

MARKET POTENTIAL FOR U.S. LIVESTOCK GENETICS IN A FREE MARKET CUBAN ECONOMY

James E. Ross¹

Cuba's livestock industry has undergone dramatic change from the time when Fidel Castro took control of the country's government in 1959. At the time of the revolution, cattle was the most important component of the livestock and poultry industry. Today, the cattle population in Cuba is less than at the time of the revolution. Beef and veal rank behind poultry and pork as the major source of meat in the Cuban diet. Ration stores no longer stock beef and it is illegal to serve beef at the small in-home restaurants known as *paladares*, unless the owner has paid a special tax.

What brought about this change, and what are the implications for potential U.S. exporters of livestock genetics if U.S. trade sanctions are lifted? This paper attempts to provide information bearing on this question. Livestock genetics, as used in this paper, refers to live animals for breeding purposes, semen, and embryos.

LIVESTOCK SITUATION

Cuba, with a land area approximately equal to three-fourths the size of Florida, is located in the tropics immediately south of the Tropic of Cancer. Climates in tropical countries have been considered by animal scientists as among the primary factors in the low lev-

el of returns from livestock enterprises. Other factors, such as lack of genetic improvement of breeding stock, inadequate research, and limitations of technology, have also been identified as important causes for poor performance in tropical climates.²

Cuban livestock production identifies with all of these factors, but Cuba also offers advantages over many other tropical and sub-tropical areas for production of livestock, especially cattle. In the eastern provinces, Cuba has a favorable climate with relatively consistent temperatures. The soil is fertile and offers prospects for improved pasture grasses. Being an island, Cuba provides opportunity for better control of animal diseases than countries bordering on other countries.

In addition to conditions affecting the tropics, Cuban livestock production during the past decade has been affected by economic problems. Since the loss of trade preferences with the Soviet Union and East European countries, an inadequate supply of animal feed has become a major factor in limiting efficiency and yield of livestock production.

Another factor, especially in the early years following the revolution, was management. Slaughtering breeding stock to increase the supply of beef became

1. The author wishes to thank Ambassador Clarence Boonstra and Dr. Lee McDowell for reviewing the paper in draft form. Their insight into Cuba's livestock situation and tropical livestock production in general, as well as their comments on the paper, were helpful and appreciated. Responsibility for content of the paper, however, is entirely that of the author.

2. McDowell, R. E. "Problems of Cattle Production in Tropical Countries." Department of Animal Science, New York State University, Cornell University International Agricultural Development Mimeograph 17, Ithaca, New York, December 1966.

an important long-run factor hindering genetic improvement of cattle.³ In recent years, theft and illegal slaughter of cattle have affected the cattle industry adversely.

Cattle

Spanish cattle brought to Cuba in its early history became the basis for the country's cattle population. During the administration of Cuba by the United States (1899-1902), more cattle were imported from Mexico, Venezuela, Central America, and the southern United States. The trend in importing cattle continued during the following years, mostly bulls from Latin America and the United States. Zebu cattle from India imported via U.S. southern states played a major role in improvement of the quality of Cuban cattle.⁴

In the late 1920s, imports of zebu (Brahma), Short-horn, Jersey, Hereford, Angus, Charolais, Brown Swiss and Holstein breeds increased. In the late 1940s, the Santa Gertrudis breed was imported from Texas. At the time of the revolution, the Brahma, Brown Swiss and Santa Gertrudis were the most popular breeds.⁵

In 1962 the government began an intensive cross-breeding program. The objective was to increase production capacity through use of the Holstein breed.⁶ Two of the most popular breeds developed through the cross-breeding program were given names of historical significance. The Mambi breed, a cross be-

tween the zebu and Holstein breeds, was named for the fighters against the 18 century Colonists. The Siboney breed, also a zebu-Holstein cross, was named for the inhabitants of Cuba at the time the Spanish arrived in the 15th century.⁷ Artificial insemination was the basis of the cross-breeding program. Some 3,000 middle level technicians were employed in thirteen insemination centers, where semen was processed. Frozen semen in tablets, preserved in liquid nitrogen, was the technology used.⁸

