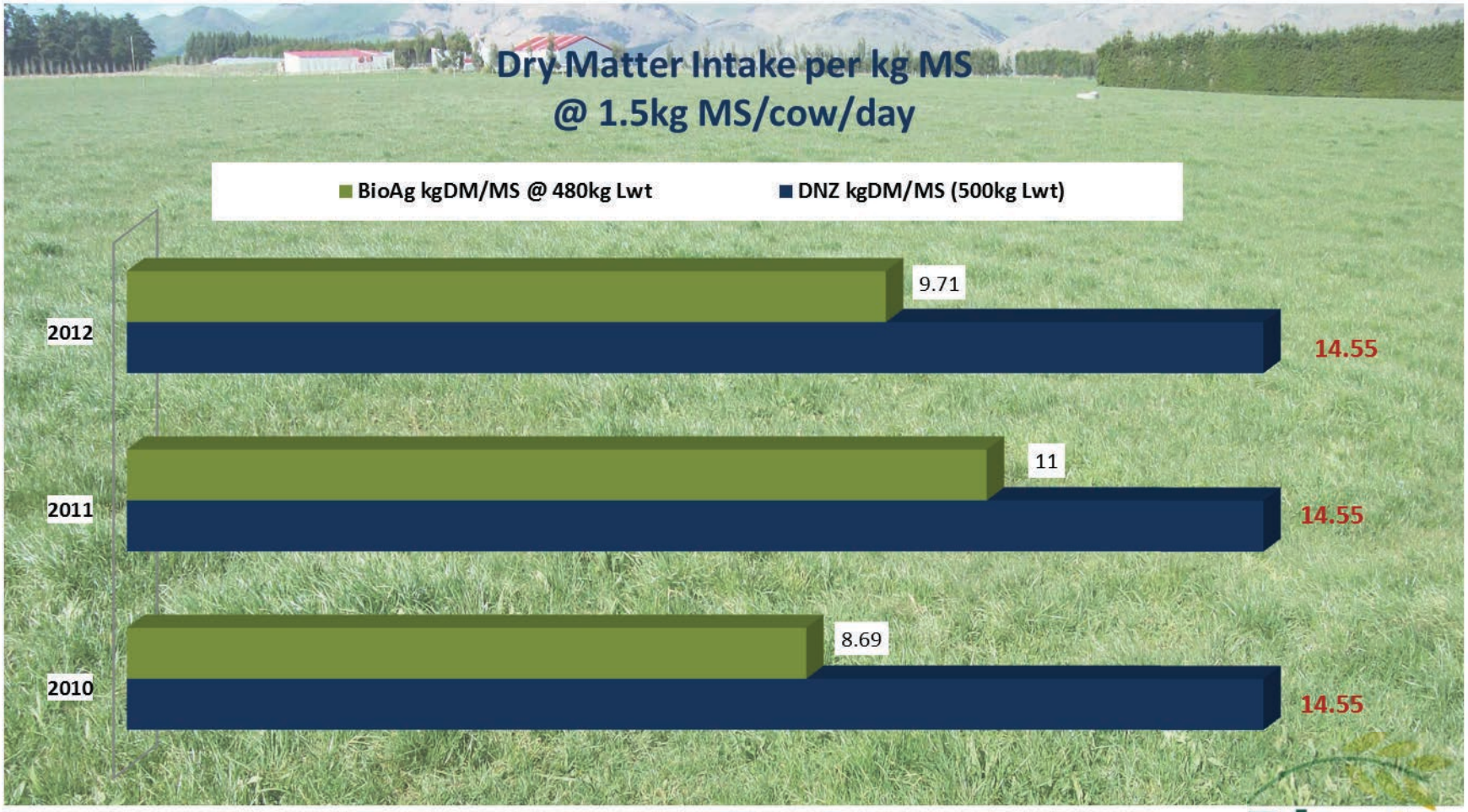
DM Intake / kg MS [@1.5kg MS/cow/day]



