THE FARM ECONOMICS OF PRODUCING CASHMERE FIBRE AND MEAT ON NORWEGIAN GOAT DAIRY FARMS

by

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ABSTRACT

The variations in volume and quality of the milk due to the current system of production in Norwegian goat dairy farming complicate production of brand goat cheeses. In the specialised goat dairy farming system most kids are also culled right after birth and there are currently few options for utilising the meat. In this paper the farm economics of an alternative system with altered period of kidding, currently in the period from January to March, combined with production of meat and cashmere fibre is examined. May kidding combined with raising the kids for 8 months yielded the most promising economical return, however depending upon the fibre output and expected decrease in milk yield. Compared to the present system the changes would be favourable from an animal welfare point of view.

Introduction

In Norway goats are kept mainly for the milk and kidding normally takes place in February. Due to the decreased sale of traditional brown Norwegian goat cheeses and mixed cheeses (i.e. cheeses made from both cow and goat milk), there is a surplus production of goat milk in Norway. However, the Farmer's co-operative milk marketing board "Norwegian Dairies Association" has through a successful marketing of the brand cheese "Snøfrisk" (i.e. Snow-fresh), shown that it is possible to acquire market shares for a new product on the local as well as on the European

market. The "Snøfrisk" is a white spreadable cheese with a mild taste. Since it may be stored only four months an equal milk supply throughout the year is a prerequisite for the production of "Snøfrisk".

The new cheese is produced in the north-west of Norway. In this area the goat farmers have agreed to alter the time of kidding to begin either in early December or April. In addition they will try to extend the milking period from nine to ten months. The price of milk has also been substantially increased during the period from November to February thus giving the farmers an incentive to change the production pattern.

In this paper we will examine a more comprehensive transposition of Norwegian goat dairy farming involving altered period of kidding combined with production of goat meat and cashmere fibre. This transposition might generate additional incomes on such farms and contribute to further improving the economy while meeting the requirements concerning animal welfare and consumer satisfaction.

Background

In the current specialised goat dairy system the kids are culled right after birth. Only kids for replacement are saved. Many farmers react emotionally against the current practice, in a recent newspaper article one farmer described the culling of kids as "the most unpleasant task I have to do". There are few attempts to utilise the meat. According to Statistisk Sentralbyrå (1994) the production of meat from goats and kids constituted in 1992 only 0.3% of the total production of meat in Norway. However, goats have had an important position in the system of self-sufficiency agriculture prevailing traditionally in the country.

According to the prevailing rules of carcass classification there are currently only two main groups of goat meat. The carcasses of young animals with a minimum weight of 2.5-3 kg and a maximum weight of 6 kg are termed "kids" while the term "goats"

is used for the remaining carcasses. This classification is rather broad and the last category could be split into a) castrated billy kids and females between 10 weeks and one year b) young goats and castrated goats between one and two years c) old milking goats and male goats. Kids between 10 weeks and two years may be utilised more or less like lamb and mutton. Meat from old milking goats are an important raw material in different forms of salted and smoked sausages today. Due to its special taste goat meat may be utilised in speciality products which may yield a higher price.

Today most Norwegians with the exception of some immigrants, are unfamiliar with unprocessed goat meat. A co-operative effort, with "PAK-mat" in Oslo, was therefore carried out in 1990 and 1991 in order to market goat meat in the Pakistani community there. Meat from seven to eight month old kids with slaughter weight between 10 and 15 kg was sold for the same retail price as lamb[i]. The meat was well received and the sale could possibly have been extended. A presupposition for many Muslims is that the kids are slaughtered in accordance with certain rituals (Halal meat). At present only one slaughterhouse in Norway practices the Halal slaughtering of lambs.

Cashmere fibre[ii] is the fine under fibre found on goats suited for living in cold areas. On northern latitudes it grows in the period from June to December and the goats shed the old fibre during spring and early summer. The cashmere fibre may either be sheared or combed off the goats during the winter period. Only fibre with average diameter 18.5 micron or thinner (<0.0185 mm) may be classified as cashmere fibre[iii].

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[i] The price was US $ 7.56 per kg (US $ 1 = 6.48 NOK in 1991)

[ii] Goats and kids may produce two kinds of fibre either mohair or cashmere. Mohair comes from angora goats originating in Turkey. Mohair is a long and curly bottom fibre and the mohair goats do not have special hairs to protect against rain and wind. This may be the reason this fibre is mainly produced in areas with a dry and relatively warm climate like in South-Africa, Texas or Turkey.