In 1968 the cattle population reached 6.9 million head, but in the following years the number of cattle started to decline. By 1989, the number of cattle had fallen to 5.7 million. Currently, the number of cattle is estimated at 4.65 million, nearly a half-million less than at the time of the revolution, over two million less than 30 years ago and a million less than 10 years ago.⁹

Five provinces, generally, have been the largest cattle production areas, with more than half of the country's cattle. Camagüey, the second largest sugarcane producing province, has been the largest producer of cattle with about one-fifth of the country's total. Granma is next with 10%. Other provinces with nearly 10% each, include La Habana, Villa Clara and Pinar del Rio.¹⁰

Ownership of cattle is divided between the state sector and the non-state sector. The non-state sector includes the Basic Units of Cooperative Production

3. Boonstra, Clarence. Personal communique. (Boonstra was the Counselor for Economic Affairs assigned to the U.S. Embassy in Havana from 1955-57. He also was assigned to Cuba from 1942-44 by the U.S. Department of State and from 1957-60 he made frequent private visits to Cuba.)

4. Riera, Arturo J. "Cattle: The Forgotten Industry." *Cuba in Transition—Volume 4*. Washington: Association for the Study of the Cuban Economy, 1994.

5. Ibid.

6. Cuban Delegation to the X Regional F.A.O. Conference. "Agriculture and Livestock Production in Cuba." Kingston, Jamaica, 1967-68.

7. García, Anicia. Personal communique. Centro de Investigaciones de la Economía Internacional (CIEI). University of Havana, Cuba. June 2000.

8. Cuban Delegation. Op. cit.

9. FAO Website: <http://apps1.fao.org/servlet/XteServlet.j>. Food and Agriculture Organization, Rome, Italy, Data from 1961-1998.

10. Smith, Douglas, David Zimet, and Timothy Hewitt. *An Overview of the Cuban Livestock Sector*. International Working Paper IW95-18r, International Trade and Development Center, Food and Resource Economics Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, Florida, October 1995.

(UBPC), the Agricultural Production Cooperatives (CPA), the Cooperatives of Credit and Services (CCS), and the small private farmers that have established “compromisos” with the Government of Cuba (GOC). Within the state sector, 97% of the cattle population is overseen by the Ministry of Agriculture. The remainder is administered by the Ministry of Sugar and provincial organizations.¹¹

In 1961 the state-sector owned 24% of the country’s five million head. By 1965, state ownership had increased to 57% of the nearly seven million cattle, and by 1989 the state sector managed 75% of the cattle. State farms provided most of the meat, milk and other foods for domestic consumption. Among the non-state entities, CPAs owned the largest number of cattle.

With the transformation of many of the state farms into UBPCs beginning in 1993, the majority of ownership of cattle shifted from the state sector to the non-state sector. By 1996 the importance of state farms had decreased; however, according to official data, 95% of the beef that year was produced in the public sector.¹² (Information is not available to the author to explain the high percentage; however, it could result from public ownership of the slaughtering facilities, and data could include animals produced in the non-state sector but slaughtered in state-controlled facilities.)

Official records do indicate a major shift of animal ownership from state farms to the non-state sector. In 1993, when the UBPCs were formed, 64% of the 818,600 calves born that year were in the state sector. In 1996 only 27% of the 782,000 calves born were recorded in the state sector.

In 1996 the average weight of cattle slaughtered for meat was 302 kilos (665 lbs), an increase of 56 kilos (123 lbs) from 1993 and 75 kilos (165 lbs) from

1992. This could reflect the decreased availability of foreign exchange at the end of the 1980s to import feed following loss of Soviet Bloc trade preferences, and the increased availability of inputs as a result of the improved economy beginning in the mid 1990s. It is also interesting to note that 80% of the calf mortality in 1993 was in the state sector, but only 31% in 1996.¹³

Swine

Pork, traditionally, has been a favored meat in Cuba and State planning has focused on increasing production. The number of pigs increased from 1.1 million in 1961 to 1.8 million in 1966 and then leveled off at about 1.5 million through 1981. In 1982 the number of pigs began to rise, reaching 2.8 million in 1991. Since then, the number of pigs has declined to about 2.4 million.¹⁴

As has been the situation with beef cattle, the average weight of hogs slaughtered increased during the last half of the past decade. In 1992 the average weight of hogs slaughtered was 50 kilos (110 lbs). It had dropped from 75 kilos (165 lbs) in 1990, a reduction of one-third. In 1993 the average weight began to increase and was 70 kilos (154 lbs) in 1996. Since then the average carcass weight has increased, but is still not at the level of the 1980s.

