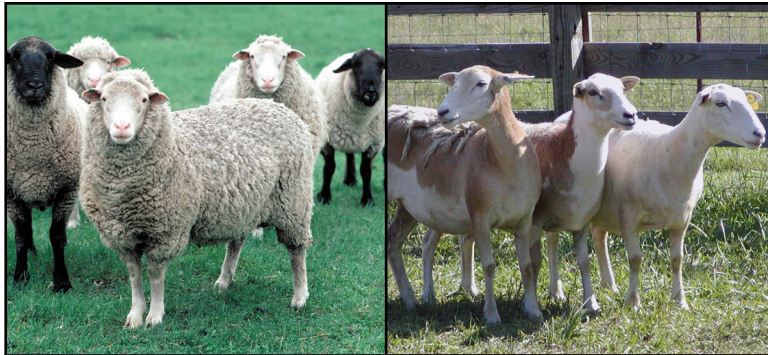


## Changes in the Sheep Industry in the United States

During the past 60 years, the number of sheep and lamb in the United States have been declining, a fact that has been attributed to a confluence of forces. Despite the downward trend, the domestic sheep industry has taken steps toward transforming itself into a more efficient and competitive industry. This report examines the current and future challenges and opportunities that the sheep industry faces and concludes that, with a concerted industry effort and focus on new technologies, products, and markets, the downward trend can be stopped and possibly reversed.

The United States sheep industry is rooted in history and tradition, dating back to the second voyage of Columbus in 1493. Domesticated sheep were used by colonists primarily for wool for home-produced textiles and, to a lesser extent, meat. Today the U.S. sheep industry is one of the most complex industries in animal agriculture. Sheep provide lamb and mutton (mature sheep) meat for consumption, wool and pelts for textiles, and milk from the emerging dairy sheep industry.



U.S. sheep including black and white faced wool producing sheep (left) and hair sheep (right). Photos courtesy USDA

Despite the sheep industry's long history and versatility, the dominant feature has been the steady decline in the number of sheep and lamb since the mid-1940s. (Figure 1) From a record high of 56 million head in 1942, inventories have declined to 6.2 million head as of January 1, 2007, the lowest level in recorded history. No one factor, event, or policy change is responsible for the industry's steady decline, but rather a confluence of forces against which U.S. sheep producers have had to struggle. Although producers have little control over many of the forces affecting the industry—from globalization to the growing competition from other meat and fiber industries in the United States and competition abroad with large lamb and wool producers, such as Australia and New Zealand, who provide 50% of the U.S. consumer lamb supply—the prosperity of the industry is not entirely dependent on external forces. Various components of the sheep industry have made adjustments, invested in new technologies, and improved efficiency. These

changes are transforming the industry toward a more efficient and competitive future. This report concludes that a better description of the current U.S. sheep industry is “an industry in transition.”

In response to a Congressional request in the Agricultural Appropriation bill and with support from the Economic Research Service of the U.S. Department of Agriculture (USDA), the National Research Council assembled a committee of experts to review the development and current status of the sheep industry in the United States and to examine challenges and opportunities of the future.

### Structure of the U.S. Sheep Industry

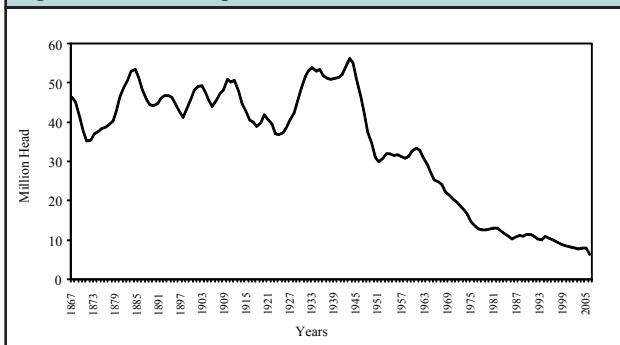
In the United States, commercial sheep production consists of two main types of operations: (1) range sheep operations, which consist of relatively large flocks that graze on native or unimproved pasturelands, common

in the western states, and (2) farm flock operations, characterized by smaller flocks (often less than 50 head) and raised on smaller improved pastures or in feedlots, common in the midwestern and eastern states. Sheep production from these operations provides lamb meat and wool and pelts for textiles, but also other emerging sheep products including milk for sheep cheeses and yogurts, purebred sheep for shows, specialty wools, high-quality lighter-weight and younger lambs, and organic and natural lamb and wool products.

The current foundation of the industry, lamb meat, is primarily marketed through a traditional channel, in which lambs move from pastures to higher-quality feeding systems to grow to harvest weight and then are commercially harvested. However, increasing numbers of lambs are being sold as early harvest lamb to meet the demand for better quality, lighter-weight lambs and/or are being sold directly from the farm gate to individual consumers. Official government data capture information about the traditional channel, but provide incomplete information about the other channels.

