



# **Research on diversification in the Norwegian small ruminant sector**

LARS OLAV EIK

University of Life Sciences (UMB-Norway)

# Outline of Presentation

1. Background information about the Small Ruminant Sector in Norway
2. Meeting new challenges in the Sheep Husbandry Sector; i.e. of-season supply of fresh lamb's meat and diversification of products
3. New Production systems for goats; i.e. meat production on older animals, producing halal-meat, cashmere fiber and use of goats for landscaping purposes
4. References

# Background information about the Sheep Sector in Norway I<sup>1</sup>

Key Information	Numbers
Number of herds	15 000
Number of breeding ewes	1 000 000
Average herd size, ewes	67
Main lambing season	April – May
Barn-feeding period	November – May
Breeds	Norwegian White Sheep, Spæl, Dala, Steigar, Cheviot, Rygja, Pelt Sheep

<sup>1</sup>Adapted from Vatn (2009)

# Background information about the Sheep Sector in Norway II<sup>1</sup>

Key Information	Numbers	Sheep
No of lambs per ewe (including stillborn)	2.0	
No of lambs per ewe in fall	1.66	
Lamb mortality, %	17	
Age at slaughter, d.	130	
Slaughter weight, kg	19	
Yield, Live body weight per ewe, kg	70.8	

<sup>1</sup>Adapted from Vatn (2009)



## On Summer Mountain Pasture, Norwegian White Sheep (Photo: NSG, 2009)



## Meeting new challenges in sheep sector; of-season supply of fresh lamb's meat

- Most lambs are slaughtered in September and October
- Castration of ram-lambs normally not permitted in Norway. Extended slaughtering season; does it result in increased male off-flavor in meat?
- Extended slaughtering season; does it alter the possible premium qualities of meat from lambs slaughtered directly from the mountain range?

# Extended slaughtering season: Materials and Methods

- Involved use of 231 lambs distributed into:
  - 40 lambs grazing on the mountain ranges or cultivated lowland pastures and slaughtered in September.
  - 107 lambs fed indoors by farmers and slaughtered in March-April.
  - 84 lambs subjected to either ad libitum or restricted concentrate supplementation and slaughtered in October – November.
- Sensory meat quality assessed with special emphasis on male flavor – odor and taste



# Extended slaughter. season: Main findings I.

Table 1: Variation of ram taste with animal sex and time of slaughter.

Season	Ram	Ewe	Sign.
September	2.4	2.3	NS
October - November	2.2	1.6	* * *
March - April	4.4	3.2	*

- Except for the lambs slaughtered in September (4 – 5 months old), meat from ram lambs slaughtered in October/November (6 to 7 months of age) and March/April (10 to 11 months old) had noticeable ram flavour.



## Extended slaught. season: Main findings II.

- Meat from individual ram-lambs scored so high on male-flavor that it was likely to affect consumer acceptability negatively.
- New studies Lind et al. (personal communication) indicate problems with ram flavor even in lambs slaughtered in September.
- At present, meat from ram-lambs are used for up-market products due to higher EUROP-score. Probably, the wrong approach?

# Diversification of products

- Examples of regional brands:

- ✓ Kvitsøy-lam
- ✓ Hallingskarvet-lam
- ✓ Lofot-lam
- ✓ Villsau-lam







# Diversification of products: Material and methods

- Involved use of large number of lambs from different locations in Norway distributed into:
  - Lambs grazing on the mountain range or cultivated lowland pastures in different parts of Norway
  - Lambs fed indoors for 3 to 6 weeks pre-fattened before slaughter compared with directly slaughtering from mountain pastures.
- Sensory meat quality assessed with special emphasis on odor and taste.



## Diversification of products: Main findings I.

- Compared with lambs from lowland cultivated pastures, lambs slaughtered directly from the mountains, were:
  - Heavier and obtained better grading according to the EUROP - System
  - Less DM in the meat
  - Less fat
  - More protein in % of DM
  - Higher contents of poly-unsaturated fatty acids
  - Small, but significant differences in flavor of meat

## Diversification of products: Main findings II.

- Small, but significant differences in flavor of meat also observed between lambs from different regions
- Fattening after grazing unimproved pastures for 3-6 weeks did alter meat quality to a small extent with effect of year observed
- These differences in quality of meat may give fascinating market opportunities:
  - Should producers in less-favored areas of mountainous Europe market for example mountain-lambs from their respective locations?