Consumer preference plays a role in Cuba in the weight of pigs when they are consumed. While the government effort is to increase the average weight in order to increase the meat supply, the consumer traditionally has preferred to roast pigs at a weight of under 100 pounds, preferably 60 to 70 pounds. This factor, however, probably is not reflected in the official weight data of hogs slaughtered.

Live pig births in 1996 was placed at around 2 million, with the mortality rate at 17%. This was a significant decrease in the mortality rate from 1993,

11. Nova González, Armando. “La Agricultura Cubana: Evolución y Trayectoria.” Centro de Estudios de la Economía Cubana (CEEC), University of Havana, Havana, Cuba, 1998.

12. *Anuario Estadístico de Cuba* (AEC). Oficina Nacional de Estadísticas. Havana, Cuba. 1996, p. 208.

13. Centro Nacional de Control Pecuario (CENOP) in AEC, Capítulo IX, p. 208.

14. FAO Website.

when it was reported to be 29%. Mortality of swine was higher, 38%, in the state sector than the total average in 1993, but lower in 1996 at 15%. The overall decreased mortality rate indicates improved swine management, especially in the state sector. Another factor affecting the decreased mortality rate in the state sector relative to the non-state sector could be retention of the better managed operations in the state sector and the conversion of less efficient state farms to UBPCs. (Only 13 of 46 UBPCs, reportedly, showed profit in 1999.)

Swine mortality is most important from birth to weaning. Sows laying on their pigs in the early weeks after birth is an especially important factor in swine mortality. Good management, therefore, is critical. The second most important factor is hygiene, e.g. preventing diarrhea. Nutrition, genetics and, obviously, wiping out brucellosis—a serious disease that has affected swine since the pre-revolutionary days—are other important factors.¹⁵

Sheep

The Government of Cuba in the early years of the revolution had plans to increase sheep numbers to more than two million head in an effort to increase the meat supply and provide raw material for use in the textile industry. The number of sheep increased steadily during the 1960s, 1970s and 1980s, but began a decline in the 1990s. The number of sheep in 1961 was 220,000; in 1971 the number was 290,000; in 1981 it was 361,000; and by 1991 it was 385,000. From the peak in 1989-91, the number of sheep has declined to 310,000 and has remained at about that level.¹⁶

Official Cuban data showed the number of sheep in 1996 at 899,851, almost three times that of the FAO data, and the number of goats at 118, 541. Whatever the correct number might be, it is evident the plan to increase sheep numbers to two million has not materialized. Approximately one-fourth of the sheep and about 10% of the goats are held in the state sector.

Horses

Horse numbers, including donkeys and mules, are estimated to have leveled off at a little more than 600,000 (620,000 in 1999), about 200,000 more than at the time of the revolution. State farms accounted for 17% in 1996. One of the main reasons horse numbers have increased since the revolution, is that animal power has been used to a large extent to supplement, or replace, mechanical power.

In addition to horses, oxen have been used to substitute for tractors. Oxen, for example, have been used widely for working in the fields, to transport sugarcane, and for other purposes. In 1992 the Cuban government acknowledged that the country was using in excess of 100,000 oxen. Even at present, when traveling through the countryside it is apparent that oxen are used widely in the fields. Horses appear to be used mainly for transport purposes.

Live Animal Trade

In 1961 Cuba imported live animals valued at \$4.9 million. The following year imports dropped to \$1.5 million and remained under \$1 million annually until 1990. Live animal imports that year were valued at \$3.5 million. Since 1990, imports of live animals have remained insignificant. Cuba's exports of live animals, also, have remained relatively insignificant.¹⁷

MEAT AND MILK PRODUCTION

Prior to the loss of Soviet assistance in 1989-90, meat production—in terms of total production and on a per capita basis—was higher than during the years following the revolution. With the loss of trade preferences and the lack of foreign exchange to import feed, total meat production in recent years has fallen to less than in the 1960s. On a per capita basis, meat production has dropped dramatically.

