The profitability of early silage harvesting on Norwegian dairy goats farms

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Presentation at 61st EAAP 2010, Session 5a

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Background

- Mountain areas in Norway: Indoor season up to 9 months
- Feeding of forages harvested at early stages of maturity
  - Improved animal performance but lower crop yields and more forage required
  - The economic performance?
- Optimal input of fertilisers in grasslands and use of concentrates supplements?

Aim of the study

- Evaluate how harvesting regimes of grass silage influences economic result and optimal use of inputs, in particular fertilizers and concentrate in dairy goat farming in mountain areas of Norway

Methods

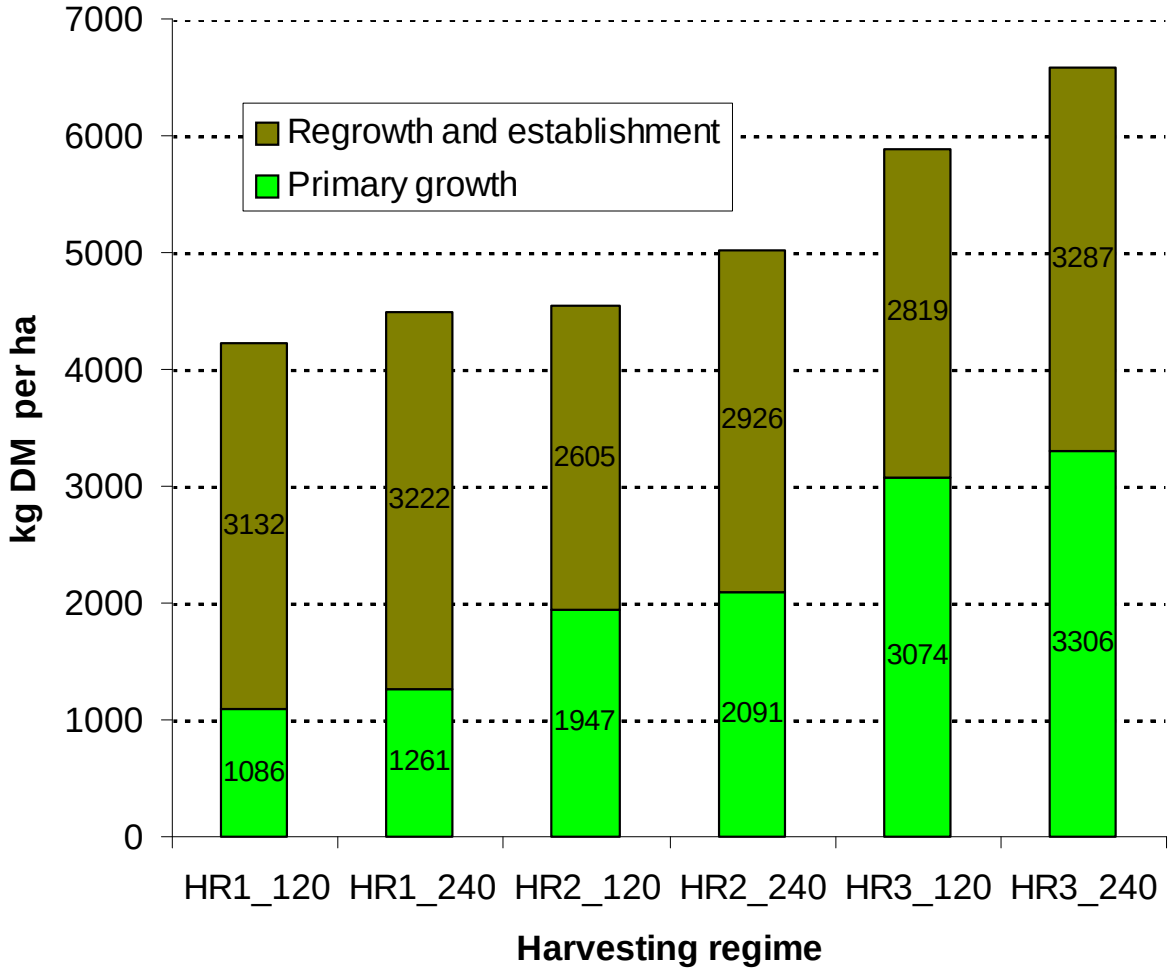
- A linear programming model of a dairy goat farm was developed to establish optimal farming systems and economic rewards of three harvesting regimes (HR).
- HR1 and HR2 – high-quality 3-cut systems, HR3 – traditional 2-cut system.
  - Seed mixture of timothy, meadow fescue and red clover

The field crop experiments

- Two N rates (120/240 kg per ha) per harvesting regime
- More frequent winter damages and weed invasions in earlier harvesting regimes

