

LIVESTOCK DIVERSIFICATION: ISSUES AND TRENDS

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Summary

Although wildlife production has ancient origins, the current global wave of interest gained momentum about 1970. This article reviews the development and current status of wildlife farming with special emphasis on bison and deer, reveals development trends, and raises issues relating to conservation and community development. The farming of bison is now firmly established in North America with a commercial herd of about 500 000 animals. The farming of deer is more widespread and numbers may exceed five million worldwide. The main products are venison (meat), velvet (growing antlers), and breeding stock. Commercial wildlife production raises important issues of economic and ecological sustainability, welfare, and social equity. There is an urgent need for more precise information on the status, dynamics, and policy implications of this emerging industry.

1. Introduction

The global trade in wildlife is large but difficult to estimate. Its annual worth has been placed at between US\$8 billion and US\$20 billion, of which perhaps US\$3 billion is

illegal. Although much of this trade comes from animals killed or captured in the wild, interest in production of wildlife and other types of diversified livestock has grown and spread worldwide.

Most of the recent expansion of wildlife ranching and farming has occurred since 1970. In some areas, it originated as a conservation initiative, but the driving force has been the lucrative market for products and hunting opportunities created during a time of economic prosperity in Asia, Europe, and America.

Wildlife production can be seen as the commercialization of traditional uses. Although the "country foods" market has followed the migration of people to cities, the strongest demand has been for traditional medicines such as velvet antlers, horns, bones, and other body parts and secretions. The sport hunting traditions of Europe and America also have been commercialized in safari hunting and in the growing demand for venison.

Wildlife production also can be seen as a quest for an efficient complementary alternative to conventional agricultural animals. The logic of livestock diversification, in its simplest terms, is to tap multiple species to use multiple resources to serve multiple markets (Figure 1). Although this ideal may hold when considering world agriculture, regional development in some cases has been co-opted by high prices for specific products, creating precarious dependence on a single overheated market such as velvet antler.

Diversified livestock production offers to stabilize rural economies and to encourage new investment in animal agriculture. This paper reviews the emergence of the bison and deer industries, assesses their likely contribution to animal agriculture, and identifies several important implications for wildlife conservation and rural development.

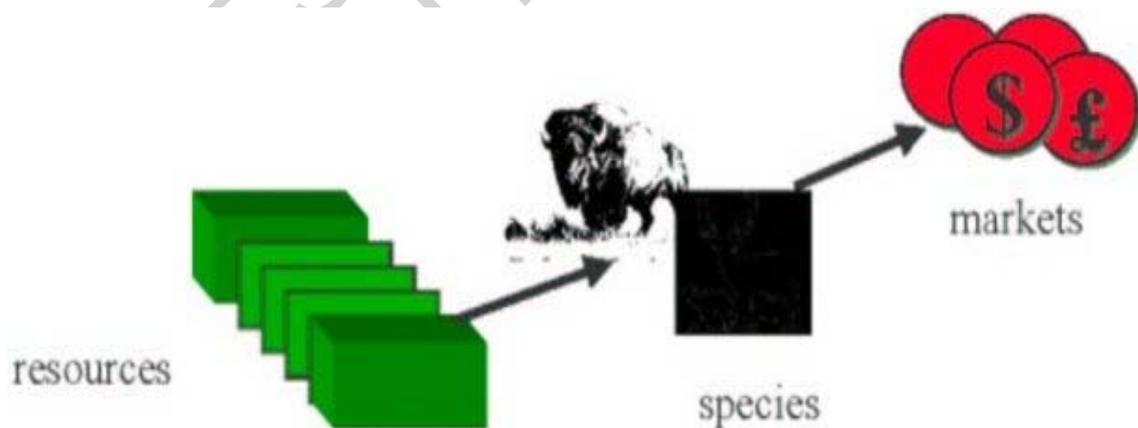


Figure 1. Logic of livestock diversification. Livestock diversification using wildlife offers opportunities to use regionally adapted species to efficiently use multiple (native) feed resources and to tap multiple niche markets. This should serve to stabilize rural economies but the logic of the market sometimes co-opts this ideal.

2. Emergence

Although much of the growth occurred in the latter part of the twentieth century, wildlife husbandry has ancient origins. Beyond classic domestication, well-developed wildlife husbandry is evident from depictions and writings from the Old Kingdom of Egypt, and the Persian, Greek, and Roman Empires. Wildlife husbandry also dates to antiquity in Asia. One of the most remarkably comprehensive texts on wildlife husbandry is Columella's *de Rustica* written almost 2000 years ago.

The history leaves a clear trail of experimentation. Some of the most remarkable commercial developments this century have occurred in Russia and China, where the focus always has been antler production. The firm establishment of deer production traces from the days of the Czars. In North America, the most complete agricultural evaluation of wild ruminants was published by Judge Caton in 1877. A flurry of activity by the American Breeders Association at the turn of this century led to the publication of a farmer's bulletin on deer farming by the US Department of Agriculture in 1908. This publication proposed that deer might be suitable for young families who could not afford cattle. It coincided with the initiation in 1915 of a 50-year experiment on crossbreeding of bison and cattle by the Canadian government.

In North America, the fortunes of the wildlife industry have been strongly influenced by questions of the ownership of wildlife and legal controls on marketing wild animals and their products. This persists today in widely different regulations governing wildlife production in various countries and states or provinces. However, a more general explanation for the hiatus of wildlife farming at the turn of the century may simply be that socioeconomic conditions were not right. The relatively high investment costs of wildlife production may require lucrative markets that are sustained only during times of economic prosperity.