Beef, Pork and Poultry Meat Production

Total meat production (beef, pork, poultry and other) averaged 30 metric tons per 1,000 population in the 1987-91 period. Using the same measure, pro-

15. McDowell. Personal electronic communication.

16. FAO Website.

17. FAO Website.

duction for the 1992-96 period averaged less than 18 tons—a reduction of more than 40%.

Table 1. Cuba: Meat Production in Metric Tons per 1,000 Capita

ITEM	1961-66 avg.	1987-91 avg.	1992-96 avg.	1997-98 avg.
Beef and Veal	20.92	12.30	6.15	6.43
Pork	4.07	8.53	5.96	6.62
Poultry Meat	3.49	8.83	5.26	5.77
Other	0.28	0.35	0.27	0.24
Total	28.76	30.01	17.64	19.06

Source: Food and Agriculture Organization Data Base.

Total meat production per person in 1987-91 was about 5% higher than the average for 1961-66, but by the 1997-98 period, production had fallen to two-thirds of the early 1960s. Production of beef and veal recorded the largest drop of the three major meats. Total beef and veal production fell from the 1961-63 average of 146,000 metric tons to 71,300 tons for the 1997-98 period, a decrease of more than half. During the last half of the 1990s, production of beef and veal per capita was slightly ahead of production in the first half of the decade. The even larger decline in production in the first half of the 1990s reflects the severity of the loss of Soviet and Eastern Bloc trade preferences.

Pork production, contrary to beef and veal production, has increased in terms of both total production and per capita production compared to the early years of the revolution. Production per person in 1997-98 was 63% higher than the average for 1961-66, but was 22% below 1987-91.

Poultry meat production increased even more than pork production in the 30 years following the revolution, however, production following the loss of trade preferences fell more than pork. Lower production of poultry meat reflected even more than pork production, the loss of foreign exchange to import feed.

Even today, many poultry production units remain idle because of the lack of feed.

Milk Production

Altitude within the tropics has a significant effect on milk production. The average milk yields and rates of growth of cattle in the lower elevations (less than 400 meters) of countries lying in the North-South 30 degree latitudes—generally considered as the area of tropical climate—are only 10-15 percent of that acceptable in the North 35-60 degree latitudes.¹⁸

In addition to the vagaries of the tropics, investments in livestock in Cuba in the years before the revolution were not as significant in milk production as in beef production. Although there were some entrepreneurs investing in the dairy industry in pre-revolutionary Cuba, cattle breeding generally focused on production of meat.

Following the revolution, especially the period 1962-70, the Cuban government initiated a concerted effort to increase milk production through the cross-breeding program. About 900,000 cows were inseminated annually to produce higher-yielding offspring.¹⁹

In 1961, Cuba's production of whole fresh milk was reported to be 350,000 metric tons. Production increased gradually reaching one million metric tons in 1979, and remained at approximately that level until 1991. During the 1990s, largely as a result of lack of animal feed, production declined to the present level of about 650,000 metric tons.²⁰

Milk production per cow had increased dramatically from 1960 through 1980. The steady increase was attributed to the success of breeding programs to cross Holstein and Brown Swiss breeds with the criollo (mainly local zebu) cattle. By 1980 about 70% of the Cuban dairy herd was made up of these crosses, more than three-quarters were Holstein-criollo crosses.

18. McDowell. Op. cit.

19. Nova. Op. cit.

20. FAO Website.

Market Potential for U.S. Livestock Genetics in a Free Market Cuban Economy

In spite of the productivity gains in the late 1960s and 1970s, Cuba supplied only about 30% of its domestic demand for milk. Powdered milk was imported to meet the remaining demand. In years prior to the revolution, milk was supplied mainly in the form of sweetened condensed milk and evaporated milk.