Wool production, once the mainstay of the U.S. sheep industry, has declined more rapidly than lamb production. Much of the current U.S. wool production is exported to countries with expanding textile industries, such as China and India. Sheep pelts

Figure 1: U.S. Sheep and lamb Inventories, 1867-2007



enter industrial markets and are either used for various consumer products or are exported. The growing dairy sheep industry is made up of a small number of farm flock operations located in the Midwest and East. Sheep milk cheeses and yogurts are sold at the farm or cooperative level, as well as at farmers markets and small commercial outlets.

## OPPORTUNITIES AND CHALLENGES

Despite the decline in the sheep industry since World War II, data show that in recent years the sheep numbers have leveled off significantly and even reversed in some regions of the country. One contributing factor is that the sheep industry has begun to incorporate hair sheep in place of traditional wool-producing sheep because they are easier to care for and are more adaptable to humid climates (see photo). They are short-haired sheep that shed, eliminating the need for shearing. Productivity increases have also been achieved through genetic progress and improved nutrition, health, and management practices.

The future well being of the U.S. sheep industry depends on the potential for profitability, which is affected by various challenges and opportunities. Challenges that need to be overcome to ensure sustainable growth and economic competitiveness include the loss of infrastructure due to decades of decline in volume

**Although specific events, such as the end of World War II and the repeal of the National Wool Act, are often given as the cause of the decline of the industry, in fact many events and issues have contributed. Some of the more often cited factors are:**

- **Labor loss during World War II;**
- **A negative American G.I. experience with mutton during World War II;**
- **Changes in regulations and permits for grazing on public lands and endangered species regulations;**
- **Competition from other meats and other fibers;**
- **Changes in consumer preferences;**
- **Losses from predator kills;**
- **Loss of the National Wool Act and the Incentive Payment programs;**
- **Foreign wool production subsidies;**
- **Competition from imports along with an appreciation of the U.S. dollar against Australian and New Zealand currencies in the 1990s; and**
- **Concentration in the U.S. packing and feeding industries.**

**Despite the continuing decline in the U.S. sheep industry, there are reasons for optimism about the future. Developments have occurred that have made the sheep industry more profitable for some. These developments include the following:**

- **Improvements in production efficiency;**
- **Leaner lamb;**
- **Development of further processing of lamb and new packaging techniques;**
- **Decline in Australian and New Zealand sheep numbers;**
- **Depreciation of the U.S. dollar; and**
- **Emergence of new and niche markets.**

of sheep production; problems in pricing and price determination; the decline in the share of public and private support for new technology development and education activities; and an increased problems with predators, which is currently the largest cause of sheep/lamb deaths. Coyotes account for 60% of all confirmed predator losses; other predators include domestic and feral dogs, wolves, vultures, and hogs.

The U.S. sheep industry has many opportunities for enhanced industry efficiency and competitiveness, despite these challenges. Productivity gains can be made by further advances in genetics, nutrition, health, and management programs; by getting lambs to their final weigh on forage or pasture in order to off set the rising price of grain and concentrate feeds; and by direct marketing of high-quality and lighter-weight lambs to the rapidly expanding ethnic markets.

### **Sheep Health Issues**

A healthy flock is imperative for successful sheep operation. Disease reduces sheep viability, overall growth rate, immunity, and reproductive performance. In the United States, making and prioritizing recommendations regarding research needs and control measures for sheep disease is difficult because the data related to the economic impacts and the true prevalence of most disease conditions affecting the sheep industry are lacking.

Currently, stomach and intestinal parasites (worms) cause substantial economic losses, and they are increasingly drug resistant. In addition, the United States has a shortage of approved animal drugs intended for less common animal species, such as sheep. The shortage of large-animal veterinarians in many areas of the country is a challenge to the sheep industry as well as to other livestock industries. Other diseases that could have significant economic impacts on the U.S. sheep industry include Johne's disease, foot rot, and foreign animal diseases, such as foot and mouth disease. Although rare in the United States, scrapie is a degenerative disease that affects the central nervous system of sheep and has led to some concern over the public health risk. An outbreak of scrapie may also impede or restrict the U.S. sheep exports, which could have serious economic effects.

Progress has been made and there are more viable opportunities to minimize the economic impacts of disease. As a result of nationwide efforts (including the National Scrapie Eradication Program and others), there have been substantial strides in the effort to eliminate scrapie from the United States. Improvements in the use of the identification systems to monitor animal

movement as the foundation for an overall flock health program and improvements in biosecurity practices could further minimize economic impacts of disease.

### **The U.S. Lamb Industry**

Marked by its distinct flavor, lamb meat is a relatively minor product in most food stores. But despite the decline in U.S. production, lamb consumption has grown slightly in the United States. An increase in consumer demand is good news for the U.S. lamb industry, which has an opportunity to further increase its demand and better compete with Australian and New Zealand lamb.

Given this opportunity, there are many challenges that the domestic lamb industry continues to face. Because lamb is a relatively minor meat product, packers have a disadvantage in bargaining on price with large retailers and large foodservice buyers. In addition to pricing issues driven by the market structure, the current pricing system rewards producers for weight rather than value of the lamb meat, which leads to a persistent problem of excess fat on lamb carcasses. Numerous modern tools exist to improve the assessment of the value of lamb carcasses, but they require an investment by the industry. Data on different types of consumption of lamb meat and consumer preference are lacking.