	HR1 (very early)	HR2 (early)	HR3 (normal)
First cut at	onset of stem elongation	3-4 days before heading	full heading
Date	June 7	June 16	June 30
Energy content, PG/RG (MJ NEl/kg DM)	7.2/6.2	6.2/6.2	5.3/5.3
Duration (years)	2	3	4

Farm-level DM-yields – (60% of exp. yields, establishment year included here)



Feeding of the dairy goats

- Kidding in January
- Simulate the lactation year of the feeding trial (some modifications)
  - Preparation period, 2 weeks
  - Trial period, 112 days (cyclic changeover design)
    - 3 silage qualities (only primary growth) x 2 concentrate levels (low; 0.6 kg/goat/day, normal; 1.2 kg/goat/day)
  - After trial period, indoors, 16 days
  - Grazing period, 100 days
  - Late lactation, 33 days
  - Dry period, 90 days

Goats' feed intake and milk production in the trial period

Harvesting regime		HR1		HR2		HR3
Concentrate level[a]	LC	NC	LC	NC	LC	NC
Concentrate (kg DM/day)	0.53	1.02	0.53	1.01	0.53	1.04
Silage (kg DM/day)	1.75	1.56	1.45	1.33	1.33	1.17
Milk yield (kg/day)	3.66	3.93	3.19	3.53	2.86	3.34
Milk solids (g/kg milk)	109.5	110.3	112.1	109.6	106.3	107.6