[iii] The name Cashmere originates from the province of Cashmere on the border between India and Pakistan. It is from this area that the fashionable and expensive shawls from 100 years ago originated. In the text book "Goat breeding and goat farming" Pyndt (1912) writes about "the famous and expencive genuine Cashmere shawls that may reach a price of 2000 kroner each". Textiles made from cashmere fibre are still a symbol of wealth and luxury.

The fibre is further classified into Weavery (16.5-18 micron) and Hosiery (<16.5 micron). Only a tiny variation in the diameter of the fibre is allowed.

The main cashmere producing countries, China, Mongolia, Iran, Afghanistan and Australia, produced around five thousand tons of cashmere fibre in 1991. China produces about 60 per cent of this amount and about 40 out of 67 million goats in China produce cashmere fibre (Watkins & Buxton, 1992). Most of the production is consumed by the knitwear industry although significant amounts go to the weaving sector. Traditionally Scotland has been the home of the knitwear industry and in spite of challenges from Italian manufacturers Scottish knitters still constitute one of the biggest markets for cashmere fibre outside China (Watkins & Buxton, 1992).

In the EU only about 5,000 Scottish goats produce cashmere fibre[iv], however the EU-commission (1993) has estimated the total demand for cashmere fibre to be 2,750 tons in 1993. This amounts to the production from about 11 million cashmere goats and is about the same as the current number of dairy goats in the EU (Buxadé Carbo & Caballero de la Calle, 1995). The Norwegian goat population amounts to approximately 60,000 dairy goats, originating from local breeds. Some of them have been reported to produce about 100 g very high quality cashmere (mean fibre diameter 14.4 micron), while on others only insignificant quantities were found (Vegara et al., 1996). Larger quantities have to be obtained by breeding on the native goat or by crossbreeding with cashmere goats from Scotland or New Zealand.

[iv] The Scottish producers are organised in two organisations. The Cashmere Breeders Limited aims to develop an efficient cashmere goat suited for the Scottish climate and The Scottish Cashmere Producers Association (SCPA) which deals with extension, grading and marketing of the fibre. A future Norwegian production may be marketed through SCPA.

Prices for fibre and meat

The world market prices (in US $) for cashmere fibre for the period from 1977 to 1991 are shown in Figure 1. In the late 1970s and most of the 1980s there was an increased demand for cashmere fibre with a subsequent rise in the prices. The price, however, peaked in 1989. According to Watkins & Buxton (1992) the change in government policies in China bears much of the responsibility for the turmoil in the market at that time. In June 1990 the official prices were 20-30% lower than the year before.

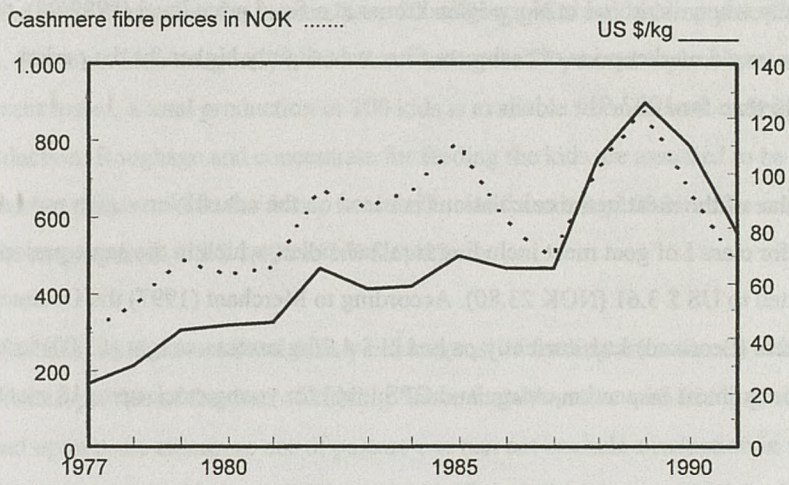

Figure 1. Current producer prices for best quality of willowed cashmere fibre during the period 1977-91 measured in US $ (solid line, right scale) and in Norwegian kroner at the price level 1989/90 (dotted line, left scale).

Source: Watkins & Buxton (1992)

Fluctuations in the world market price for cashmere fibre, both short term, medium and long term are thus common. Since the inflation level and the exchange rate

change over time one has to take these changes into account as well. Therefore the current price in US $ for the period 1977-91 was transferred to Norwegian kroner and deflated to the price level in 1989/90 by use of the Norwegian GDP-deflator. In the following calculations it was decided to use the average cashmere fibre price for the last two five-year periods in Figure 1, i.e. 1982-91 which amounted to NOK 667. In recent years the prices have improved and the producer prices in Scotland varied in 1994 between US $ 139 (£91) and US $ 154 (£101) per kg for hosiery (Boyd, 1994).

