



MASSEY UNIVERSITY

Additional Effect of Dairy Farm Intensification on Farm Operation, Economics and Risk

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Objectives

- Apply Production Economics (MR v MC) to pasture-based dairy farm system
- Intensification, profitability, risk: changing milk price and herd size on case farm, at constant per-cow production (kg MS/cow)



Examples of items changing with increased intensification:

- Fixed items: “lumpy” resources.
- Operating items: cows, replacement heifers; machinery (tractors, feeding wagons); dairy company shares.
- Cash /working expenses: per-cow running costs; BIF, agistment/grazing fees; staff wages; interest; cash depreciation allowance.

Income potentially changing with intensification:

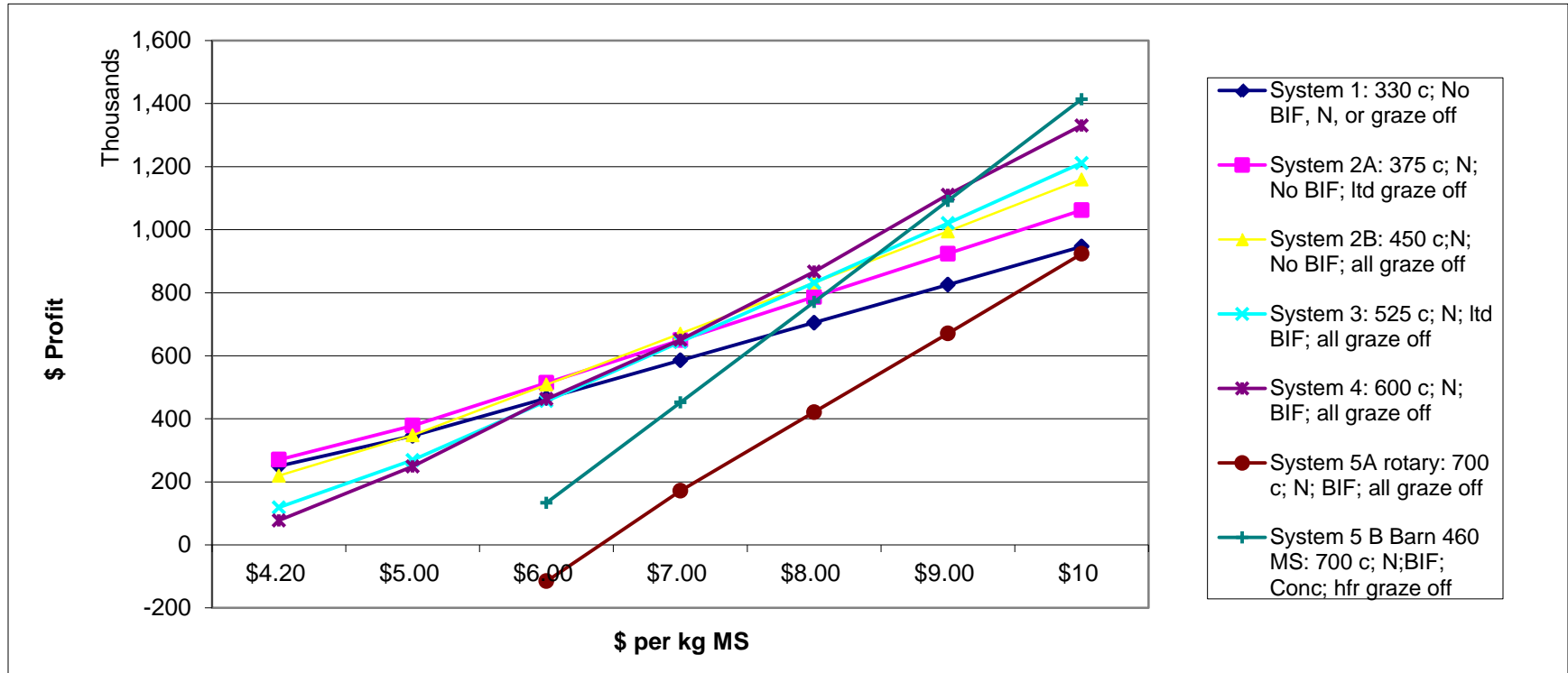
- Milk (kg milksolids (MS))
- Culled cows and heifers
- Bull calves and surplus heifer calves



