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## BRIEF COMMUNICATION: Assessing the current value of milk, meat and fibre products from the goat industry in New Zealand

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### Introduction

Goats have a historical record of being productive and valuable to families and communities (Aziz 2010). Small ruminants, which include goats, still have an ‘unfulfilled’ potential despite the numbers of animals farmed and their distribution around the world (Anaeto et al. 2010). Pollot and Wilson (2009) concluded that goats deserve greater attention due to their capacity for producing food. A similar study in New Zealand (Sheppard & O’Donnell 1979), described the uses of goats for meat, skins, milk and mohair and concluded that the goat was valuable, but that the production potential was largely unfulfilled. A recent New Zealand study (Ministry of Agriculture and Forestry 2009) concluded that food-consumption patterns are changing in New Zealand, and globally demand for more diversified products provided an opportunity for goat meat. The objective of this study was to determine the current value of domestic and exported New Zealand goat products and to explore possible future products and their target markets. Many of these product values are gathered from retailers, personal communications and individual producers. This research is an attempt to bring together information that has not yet been gathered to present a current value of the goat in New Zealand.

### Dairy industry, products and value

Goat milk has been proven to be beneficial for human health (Anaeto et al. 2010; Agostoni et al. 2012). The components of goat milk and the quality of the milk produced in New Zealand is a major attraction for international markets (Stanley, 2012). Favourable properties of goat milk when compared to cow and sheep milk include the protein and vitamin content, and fat globule size (Park 2006; Anaeto et al. 2010). Compared to cow’s milk, the fat-globule size in goats’ milk is smaller in diameter which results in differences in the physico-chemical structure and composition (Park 2006) although it should be noted that direct clinical substantiation of these anecdotes is not available. This result in goat milk being better digested and tolerated by those with health disorders. The overall composition of goat milk allows it to be very versatile for many areas of human health (Park 2006).

The value of goat milk depends on which products are manufactured from it. Table 1 lists the dairy products sold domestically in New Zealand and the market value for each product. These domestic products are made by local companies and may be sold by supermarkets, food service providers, or sold directly by farmers to customers.

**Table 1** Domestic products, their description, destination and their current retail value.

Product	Description	Destination	Value of finished product (\$NZ/kg)
Chevre cheese	Common name for goats’ cheese. Can have additional flavorings	Many small suppliers around New Zealand	87.00 <sup>a</sup>
Feta cheese	Salty Greek cheese	Supermarkets	59.40 <sup>b</sup>
Powdered milk	Spray-dried goat milk, can have added ingredients depending on the customer	Online, supermarkets or health stores	55.00 <sup>b</sup>
Yoghurt	Semi-solid food prepared from milk fermented by added bacteria	Local supermarkets	17.70 <sup>b</sup>
UHT milk	“Long life milk”, can be stored unrefrigerated due to heat treatment	Online or large supermarket chains	7.60 <sup>b</sup>
Whole milk	Milk with no constituent removed	Farms supply local supermarkets and small stores	4.10 <sup>b</sup>
Ice-cream	Sweet frozen food made from cream and milk. Can have additional flavorings	Farms supply local food-services	Sold in food service

<sup>a</sup>Price from Kaikoura Cheese, personal communication.

<sup>b</sup>Retail prices from Countdown (15/1/2017).

**Table 2** Exported products with markets and current retail value

Product	Description	Export amount	Destination	Value (\$NZ/kg)
Infant formula	Spray-dried goats milk with added vitamins	4,000 tonnes	Asia, Australia, Europe.	48.90 <sup>a</sup>
Adult formula	Spray-dried goats milk suitable for adults		Smaller companies export to Australia and USA	55.60 <sup>a</sup>
Milk powder	Spray-dried goats milk	16 million tablets <sup>b</sup>	Asia, Taiwan	45.00 <sup>a</sup>
Goat milk tablets	Chewable tablets			333.33 <sup>a</sup>

<sup>a</sup>Retail prices from Fresco nutrition (3/1/2017).

<sup>b</sup>Each tablet weighs 600 mg and contains a mixture of whole milk powder and dextrose.

Table 2 shows the current market value of exported dairy products from goats milk. The Dairy Goat Cooperative has major markets in Asia and has expanded into 20 countries. Smaller companies such as New Image Group have markets for infant formula in Mainland China, South East Asia and the Middle East. New Zealand goat milk powder is attractive to international buyers due to its versatility, and New Zealand's "clean and green" image (Stanley, 2012). Export products are sold as spray dried milk powders in cans or tablet form.