Refrigeration facilities for preserving fresh milk play an important role in milk production, especially in the tropics, and undoubtedly limited refrigeration capacity has had negative impact on efforts to increase dairying in Cuba. In addition, especially in the past decade, the lack of animal feed has had a particularly negative effect on milk production. Annual production per cow in 1996 averaged 1,252 kilograms (2,754 lbs), about 600 kilos (1,348 lbs) below 1990—a decrease in yield of approximately 50%. In 1996 Florida's annual average milk production per cow was 14,588 pounds, more than five times higher than in Cuba.

The average number of cows producing milk in 1996 was 511,200, some 40,000 fewer than in 1990. Milk production in 1996 was 640,000 MT and 1,034,000 MT in 1990. Thus, while the number of dairy cows in 1996 had declined less than 10%, the total production of milk had dropped nearly 40%.

State production of milk in 1990 was 80% of the total, and in 1996 it was about 20%. As for beef cattle production, this was primarily the result of transforming state farms into UBPCs. The number of dairy cattle in the state sector in 1996 was only 16% compared to 66% in 1990.

One of the more widely publicized efforts to increase milk production in Cuba was an ambitious program supported by the United Nations World Food Program (WFP) in the province of Camagüey in 1989. Plans called for 358 new dairies and eleven new villages to encourage relocation of labor. It was referred to as the creation of the largest dairy complex in the world. In 1992 WFP introduced another project in the province of Las Tunas to benefit small farmers and cooperatives. Information is not available on the current status of these projects; however, data do not indicate any impact on increasing domestic milk production.

POTENTIAL MARKET CONSIDERATIONS

Assume that proposed legislation being considered by the U.S. Congress results in lifting the embargo on food exports, including livestock genetics, to Cuba. What are some of the major factors that will impact the market for U.S. livestock genetics?

Market Structure

Livestock products in Cuba are sold through four different markets—Ration Stores, Agricultural Markets, Dollar Stores, and the Black Market. Commodities and their availability have changed from time to time, but over the years have included beef, chicken meat, eggs, butter and canned milk. In recent years beef has not been available in the Ration Stores.

Beef, along with other kinds of meat, is sometimes available in the Dollar Stores. Reportedly, more than half of Cuba's population has access to U.S. dollars and could use those dollars to purchase beef, as well as pork, poultry and other livestock products in the Dollar Stores.

Pork and poultry meat are sold through the Agricultural Markets. Beef is not sold in these markets. Generally, beef is not offered on the menus of the *paladares*. Some *paladares*, however, do from time to time offer beef to their patrons. Reportedly, by paying a special tax, a *paladar* can provide beef on the menu. *Paladares* could purchase the beef through the Dollar Stores or in the Black Market.

Tourist and government hotels provide an additional market for livestock products. Meat and dairy products utilized in the tourist industry are largely imported.

Market Demand

Cuba's current population of more than 11 million is nearly 60% greater than in 1959. The total food supply, therefore, needs to be 60% greater just to maintain the same level of per capita consumption. Production of some commodities, such as beef, is below levels prior to 1959.

Poultry meat in Cuba has surpassed both beef and pork as measured by per capita consumption. Poultry meat consumed per capita in 1998 was more than 10% greater than pork. Per capita beef consumption

at 6.4 kilograms per year was about three-fourths the amount of poultry meat consumed. In the 1960s beef consumption per capita was more than six times that of poultry meat, and more than five times that of pork.

Table 2. Cuba: Meat Supply Per Capita Per Year in Kilograms

ITEM	1961-66 avg.	1987-91 avg.	1992-96 avg.	1997-98 avg.
Beef and Veal	21.1 (65%)	13.3 (35%)	7.4 (31%)	6.4 (28%)
Pork	4.0 (12%)	8.1 (21%)	6.7 (28%)	7.3 (31%)
Poultry	3.4 (10%)	12.3 (33%)	8.3 (35%)	8.1 (35%)
Other	4.1 (13%)	4.1 (11%)	1.4 (6%)	1.2 (6%)
Total	32.6	37.8	23.8	23.2

Source: Food and Agriculture Organization Data Base.