Since decisions concerning breeding of cashmere wool involve investments in a breeding program, they should be based upon predicted prices as well as predicted exchange rate of the US $. To the knowledge of the authors, no such analysis exists. Typically when measured in Norwegian kroner at a fixed price level (1989/90), the average world market price of cashmere fibre was slightly higher for the period 1982-86 than for 1987-91.

The value of the meat in the calculations is based on the actual Norwegian producer prices for class I of goat meat including rural subsidies, which in the same period amounted to US $ 3.61 (NOK 23.80). According to Merchant (1997) the Goatmeat Producers (Scotland) Ltd. currently pays US $ 4.9/kg carcass weight (£3.00) less deductions (meat inspection charge and GPS levy) for young stock up to 18 months.

Calculation of farm economy

In order to determine whether production of cashmere fibre might be profitable on Norwegian goat farms, the farm accounts for 1989 and 1990 for six farms in Western Norway were selected from the official farm account statistics (NILF, 1990, 1991). All the farms were specialised goat dairy farms with 80 dairy goats plus replacement and kidding around the 10th of February. Their average farm result refer to the price level around January 1, 1990 and has been termed the basic alternative.

The basic alternative is compared with different alternatives causing a different degree of transposition. Merely adding production of cashmere fibre to the milking goats involves the smallest transposition. The next alternative would be to stop culling and raise the kids for 11 months (20 kg carcass weight) with slaughtering in January. This alternative yields meat and fibre from the kids as well. If the kids are fed an additional year (23 months) they will be heavier (30 kg) and the fibre might be harvested twice. The final question is whether the period of kidding also could be altered. An alternative with kidding in May has therefore been worked out to 8 months (16 kg) or 20 months (25 kg) old kids. For kidding in December we assume the kids are 13 months old when slaughtered (22 kg).

In the basic alternative the farmers keep 80 milking goats and kidding percentage (i.e. 100 x no. kids/no. goats) is 160. Accounting for 27 percent replacement and 7 percent losses, a total production of 100 kids is available for meat and cashmere production. Roughage and concentrate for feeding the kids are assumed to be bought at market prices outside the farm, total feed costs for raising 100 kids one or two years ranging from US $ 1,406 to US $ 6,421.

In the basic alternative annual milk yield and cost of feeding are assumed to be the same irrespective of the time of kidding. Since the alternative with kidding in May is based upon more extensive use of pasture one can not exclude a reduction in the milk yield. Based on data from the Milk Marketing Board (Rønningen, 1964) reported 8 % lower milk yield for goats kidding in the period from March to May compared to February. In later studies (Rønningen & Gjedrem, 1966; Steine, 1975), the yield reduction was about 20 %. The yield reduction however, will depend upon the quality of the pasture and the level of supplementary feeding. According to Heldal (1978) goats kidding in February on an annual basis were fed by substantially more concentrate than goats kidding in May. An alternative with only 10 percent less milk yield have therefore been worked out for May kidding assuming the same level of supplementary feeding as February kidding.

Table 1 shows distribution of the increase in labour input for the alternatives when cashmere fibre is added and the kids are raised.

Table 1. Distribution of extra labour input by change of production system in goat farming*. Hours.

Month of kidding	February			May		December
Kid age at slaughtering (months)	0	11	23	8	20	13
Shearing and combing	68	76	143	76	143	76
Feeding 1st. spring	-	220	220	62	62	338
Pasture 1st. summer	-	75	75	75	75	75
Extra feeding 1st. autumn	-	75	75	75	75	75
Extra feeding 2nd. spring	-	-	141	-	141	-
Pasture 2nd. summer	-	-	75	-	75	-
Extra feeding 2nd. autumn	-	-	75	-	75	-
Total extra labour input	68	446	803	288	645	564

*Combing the fibre is assumed to take 40 minutes per goat and shearing takes five minutes per kid. The milking goats are sheared while kids are combed and sheared before slaughtering. Barn feeding of 100 kids before letting them out on the pasture is assumed to take two hours a day, while half an hour per day is sufficient for 150 days on pasture starting on May 31. Supplementary feeding during autumn or winter is assumed to take an hour per day.

Source: Own calculations.

The average future yield of cashmere is assumed to be 200 g/year for animals older than one year and 170 g/year for kids after 10 years of breeding. Thus the total fibre production will be 19.8 kg (80.6x0.2 + 21.7x0.17) if one merely adds cashmere fibre to the dairy goats and replacement stock. The fibre production will increase by 86 percent by feeding the kids one year and by 187 percent by feeding them two years since the kids will have the same weight and produce equal amounts as the milking goats the second year. Due to an uncertain outcome of a breeding program, an

alternative with half of these quantities will also be discussed. This amounts to what have been found on the best native goats without breeding.