Export opportunities exist in Asia for goat-milk powder, UHT milk and cheese (Coriolis 2015). New Zealand producers have also developed innovative infant formula blends of milk from different animals (Freeman-Rock 2015). In the Asian market, consumer sectors for indulgence and convenience products are an untapped opportunity for New Zealand goat milk (Coriolis 2015). Although these product types (e.g., infant formula, UHT milk, yoghurt, butter, ice-cream and condensed/evaporated milks) do exist, infant formula from goat milk is exported to Asia from New Zealand and the other products on this list are not.

**Table 3** Domestic meat products sold in New Zealand, their use in cooking and current market value.

Product	Use	Value (\$NZ/kg)
French rack	Roasted	46.88 <sup>a</sup>
Back strap striploins	Marinated and slow roasted	37.50 <sup>a</sup>
Rump with cap	BBQ, marinated and pan fried	34.50 <sup>a</sup>
Diced chevon	Curry, tagine and kebab	25.00 <sup>a</sup>
Short leg roast	Roasted or grilled	22.50 <sup>a</sup>
Chevon leg roast	Slow roasted	19.50 <sup>a</sup>
Chevon mince	Burgers, meatballs, meatloaf and ragu	19.50 <sup>a</sup>
Shanks	Slow cooked as for lamb shanks.	18.13 <sup>a</sup>
Boneless shoulder	Roasted or BBQ	13.75 <sup>a</sup>
Pet food	For a variety of pets	2.50 <sup>b</sup>

<sup>a</sup>Retail prices from Shingle Creek Chevon (22/1/2017).

<sup>b</sup>Retail prices from New Zealand Petfoods Ltd.

### *Meat industry, products and value*

Goat meat can be considered as a healthy alternative to other red meats. Goat meat is becoming more widely accepted internationally in places where it is not a dominant meat-based on the nutrient composition of the meat and the health benefits it may provide. Research shows that goat meat (chevon) regardless of age, breed or region will supply a high-quality protein source, along with a healthy fat profile with minimal cholesterol content (Anaeto et al. 2010).

Products derived from goat meat depend on market demand (Pinkerton & Harwell, 2015), so a wide variety of products is produced. Products processed in New Zealand for domestic use are shown in Table 3, but there is a predominance of cubed meat being used for curry and cultural dishes at a local level (Napier 2015). Currently, most goat-meat consumers in New Zealand purchase their goat meat from their local communities. As goat meat is not yet a mainstream product, the meat is often purchased from their local butcher, farmer or ethnic take-away shops. Goat meat sold in New Zealand tends to be from Boer goats, and is considered the premium goat meat for the domestic market.

There are other products derived from goat carcasses that are bought from small-scale farmers and businesses. These products are not exported and include horns for decoration sold at \$NZ11.00-50.00 per pair skins and hides from feral goats processed by local tanners for approximately \$NZ110, and tallow which is utilised for soaps and lip balms and sold for \$NZ2.00 per kg.

There is currently no domestic demand for goat pharmaceutical products in New Zealand, so goat organs and blood are processed into fertilizer or pet food. Pharmaceutical companies have capacity to process goat organs and blood once domestic demand increases (Agrilab 2017; personal communication).

In 2015, New Zealand exported 1,200 tonnes of goat meat (Beef and Lamb 2016). Products are exported from New Zealand as primal cuts or whole carcasses. Once the meat arrives at the overseas importer, they further process the meat based on market demand or sell as is to customers. Most importers can process meat based on consumer orders and requirements. Table 4 shows the exported goat products which include those destined for pharmaceutical

**Table 4** New Zealand goat-meat products, export market and current retail value.

Product	Description	Destination	Value (\$NZ/kg) <sup>a</sup>
Overall meat export	Frozen, carcass, specified cuts	USA, Japan, Middle East, Caribbean	6.92 <sup>b</sup>
Live goat (under 23kg)	Bred on ranch	USA	7.45 <sup>c</sup>
Live goat (23-37kg)		USA	8.43-12.10 <sup>c</sup>
Live goat (over 37kg)		USA	11.26 <sup>c</sup>
Goat blood - pharmaceutical	Used for proteins, can be added to food	Turkey, India, China, USA	73.60 <sup>d</sup>
Goat organs - pharmaceutical	Used in pharmaceutical, cosmetic and food industry	Turkey, India, China, USA	Price unknown
Goat serum - pharmaceutical	Drugs for humans and animals	Turkey, India, China, USA	152.74 <sup>d</sup>
Goat plasma - pharmaceutical	Proteins in food, fertilizer and functional ingredients	Turkey, India, China, USA	Price unknown

<sup>a</sup>Prices from overseas retailers were converted to \$NZ at date specified using exchange rate.