Per capita consumption of beef has dropped steadily from the time of the revolution. The 1997-98 average consumption per capita of beef was only about 30% of the amount consumed in the 1961-66 period. Pork consumption per capita, on the other hand, increased more than 80% and poultry consumption per capita during the same time periods more than doubled.

Although at present more poultry meat is consumed than either beef or pork, consumption of poultry meat is only about two-thirds the level sustained prior to the loss of Soviet aid in 1990. Imports account for about 30% of the country's poultry meat supply, while imports have been a minor factor in the supply of other kinds of meat.

During the past decade adequate nutrition has been one of the most serious problems facing Cuba. Of particular concern has been the decline in per capita consumption of meat products. Prior to the 1990s, Cubans were consuming 20% or more of their calories in the form of animal products. During the first half of 1990s they were consuming only 15% from animal products. By the end of the 1990s, the calories derived from animal products had fallen to 12%. (Table 3)

Cuba's caloric consumption from animal origin, 12%, is slightly above the average level for developing countries—11%. In developed countries the population obtains an average of 27% of its calories from animal products.²¹ Calories consumed from animal products in Cuba during 1998 (309) were less than those consumed in Costa Rica (472), Jamaica (466), Bolivia (414), or Dominican Republic (345).

Prior to the 1959 revolution, Cuba's food needs were met through domestic production and importation. For 30 years following the revolution, these endeavors were supported by favorable trade terms with the Soviet Union and Eastern Bloc countries. Soviet aid and favorable trade arrangements permitted Cuba to import production inputs needed for domestic agricultural production. Exports, primarily sugar, to the Soviet Union and Eastern Bloc countries provided foreign exchange needed to import food to fill the deficit between production and consumption.

Until the collapse of the trading relationship with the Soviet Union at the end of the 1980s, the Cuban government was able to provide adequate nutrition for its people. With the loss of Soviet aid Cuba's food situation has changed dramatically. Without the favorable trade terms, access to improved technology, and foreign exchange to import, Cuba has not been able to maintain the same level of caloric intake per capita. The country's per capita food supply, measured in terms of caloric consumption, is about three-fourths of the level held prior to the loss of Soviet assistance.

In an effort to maintain an acceptable level of nutrition, Cuba in the 1990s allocated a larger percentage of foreign exchange for food imports relative to other imports. Foreign exchange, obtained through increased family remittances, foreign investment and tourism has helped to finance the food imports.

While much of the food marketed through the tourist industry is imported, some domestic production does reach the tourist market. Reportedly, the tour-

21. Delgado, Christopher, et al. "Livestock to 2020: The Next Food Revolution." International Food Policy Research Institute, Washington, D.C. 2020 Brief 61, May 1999.

Table 3. Cuba: Per Capita Caloric Consumption from Vegetable and Animal Products, Averages for the Periods Indicated

ITEM	1961-66 avg.	1987-91 avg.	1992-96 avg.	1997-98 avg.
Total Calories Per Capita Per Day	2,334	3,093	2,467	2,449
Calories from Vegetable Products	1,863 (80%)	2,436 (79%)	2,090 (85%)	2,149 (88%)
Calories from Animal Products	470 (20%)	657 (21%)	377 (15%)	301 (12%)

Source: Food and Agriculture Organization Data Base.

ism industry purchased approximately US\$120 million worth of fresh produce and meat products from Ministry of Agriculture-operated companies in 1998, compared to US\$75 million in 1997.

In addition to siphoning off some domestic food production for the tourist industry, lower per capita production and lack of foreign exchange to import has caused per capita supply of many food items, not only animal protein foods, to be substantially lower than before 1959. It could be argued that many of the food items currently available in smaller supplies than before the revolution are not necessary for human nutrition, but they are items that many consumers prefer.

It is obvious that there should be a pent-up demand in Cuba for livestock products, especially beef and dairy products. Increased demand would be expected to result from a larger human population, decreased imports of animal products and a smaller per capita domestic supply of meat.