The cost of housing for the milking goats will be the same, but depreciation and maintenance of uninsulated sheds for the kids has been added and amounts to US $ 350 or US $ 524 for 100 kids that are fed one or two winters, respectively. On the other hand governmental payments for the preservation of the cultural landscape is added to income and amounted to US $ 972 or US $ 1875, respectively for keeping 100 kids on pasture one or two summers.

Results and discussion

The actual profit measurements for the new production system are changes in net farm income and changes in earned income in total or per extra hour added. These numbers which are shown in Table 2 should form the basis for a rational decision about undertaking the investment and indicate the most profitable direction.

The accounted earned income had an average of US $ 8.9 per hour for the two years. Since most Norwegian goat farms are located in rural areas, the alternative value of the labour in other businesses are normally small. The degree of transposition on a single farm will depend upon the alternative value of family labour outside the farm as well as variation in milk price during the year.

In the calculations in Table 2 the same milk price during the year has been used only allowing for a small price reduction due to reduced dry matter contents of the milk in the period when the kids are suckling (five or nine weeks) (Eik et al., 1996). However, in order to meet market demands for the new cheese "The Sunnmøre Dairy" pays the goat farmers a premium of US $ 0.38 (NOK 2.50) per kg for the milk produced in the period from November to February. The calculations thus underestimate the income for May kidding. In addition the same cost of winter feed has been assumed while May kidding goats rather would have more pasture which is

cheaper under Norwegian conditions. In spite of this the payment per hour for May kidding turned out to be higher than for kidding in February both with one or two year old kids.

Table 2. Net farm income, earned income and earned income per hour on specialised Norwegian dairy farms and changes due to a combined production of goat milk, cashmere fibre and meat*.

Production alternatives	Net farm income, US $	Earned income, US $ Total	Per hour
Kidding in February			
Basic goat milk farming	30,035	29,427	8.9
Transposition with kidding in February			Per extra hour
Basic with cashmere fibre	+ 2,008	+ 1,807	26.6
Cashmere fibre and 11 month old kids	+ 6,125	+ 4,862	10.9
Cashmere fibre and 23 month old kids	+ 8,622	+ 5,987	7.5
Kidding in May			
Cashmere fibre and 8 month old kids	+ 6,554	+ 5,435	18.9
-50 percent cashmere yield	+ 4,688	+ 3,756	13.0
-10 percent milk yield	+ 4,702	+ 3,584	12.4
Cashmere fibre and 20 month old kids	+ 8,689	+ 6,379	9.9
Kidding in December			
Cashmere fibre and 13 month old kids	+ 4,927	+ 3,591	6.4

* Source: Own calculations, US $ 1=6.58 NOK (1989/90)

The alternative with 10 percent milk reduction performed well, however if yields are lower and cost of production also increases a transfer to May kidding is questionable. Goats may respond well to kidding in May, in fact this is the traditional Norwegian

system, while there are biological problems associated with kidding in the period from July to December.

A small transposition in the current specialised dairy production by only adding cashmere fibre on the milking goats seems to give rather high income per hour, however there will be only a few extra hours required. In case a substantial increase in net farm income is desired, raising the kids is necessary. Age at slaughtering will depend upon the demand for meat and cashmere fibre. The highest earned income per hour is obtained by selling them before they are one year old, however when kidding in May 20 months should be considered. In case kidding takes place in February, the demand for meat has to increase before raising of kids older than one year is to be recommended while December kidding seems to perform best with the present practice of culling the kids after birth. This management practice is however, considered unethical by most consumers.

Even with 50 percent yield, adding cashmere to the goats seems to be profitable. A final argument is that goats with a double pelt tolerate rain and wind better than goats which are poor cashmere producers. The cashmere fibre thus should have some value even if it is not harvested. Several goat farmers support the work for a more robust goat because they are convinced that such a goat will be better adapted to the shifting weather of the Norwegian countryside.

Conclusion

A combined production system of goat milk, meat and cashmere fibre with an even milk production throughout the year seems to be an interesting alternative compared with today's specialised dairy goat production in Norway. Based upon the results reported here a transposition of the time of kidding to May seems most promising in addition to the present kidding in February. Cashmere fibre production on milking goats as well as one or two years old kids may contribute to improved profitability, but it will take some time to breed the goats to have them produce economically

interesting amounts of the fibre. Together with utilisation of market niches for goat meat this transposition may contribute to maintain goat farming as an element for rural employment in a period with reduced government agricultural subsidies.

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