[a]LC = low concentrate level, NC = normal concentrate level

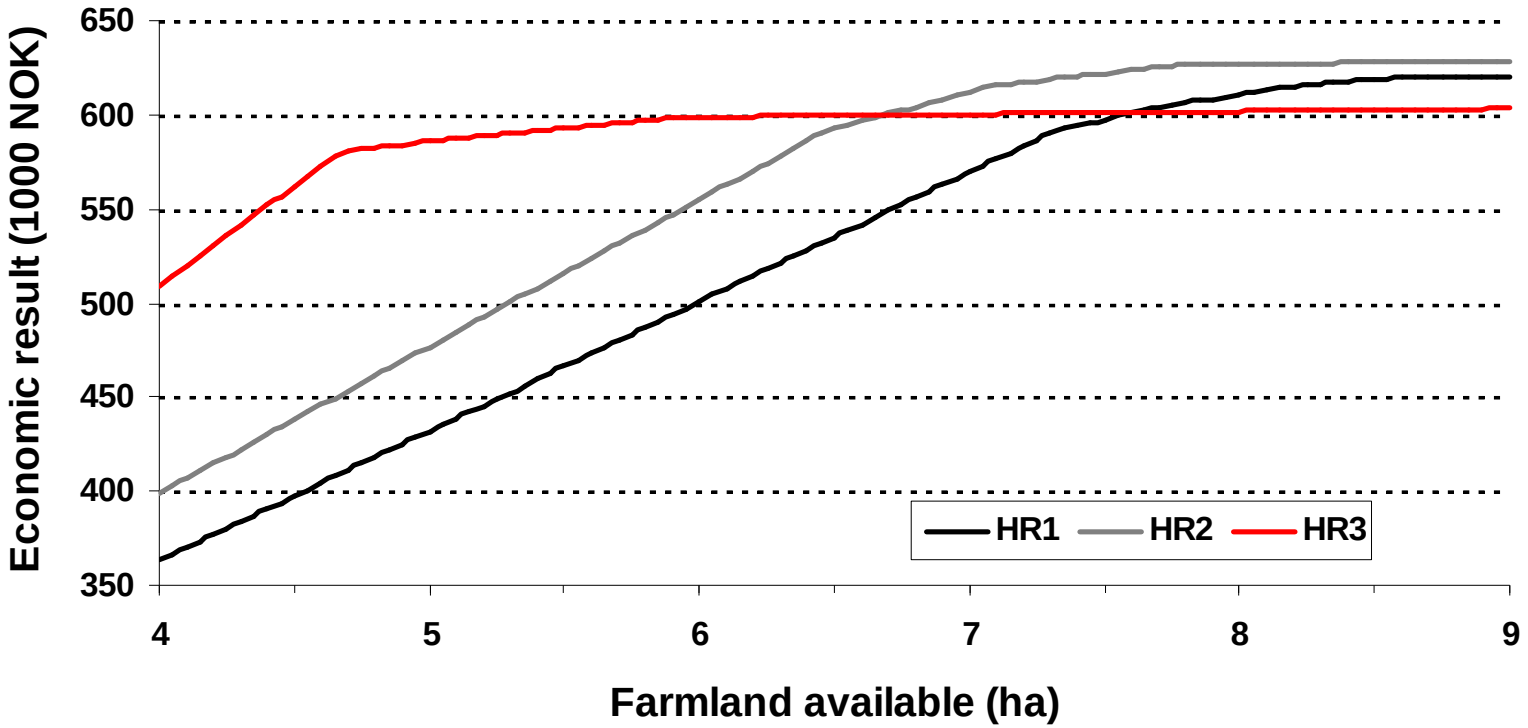
Optimal solutions for the HRs

– Quota 70000 L, land 6.5 ha, stalling capacity 100 goats

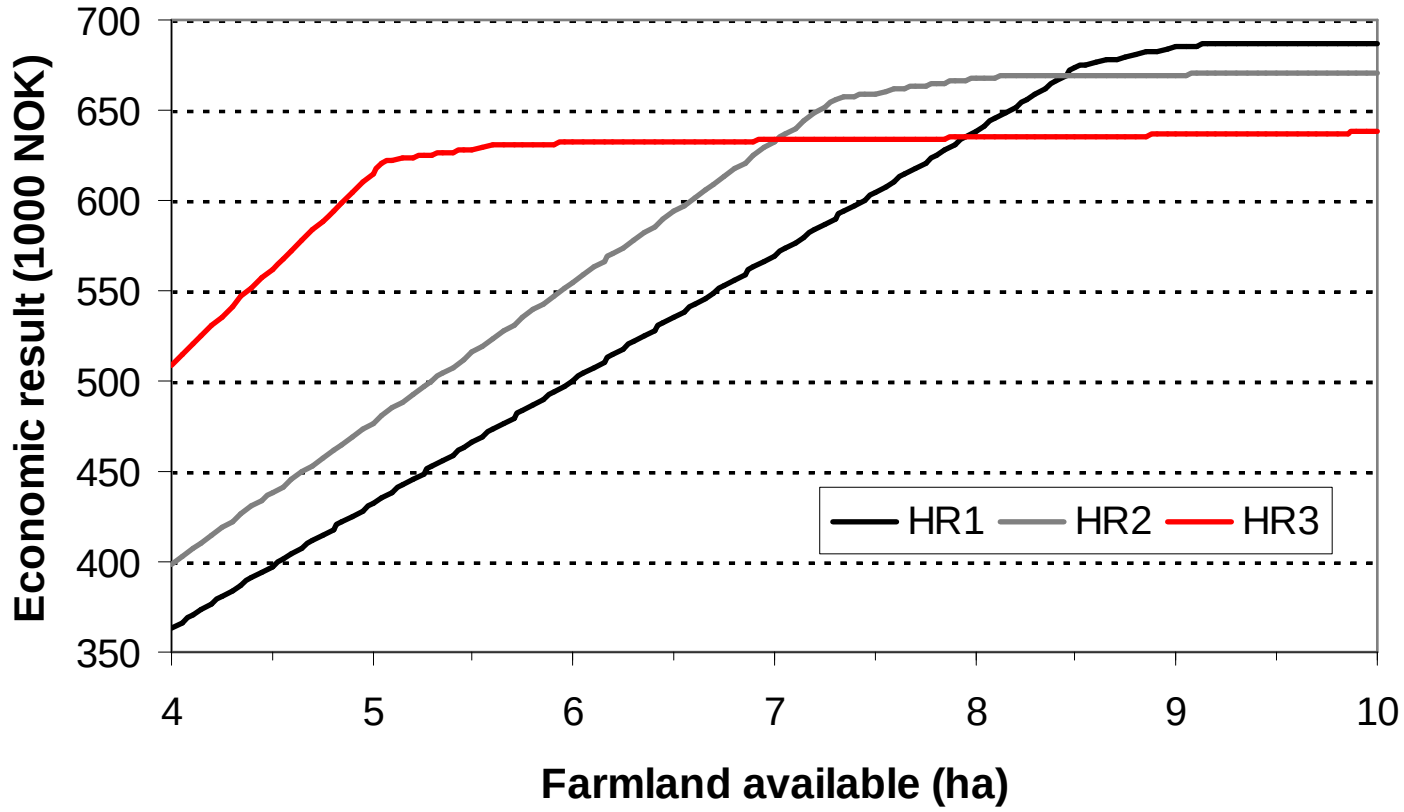
	HR1	HR2	HR3
Physical performance			
Land used (ha)	6.5	6.5	6.0
N use in ley (kg/ha)	240	240	120
Milk sold (l per goat)	816	788	704
Number of dairy goats	76	89	99
Milk quota produced (%)	89	100	100
Concentrate (kg DM/day in TP)	1.02	0.98	0.53
Financial performance			
Gross output (1000 NOK)	767	854	852
Milk sales	534	601	584
Government payments	214	230	242
Costs (1000 NOK)	232	261	253
Forage	63	67	55
Concentrates	73	84	80
Economic result (1000 NOK)	535	593	600

€1 = NOK 8.00

Parametric analysis on farmland availability



No restrictive milk quota



Conclusions

- Farmland availability profoundly influence production intensity and the profitability of producing and feeding high quality grass silage to dairy goats
  - Low to (more than) typical land availability: Normal HR most profitable
  - More land available: Early harvest performed best.
  - Very early harvest only profitable at plenty of land and no quota restrictions