Market Competition

If the market in Cuba would open for U.S. livestock genetics, it is anticipated the U.S. livestock industry would provide strong competition for suppliers from other countries. Canada has been Cuba’s major source of dairy genetics. U.S. dairy and beef cattle would compete extremely well with cattle from other country sources declared foot and mouth disease free. Because of similar climatic conditions in the southern United States to that of Cuba, livestock coming from the U.S. southern states would have a strong preference to those coming from either Canada, Europe or South American livestock-producing countries, such as Argentina and Uruguay.

Countries and firms already established in the Cuban market through trade and investment could be ex-

pected to provide strong competition for U.S. exporters. Most of the international economic associations formed between Cuba and foreign entities pertaining to food and agriculture have involved financing rather than investment. Financing is used primarily to provide production inputs, such as fertilizers, chemicals, equipment, etc. It affects mainly production and processing of exportable products, e.g. citrus, sugar, tobacco and some processed foods and beverages rather than the domestic food situation, including the livestock industry.

The only major foreign investment involving livestock is a Cuban-Vietnamese joint venture in cattle and swine approved in May 1997 and inaugurated in Ninh Binh in June 1997. The Vietnamese enterprises, Phung Thuong and Don Giad, were to contribute two-thirds of the initial investment. Bacuranao, a Cuban cattle enterprise, was to contribute the remainder. The joint venture was created for production of livestock and processing of pork and beef, primarily for the tourist trade. High-quality semen was also to be produced for herd improvement. Recent reports, however, indicate the “international economic association” has not been established successfully and is in the process of dissolution.

Another international economic association in Cuba in the livestock products area is a Cuban-Spanish joint venture known as Asturia. It is an association between the Spain-based Peñasanta S.A. and Cuba’s Ministry of Food Processing. The joint venture will initially process and bottle powdered milk imported from Spain.

In addition to these joint ventures, the Cuban Institute of Animal Sciences is offering various opportunities for foreign institutions to collaborate on research and technical matters, e.g., on biotechnology, including protein enrichment of by-products from

the sugar industry; animal physiology and nutrition, including systems to balance rations, using tropical feed; pasture improvement, including intensive management of pasture in low input systems; production systems, including calf and replacement heifer breeding systems, natural breeding in dual purpose livestock and artificial breeding with low inputs.

Once U.S. sanctions are lifted and normal commercial relations between the United States and Cuba resume, the most sought after U.S. participation in Cuba's livestock sector, according to Cuban officials, will be for collaboration on research and technology.²²

Other Market Considerations

All sectors of Cuba's livestock industry have been impacted by the lack of animal feedstuffs, especially since 1989. Cuba has had great difficulty in substituting domestic feed production and technology for lost imports.

For the hog sector, the abrupt cessation of feed imports has been the decisive factor in the decline of swine numbers. For beef cattle, the decline in numbers began before 1989. Dairy cattle also have been affected by an inadequate feed supply. Milk production, total and on a per capita basis, in the 1990s has fallen significantly from the 1980s. Aside from internal factors, such as economic organization and management, a severe drought in the 1980s may have hit the cattle sector especially hard.

The livestock sector started the past decade from a position of heavy state involvement and, although there has been a reluctant shift toward economic decentralization, there has been little indication of any impact on overall productivity. There are indications that productivity increased in the state sector following transformation of many state farms into UBPCs; however, this could be the result of shifting less efficient units to the non-state sector.

Prospects for substantial improvement in Cuba's livestock sector are directly linked to U.S.-Cuban relations, especially the market access policies enacted

by the Cuban government following normalization of commercial relations between Cuba and the United States. The vast size of the U.S. breeding stock, high level of technology in animal reproduction and physiology, advanced research on improved pasture grasses and animal feedstuffs, past experience of U.S. livestock interests in Cuba, and other factors will ultimately affect the livestock industry in Cuba.