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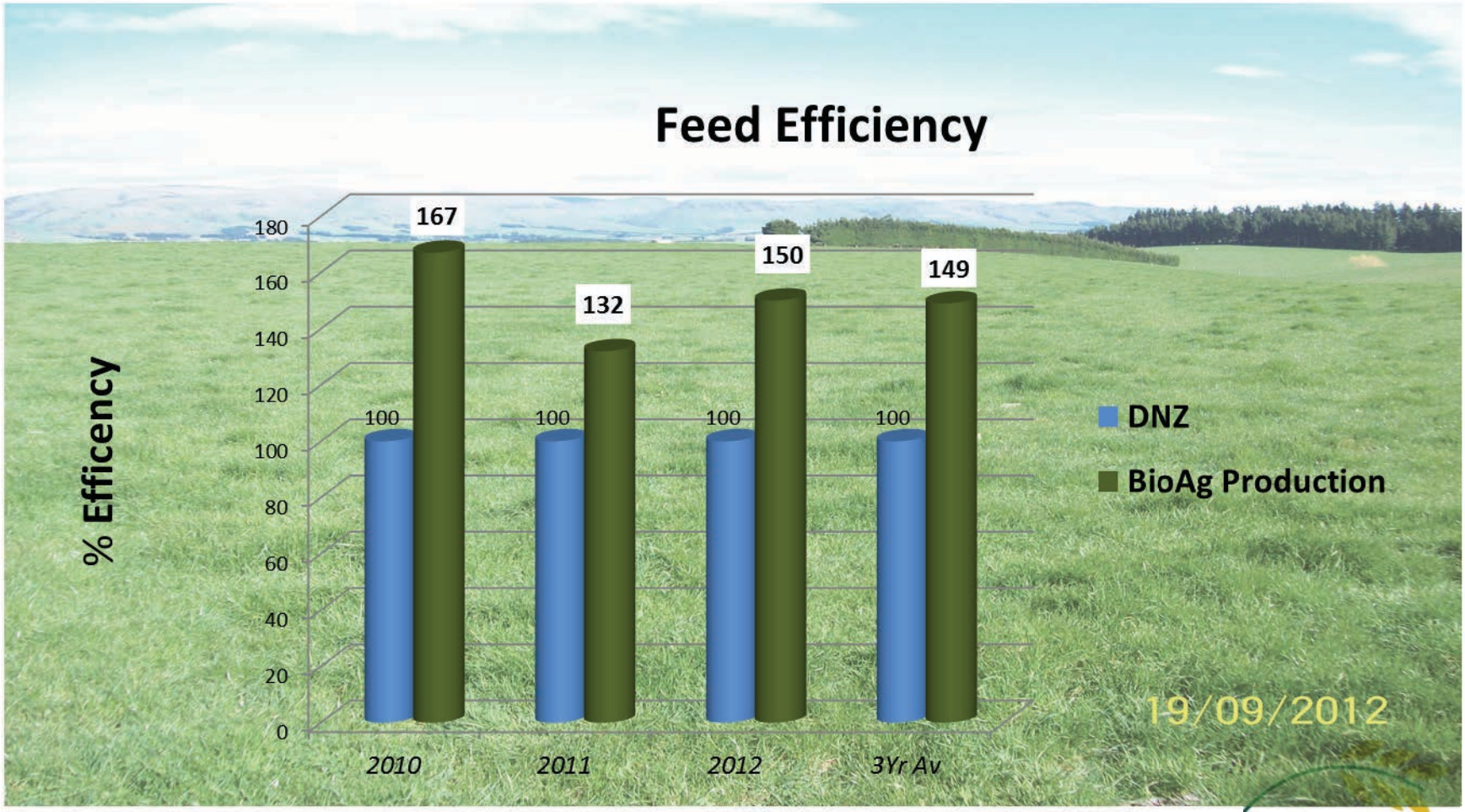
Feed Efficiency [kgMS/day] %



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Soil Test Results

Nutrient (mean of 3 sites)	Prior [Aug 2009]	Latest [Mar 2012]
Phosphorus (Morgan) [mg/kg]	1.53	8.53
Phosphorus (Bray 2) [mg/kg]	76	80
Calcium (Morgan) [mg/kg]	1094	1336
Magnesium (Morgan) [mg/kg]	112	154
Magnesium (Amm. Acet.) [mg/kg]	168	216
Potassium (Amm.Acet.) [mg/kg]	93	96
Sulphur [mg/kg]	28	23.3
Ca:Mg ratio	8.8	6.6
pH	5.71	6.08
Organic Matter [%]	5.27	5.17
Total N [%]	0.30	0.38
Total C [%]	3.04	2.96

Farm owners observations & where to now…..

Soil and pasture

- Pasture pests – grass grub was a major issue – **not any more**
- **Pasture healthy – no demand for nitrogen**
- No yellowing in base of pasture
- **Clover performance – significant improvement, active fixation**
- Resilient – dry periods; production holds up better.
- **Crop performance – turnips, wheat; exceptional yields & good quality; minimal inputs**

Stock

- Healthy > 90% have happy lines; very little lameness
- Production steady in varying conditions

Where to now..

- 5th season: Consolidating; **focus on cow selection**; overall cost control
- **Reduce whole crop silage; use more quality hay; diversify pastures**
- Introduced share milking farm to BioAg system Spring 2013
- **Integrate kids into farm working day**

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