3. Status of Farmed Wildlife

Wildlife production involves many species ranging from butterflies and crocodiles to bears and antelope. It also encompasses production systems ranging from subsistence hunting to confinement rearing. Despite this diversity, wildlife production is dominated by two success stories; namely, the farming of bison and of deer.

3.1 Bison Industry

This industry remains largely North American, although some herds have been established in Europe, Asia, and Oceania. Generally, American bison (*Bison bison*) are considered more suited for commercial production than European bison or wisent (*Bison bonasus*), an animal that is somewhat more difficult to feed and handle.

The foundation of the industry has been linked to the restoration of bison in the late nineteenth century. So profound was the depletion of wild herds by 1890 that foundation stock had to come largely from the few animals on farms and ranches. Canada's Dominion Department of Agriculture's hybridization experiment failed to produce an animal that combined the hardiness of the bison with the meat producing

qualities of beef cattle. The experiment closed in 1965 about the time that the purebred bison industry became firmly established.

Since then, the North American bison herd has compounded at well over 20% annually. By 2002, numbers were over 150 000 in Canada and 232 000 in the United States. By 2005, the annual bison slaughter in the United States had grown to 35,000. The commercial herd now greatly exceeds public herds by several-fold.

Compared with beef cattle, bison are hardy but slow growing. Their ability to digest low quality forages and resist cold is legendary. They were once considered to have low reproductive rates in the wild, maturing at three years of age and often calving only two out of three years. However, better husbandry has improved weaning rates to those expected of improved breeds of beef cattle.

As the industry emerged, producers marketed their own products, usually to local hotels and restaurants. However, the need for stable year-round supplies has encouraged formation of marketing cooperatives. The largest of these, the North American Bison Cooperative, has developed standards for finishing animals on grain. This creates a consistent product that is familiar to consumers accustomed to beef. Others such as the Intertribal Bison Cooperative take exception to this philosophy and insist that the image of bison and native culture is more important than product consistency.

The industry appears at a crossroads, uncertain whether to capitalize on a novel product or the several production advantages of the species. Landscape conservation is becoming a more appreciated aspect.

3.2 World Deer Industry

From very low numbers in 1970, the world deer industry compounded at over 20% annually to about four million today. Herds in some countries are still increasing but in New Zealand, Canada and the United States numbers have stabilized. England has seen a reversal of numbers followed by a rebound, suggesting that supply and demand are beginning to interact. Fear of transmissible spongiforme encephalopathies and other diseases has closed borders and disturbed markets.

The industry is characterized by great geographical variation (Table 1). The origin and center of modern deer farming is New Zealand with 1.7 million deer serving international markets for both venison and velvet antlers. The deer industry in Australia is smaller and involves a greater diversity of species farmed under a wider variety of conditions. These countries emphasize both venison and velvet.

Country	Commercial herd	Species and purpose
New Zealand	1 400 000	Mainly red deer for venison and antlers
China	1 000 000	Red, wapiti, sika for antlers
Russia	400 000	Wapiti, red, sika for venison and antlers
United States	250 000	Wapiti, red, fallow for venison and antlers

Australia	190 000	Red, rusa, fallow for venison and antlers
Germany	150 000	Fallow for venison
Taiwan	128 000	Red, rusa, sika for antlers
Korea	111 000	Wapiti, red, sika for antlers
Canada	98 000	Wapiti, fallow, whitetails for antlers and venison
Mauritius	60 000	Rusa for venison
England	50 000	Red and fallow for venison
Taiwan	36 000	Sika, sambar, red deer for velvet
Sweden	35 000	Red and fallow for venison
Denmark	30 000	Red and fallow for venison
Eire (Ireland)	30 000	Red for venison, some fallow and sika
France	30 000	Fallow for venison
New Caledonia	20 000	Rusa for venison and some velvet
Vietnam	15 000	Sika for antlers
Malaysia	15 000	Red, fallow, rusa for venison and antlers
Thailand	5 000	Sambar, red
Norway	1 000	Red for venison

(Unofficial estimates from trade journals and industry informants)

Table 1. Approximate populations of farmed deer in 1997

The deer industry in Asia is similarly large but numbers are not precisely known. China has the largest numbers centered in the northeast. The Russian industry spreads from the Caucasus to the Altai Mountains. Both countries focus on the velvet antler market. Korean deer farming has developed rapidly.. Numbers in Japan, Thailand, Malaysia, and Vietnam remain small, but interest is growing. Southeast Asia is home of the sambar (*Cervus unicolor*) and rusa (*Cervus timorensis*), both suitable for farming. In much of Asia, the high cost of land requires intensive production systems. Deer farming in Europe aims at venison production; indeed, removal of velvet antler is not allowed in most of Western Europe on welfare grounds. In Germanic countries, red deer are considered "royal game," too noble to be fenced for meat production, so fallow deer are the main species on farms. The North American industry is young but thriving. In the southwestern United States, deer farming is a relatively recent adjunct to the ranching of a variety of non-indigenous wild ruminants (Texotics) such as Barbary sheep, nilgai, blackbuck, and gemsbok. The Canadian inventory is precise because most provinces require individual animals to be tagged and registered. The Canadian wapiti industry is precariously based on velvet antlers alone. A few deer farms have been established in South America, but until recently, interest has been in safari hunting of introduced red deer.

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Biographical Sketch

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