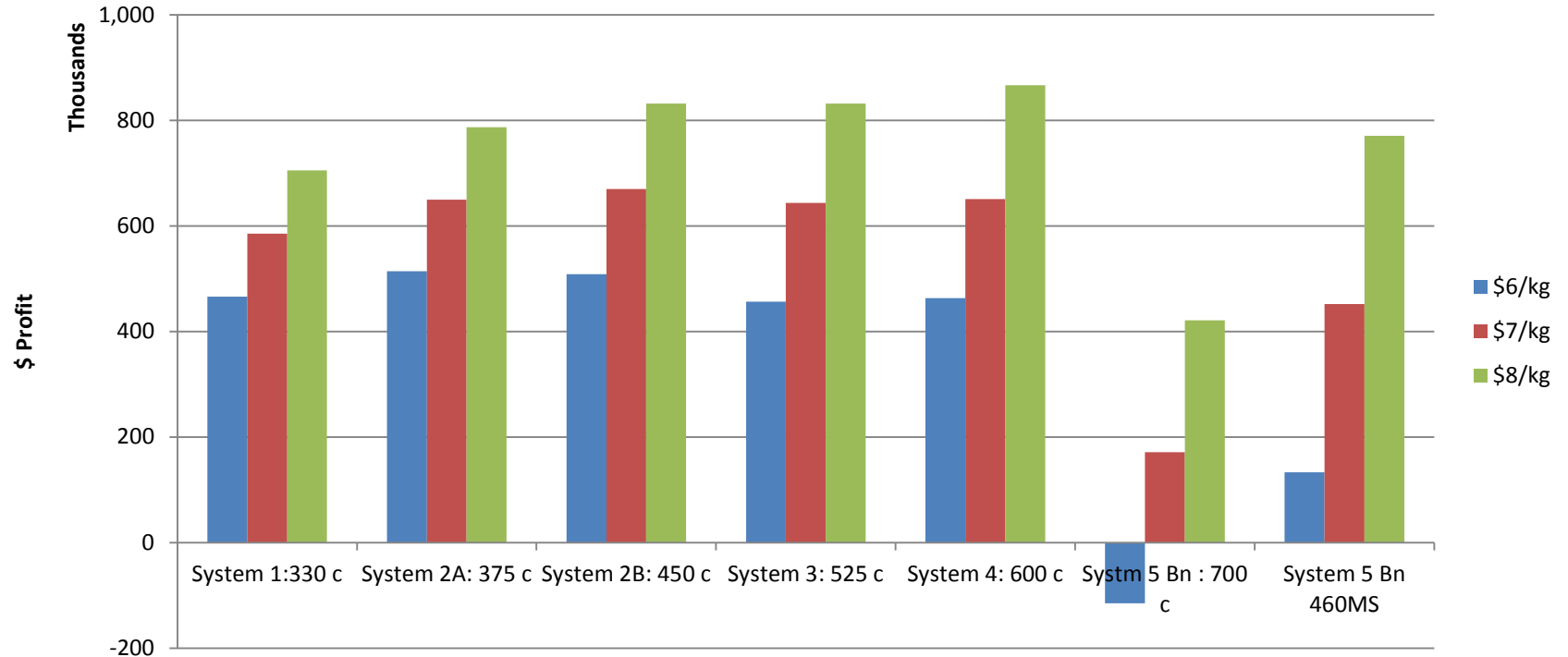
Method and Analyses

- Waikato 150 ha 330-cow dairy farm modelled with resource allocation, optimising model Grazing Systems Ltd (GSL).
- Model assumes plants and dairy cows exhibit diminishing marginal responses to some inputs e.g. N fertiliser; feed
- Changes made to “base system” to create new scenarios.
- Each scenario compared with base system.
- Results shown as operating profit (income less working expenses, interest and depreciation)

Effect of milk price and intensification on profit (360 kg MS/cow)



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Results: Profit (\$)

Milk Price (\$/kg MS)	System1 330	System 2A 375	System3 525	System 4 600	System 5A 700	System 5B (Barn)
	All cows 360kgMS					460kgMS
\$5.00	345,950	378,510	268,920	248,800	-364,000	-239,850
\$6.00	465,670	513,880	456,210	462,830	-115,000	133,360
\$7.00	585,400	649,800	643,490	677,325	171,450	451,600
\$8.00	705,100	786,750	831,600	893,345	421,170	770,600
CO ₂ emission (t)	1,110	1,170	1,480	1,610	2,040	2,355



Model optimised at \$5/kg MS, 360 kg MS/cow

- Optimum combination of resources was:
- 410 cows
- 81 t DM supplements made and fed
- No bought-in feed
- Grazing off: Dry cows in winter, heifers for 20 months
- N fertiliser: 105 kg spread 35 kg/time, Aug, Sep, Mar
- Profit: \$387,000
- DairyNZ System 2 farm.

Discussion

- Pasture: composition, growth, utilisation
- Bought-in feed: quality v feeding costs
- Infrastructure and “lumpy” resources
- Problems with using averages to analyse intensification of a dairy farm