### **The U.S. Wool Industry**

At one time, wool was considered the primary product of sheep production, with lamb and mutton as byproducts. Today, the situation is reversed. Wool is sometimes even considered a "liability." The growth of hair sheep production is a reflection of the decline in the relative profitability of wool production vs. lamb production. Wool currently accounts for 10 to 30 percent of the sheep production income in range production systems and less than 5 percent in farm flock production systems.

The decline of wool has been a result of many forces. The number of natural fibers (e.g., cotton and silk) and synthetic fibers (e.g., nylon, rayon, acrylic, and polyester) that compete with wool has increased. From 1995 to 2005, wool accounted for only about 0.6 percent of all fiber use in the U.S. mills. Furthermore, the domestic mill use of all fibers has been on a downward trend as a result the globalization of the textile industry. The loss of the National Wool Act and other legislation that provided price support to the U.S. wool industry has also contributed to the decline in U.S. wool.

Despite these challenges, the wool industry has made some progress responding to the pressures it is under. Better preparation of wools by producers can

obtain higher prices, and new wool fabrics and garments can overcome some of the challenges of wool use (e.g., not machine washable, prickly on skin, shrinking in hot water, flammable). Survival of the U.S. wool industry depends on continued progress overcoming challenges in domestic wool as well as potentially increasing exports to meet foreign demand for wool in China and other developing countries.

### The U.S. Dairy Sheep Industry

Although the dairy sheep industry makes up a relatively small segment of the U.S. sheep industry, it has the potential to become an economically important agricultural industry. The United States is the world's largest importer of sheep milk cheese, accounting for about half of the world's sheep milk cheese in international commerce. The growth of the domestic industry is the result of production in high-quality cheeses, and promotion of sheep cheeses by both national and state organizations. A lack of local commercial processing factories has led many U.S. sheep producers to make cheese on their farms in small batches for direct marketing to individuals, food stores, and restaurants. For the dairy sheep industry to continue to develop, advancement in sheep genetics to improve the dairy sheep traits, research and support for dairy production and sheep milk processing, and increased competitiveness with lower-priced sheep milk cheese imports need to be overcome.

### Alternative and Emerging Markets

Much of the recent development in the U.S. sheep industry can be attributed to the rise of alternative markets such as ethnic and religious markets. Sheep and lamb inventories indicate

growth in Eastern and Mid-Atlantic States and in the Midwest, where alternative and emerging markets are particularly important. The number of lambs moving to these emerging markets come directly from the farms or from small slaughterhouses, especially during religious holidays (Muslim holidays and Christian and Orthodox Easter), and this is not captured in official USDA slaughter data. In addition to ethnic and religious lamb markets, specialized products such as organic and "locally grown" markets are on the rise. Other "niche" sheep products include specialty wools for hand spinners, yarn and other naturally colored wools.

Although these markets provide new opportunities to the U.S. sheep industry, there are still challenges to the expansion of alternative and emerging markets. The lack of information, product pathways, and regulatory systems, make it difficult to determine current and future market opportunities and to sustain growth.

### Conclusion

Although continuing declines can be expected in some areas of the U.S. sheep industry, the changes currently taking place offer ground for optimism. The emergence of new and alternative markets for sheep products signifies that the industry may be on the brink of a transition from traditional practices and marketing channels to new markets, new technologies, new products, and a new consumer base. This offers the potential to arrest the decline experienced over the last several decades. Expanding alternative and emerging markets will create considerable challenges to the industry and to policy makers. However, all these challenges can be addressed by a concerted effort from within the industry.

---

**Committee on the Economic Development and Current Status of the Sheep Industry in the United States:** Gary W. Williams (*Chair*), Texas A&M University, College Station; DeeVon Bailey, Utah State University; Oral Capps, Jr., Texas A&M University, College Station; Linda A. Detwiler, Virginia-Maryland College of Veterinary Medicine; Hudson A. Glimp, University of Nevada, Reno (*Emeritus*); Timothy Hammonds, Food Marketing Institute, Washington, DC; Douglas D. Hedley, Canadian Faculties of Agriculture and Veterinary Medicine; Helen H. Jensen, Iowa State University; Paul S. Kuber, The Ohio State University; David L. Thomas, University of Wisconsin, Madison; Austin J. Lewis (*Study Director*); Ruth S. Arieti (*Senior Project Assistant*).

**This report brief was prepared by the National Research Council based on the committee's report. For more information or copies,** contact the Board on Agriculture and Natural Resources at (202) 334-3062 or visit <http://dels.nas.edu/banr>. Copies of *Changes in the Sheep Industry in the United States* are available from the National Academies Press, 500 Fifth Street, NW, Washington, D.C. 20001; (800) 624-6242; [www.nap.edu](http://www.nap.edu).



*Permission granted to reproduce this brief in its entirety with no additions or alterations.*