Unique market factors will provide opportunities in Cuba for the U.S. livestock industry. Some of the factors are:

- Proximity of the U.S. livestock industry to the Cuban market. Transport of livestock genetics, especially live animals, will have a comparative advantage over other country suppliers.
- Cuba's growing tourist industry will require substantial quantities of animal protein foods. In 1998 Cuba reported 1.4 million tourists, with revenue from tourism 21% greater than the year before. Cuba's share of the Caribbean tourist trade in 1998 was 9% compared to 4% in 1989. The number of tourists has grown from 300,000 in 1989 to an estimated 1.7 million in 1999. Two million tourists are expected to visit Cuba in 2000.
- Proximity of Cuba to the tourist market in the Caribbean islands. U.S. livestock entrepreneurs who want to invest in livestock production in Cuba will have an opportunity to supply products, not only for the Cuban domestic market, but also for the export market—especially the tourist industry in nearby Caribbean countries. Utilization of free trade zones in Cuba could facilitate such investments.

Cuba offers the largest land area of any island in the Caribbean, and has favorable areas for livestock production, especially cattle in the eastern provinces. In addition, Cuba has a highly educated work force relative to many other countries. If Cuba's foreign investment climate were favorable, U.S. livestock investors could become a significant factor in livestock production in Cuba.

22. Private discussion with the Cuban Vice Minister of Agriculture for Research and Development. June 2000.

MARKET POTENTIAL

In the 1980s there was a growing dependency on imported feedstuffs for the livestock sector. Imports of animal and vegetable meal rose some 52% from 1980 to 1989. Certainly, the enormous drop in feed imports in the 1990s has had major impact on the numbers and productivity of the livestock sector.

While the market for U.S. swine, sheep and horse genetics will be important when U.S. economic sanctions are lifted, prospects for substantial trade and investment in the livestock sector appear to be most favorable in cattle, both beef and dairy.

Since the revolution Cuba’s cattle population has decreased more than 7%, while the human population has increased nearly 60%. If Cuba were to regain the same ratio of people and cattle that existed in 1961, the cattle population would need to increase from 4.7 million to 7.5 million head. This would be a 70% increase in the number of cattle.

Following are the data used in calculating the number of cattle required to regain the number of cattle per 100 people existing in 1961:

Human population in 1961	7.1 million
Cattle population in 1961	5.0 million
Head of cattle per 100 population	70.0
Population in 1998	11.1 million
Cattle population in 1998	4.7 million
No. of cattle (at 1961 ratio)	7.8 million
No. of cattle required to restore 1961 ratio	3.1 million

While the cattle numbers stated in this paper are FAO or Cuban official data, it is estimated by Riera that the current number of cattle could be as low as two million head, or even lower.²³ But whatever the number might be, it is clear that Cuba does not have an adequate supply of beef and milk to meet the consumption demand of its people.

Building a domestic cattle industry in Cuba is going to depend to a large extent on the introduction of improved livestock genetics, but also important will be the establishment of improved pasture grasses and legumes for feed. Older literature shows phosphorus

and cobalt deficiencies in Cuba, with the status of other minerals generally unknown; therefore, proper mineral nutrition will also be important.²⁴

A study by the International Food Policy Research Institute (IFPRI) refers to livestock as the next food revolution in developing countries, and states there has been “a massive increase in demand for food of animal origin.” The study points out that total meat production in developing countries grew at an annual rate of 5.4% between the early 1980s and mid-1990s. In most developing countries per capita production kept up with population growth.²⁵ In Cuba, during the same time period, total meat production declined. The rate of per capita meat consumption was negative, while the rate of population growth was positive.

Based on data and information available, it can be concluded that following resumption of normal commercial relations between Cuba and the United States:

- Cuba’s population growth, urbanization and increased per capita income will generate strong demand for food products of animal origin;
- Satisfaction of that demand will depend on increased livestock production in Cuba, especially through improvement of animal genetics and nutrition, as well as the country’s openness to international trade and foreign investment.

If Cuba has access to foreign exchange for importation of food, an immediate market could open for U.S. suppliers of livestock products—especially beef, dairy products, poultry meat and eggs. Refrigeration, which was not widely available in Cuba before the 1960s, could facilitate a market for these products.

The market in Cuba for U.S. suppliers of livestock genetics and livestock products will depend largely on policies established in Washington and Havana, and, if those policies are favorable, U.S. exporters and investors of livestock genetics would have an opportunity to help Cuba rebuild an industry valued in billions of dollars.

23. Riera.Op. cit.

24. McDowell. Personal electronic communication.

25. Delgado. Op. cit.