<sup>b</sup>Price is from Beef and Lamb 2016.

<sup>c</sup>Price is from Salmon Creek Ranch (22/1/2017).

<sup>d</sup>Price is from Quad Five (22/1/2017).

**Table 5** Current goat meat products in the United States of America and current retail value.

Product	Description	Value (\$NZ/kg) <sup>a</sup>
Goat mince	Processed by retailer	45.82 <sup>b</sup>
Goat cubes	Skin burnt off, retail bagged	42.6 <sup>c</sup>
Goat leg	Bone in with the skin burnt off	39.67 <sup>c</sup>
Goat leg	Bone in, with the skin removed	39.67 <sup>c</sup>
Goat neck	Processed on site	33.57 <sup>c</sup>
Goat carcass	6-way cut	30.51 <sup>c</sup>
Goat carcass	Skin removed	28.98 <sup>c</sup>
Pet food	Processed by retailer	23.98 <sup>b</sup>
Goat liver		21.34 <sup>c</sup>
Goat kidney		21.34 <sup>c</sup>
Goat tripe		21.34 <sup>c</sup>
Goat head		18.20 <sup>c</sup>
Neck bones		16.04 <sup>b</sup>
Goat sausage		44.44 <sup>b</sup>
Goat heart		15.12 <sup>b</sup>
Goat feet		10.66 <sup>c</sup>
Goat bones		6.07 <sup>b</sup>

<sup>a</sup>Prices from overseas retailers were converted at date specified using exchange rate.

<sup>b</sup>Retail prices are from Elk USA (25/1/2017).

<sup>c</sup>Retail prices are from APJ Meats (27/1/2017).

use and live goat exports. Nearly all the goat carcass, blood and organs can be sold. The goat meat exported overseas is mainly from feral goats, with other breeds such as Kiko are also exported.

Once the processed meat (primal cuts, cubes or whole carcass meat) arrives at the importer and wholesaler, it will be purchased by a retailer and butcher where the meat is processed into various products. Table 5 shows products made from goat meat in the United States of America.

The main obstacle to increasing exports is the limited number of goats to provide a constant supply of products. As goat meat is currently exported as carcass or primal cuts, opportunities exist for further processing to be done in New Zealand. This could be carried out to appeal to international

and domestic markets. Meat quality could also be improved as younger, leaner and more heavily muscled goats are likely to create a better product and increase demand and value (McMillin & Brock 2005).

*Fibre industry, products and value*

Angora goats in New Zealand are kept primarily for mohair production. Mohair consists of strong elastic fibres that are formed into a fabric and is especially suitable for apparel, knitwear, curtaining, upholstery material, socks, shawls and accessories (Hunter, 1993). Mohair is grown in several countries, with over 60% of the world supply coming from South Africa (Agriculture, Forestry and Fisheries, 2015).

Currently the domestic market processes and makes fabrics for scarves, blankets and socks. Farmers in New Zealand sell their highest quality fibre internationally, with only 15% of fibre produced in New Zealand kept for local manufacturing (Mohair Pacific, 2016).

Fibre is exported from New Zealand to South Africa. High-quality fibre from first shear kids is highly valued. This value decreases with increasing age of the Angora goats due to the increasing diameter of the fibre. Fibre is sold based on its grade to brokers and buyers and then sent to retailers and manufacturers to be created into products for over 50 million customers. The overall fibre exported from New Zealand in 2015 was 25 mega-tonnes and had an average value of NZ\$21.34 per kg (Burt, personal communication 2017).

The fibre industry in New Zealand is currently developing more weaving grade fibre as this provides an opportunity to increase the export value of the fibre. This is the major priority for the industry as weaving grade fibre is worth at least 10% more than the average value of mohair. This process is occurring by improvement in the Angora goat genetics. Farmers in New Zealand are achieving this by importing angora goats from Australia for breeding. The mohair sector is very small compared to the dairy goat sector and is unlikely to grow significantly in the short term.

## Conclusions

This study identified the current products produced from the components of New Zealand goats and their market value. The information gathered here is an overview of the current products sold domestically and exported. Many of these product values are gathered from personal communications or from individual producers and hence this is a limitation to defining the value accurately. The dairy-goat industry is still small, but is accessing significant export markets for whole milk powder, adult and infant formulas and achieving high market values. The meat and fibre industries are less developed with a very small domestic market, however, potential access to large international markets will allow for further development of the meat and fibre industries in New Zealand.

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