# Background information; the Goat Sector in Norway I<sup>1</sup>

- 44 000 goats kept for specialized milk production with negligible output of meat
- Rapid decline in number of milking goats in recent years
- Increased interest in utilizing goats for other purposes than milk in alternative production systems, especially:
  - Meat + Grazing for maintenance of open and diversified landscape ("landscaping")

# Cashmere goat: New production systems I.



- Meat
- Cashmere
- Landscaping



## Cashmere goat: New production systems II.

- Importation of 30 cashmere goats from New Zealand in 1995 + semen from Scotland
- Fiber may be combed or shorn, combing is best
- Mature cashmere-goats may produce 100-200 gram per year
- Shearing of animals at the slaughter house after killing, is it possible?

# Product from Oleana I.; [www.oleana.no](http://www.oleana.no)

## DESIGN 303

sjal/scarf

K • cerise

G • green

W • dark blue

## DESIGN 304

pulsvanter/  
wristlets

K • cerise

G • green

W • dark blue

100% norwegian/  
scottish cashmere



# Meat from goats

- Limited tradition for goat's meat in Norway
- Surplus goat kids culled after birth
- Goats' meat used for sausages
  - Low price
- Changes are taking place
  - Marketing in collaboration with acknowledged chefs
  - Emphasis on meat from young animals, slaughtered after 1-2 grazing seasons

## Alfathi-products



Alfathi AS pays good price for animals sold on contract-basis at Id-celebrations



# Norwegian short-tailed sheep (Spælsau)



## Norwegian dairy goat





# Cashmere goat



# How different is lamb's and goat's meat?

## Main findings

- Goat meat has generally low fat higher protein contents than meat from the female Norwegian lambs
- The detection of differences in sensory characteristic between goat and lamb meats by the panellists implies that goat meat is not interchangeable with lamb meat



# LANDSCAPING

## Cashmere goats for landscaping

- It may prove difficult to obtain good income from sale of only meat and cashmere fiber
- Providing attractive landscape is supported by the government
- Landscape can be an output alongside meat and fiber from cashmere-goats

# Encroachment along river banks





# Cashmere goats for maintaining open and diversified landscape



Intensive browsing leads to opening of the vegetation, electric fencing is handy along cultivated paddocks

[www.umb.no](http://www.umb.no)



## Open landscape is also important



After 2-year grazing with goats

# References for more detailed information I.

- Ådnøy T., A. Haug O. Sørheim, M. S. Thomassen, Z. Varszeg and L. O. Eik, 2005. Grazing on mountain pastures - does it affect meat quality in lambs? *Livestock Production Sciences*, vol. 94, Issues 1-2: 25-31.
- Hansen, V., 2009. Product quality of meat from Norwegian lamb - influence of pre-slaughter fattening diets and sex. PhD-thesis, UMB. *In press*.
- Mushi, D.E., L.O. Eik, J.E. Haugen, O. Sørheim T. Ådnøy and J.E. Haugen, 2008. Effect of animal sex and time of slaughter on sensory quality of meat from Norwegian lamb. *Acta Agriculturae Scand. Section A*, 58: 31-36.
- Mushi, D.E., L.O. Eik, O. Sørheim and T. Ådnøy, 2008. Effect of concentrate feeding systems, genotype and sex on productive performance and meat quality of Norwegian lambs. *Acta Agriculturae Scand. Section A*, 58: 23-30.

# References for more detailed information

## II.

- Mushi, D.E., L.O. Eik, O. Sørheim, T. Ådnøy, 2008. Suitability of Norwegian short-tail lambs, Norwegian dairy and Cashmere goats for meat production – carcass, meat chemical and sensory characteristics. *Meat Science*, Vol. 80 (3): 842-850.
- Asheim, L.J. & L.O. Eik, 1998. The economics of fibre and meat on Norwegian dairy goats. *Small Rumin. Research* (3): 185-190.