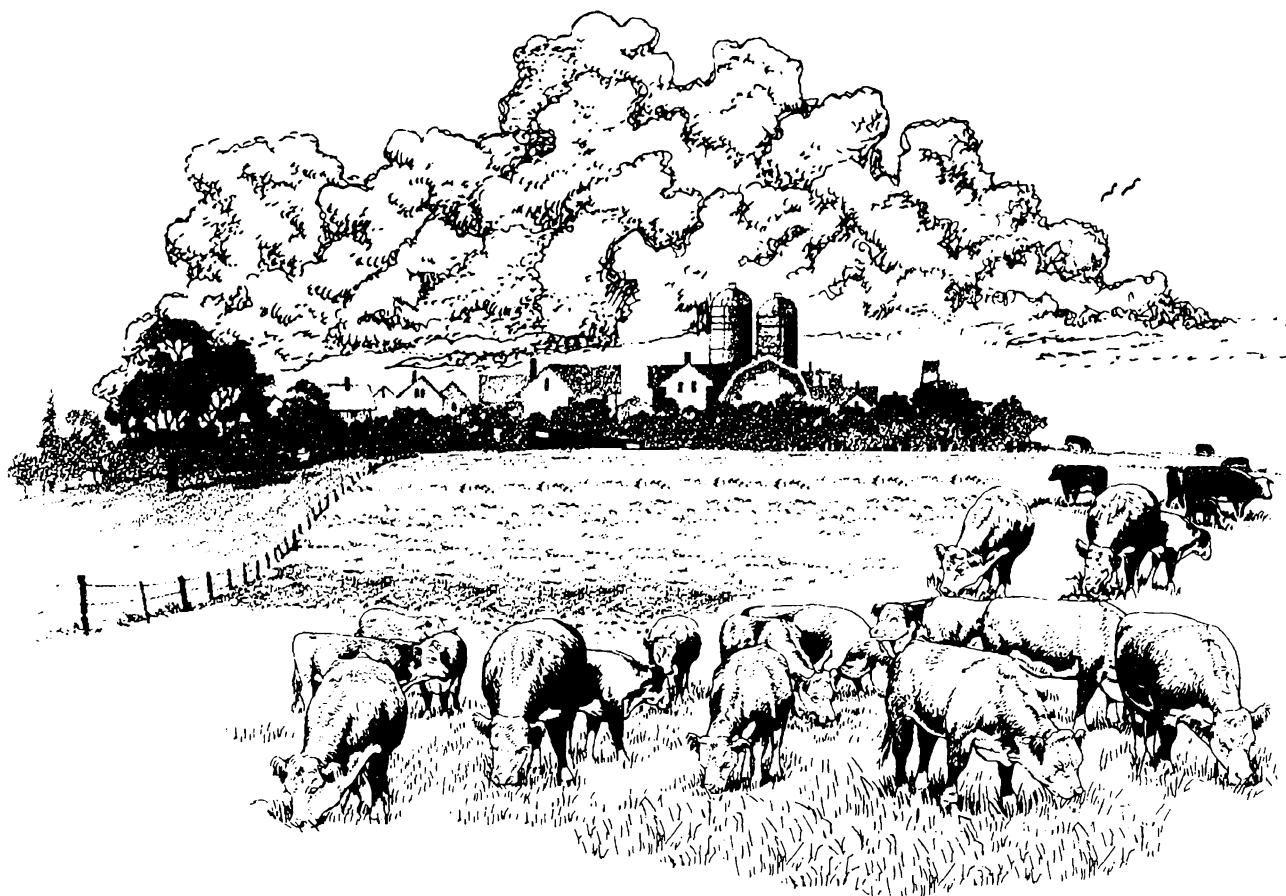


VIRGINIA'S BEEF INDUSTRY:

A STUDY AND BLUEPRINT FOR THE YEAR 2000



Virginia Cooperative Extension



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INTRODUCTION

Beef production in the Commonwealth of Virginia has a long and rich history, having its roots in colonial times and having developed into a strong, viable industry in modern Virginia. Today, Virginia, with 1.78 million cattle, ranks 19th in the U.S. and with 735,000 beef cows, ranks 18th. Virginia's beef industry has grown and developed principally because beef cattle are one of the most suitable enterprises to utilize pasture and forage which is found in abundance throughout most of the state. Cattle offer a means to market these feed stuffs which would otherwise have little value.

The sale of cattle and calves in Virginia leads all agricultural commodities and in 1991 accounted for 20 percent of the total gross agricultural farm income at \$412.1 million. Beef cattle are reported on 28,000 Virginia farms and make up 84 percent of all cattle in the state. The remaining 16 percent of the cattle population consists of dairy cows and their replacements. The average herd size is 53 head. The 735,000 beef cows found on 25,000 Virginia farms result in an average herd size of 29 head. Beef cows comprise 41.3 percent of all cattle and 49.2 percent of all beef cattle. Major production areas are Western Virginia, Shenandoah Valley, Northern Piedmont, and Southern Piedmont. Although beef cattle are extremely important on a large number of farms, they are not the major source of farm or family income in the majority of cases. Beef cattle are a complementary enterprise on a large number of farms which produce grains, tobacco, or other livestock enterprises. A growing percentage of cattle are found on part-time farms where one or more family members work off the farm.

Beef cattle are grown in every production area and county of the state because pasture and other forage is widely available and can best be utilized by beef cattle or other grazing livestock. Virginia has over 3 million acres of pasture and considerable crop land which is utilized for the production of hay, silage and other forages. Crop residues and waste feeds such as poultry litter are also important. Virginia is a deficit grain producing state which helps to explain why only 30 to 50 thousand cattle are finished for slaughter each year. Feeder cattle production is Virginia's strong point. Over 450,000 feeder cattle are marketed annually to out of state feedlot operators.

Elevated land values brought about by non-agricultural development have created problems for producers from a profitability standpoint. The encroachment of population, especially in Northern Virginia and in other areas adjacent to towns and cities as well as from roads, shopping centers and other non-agricultural land uses is and will continue to be a production constraint. Beef cattle in a pastoral setting, however, thrive in close proximity to people and other industry.

Virginia is a land of diverse topography and climate. In the narrative which follows, the state is divided into five production regions which were described in a study about Virginia agriculture which was conducted by the Virginia Polytechnic Institute and State University College of Agriculture and Life Sciences in 1987. These regions and the counties within them are shown on the map below. (Figure 1) They are: Western, Shenandoah Valley, Northern Piedmont, Southern Piedmont, and Eastern.

vi This publication is the product of a study undertaken by faculty and staff in the Department of Animal Science at Virginia Polytechnic Institute and State University with funding from the Virginia Cattle Industry Board, which administers Virginia funds from the National Cattle Check-Off Program.

This publication, giving the results of the study, is designed to provide useful information and may be read by anyone interested in Virginia and its future. Its purpose is to educate the reader about the beef industry and its value to the citizens of Virginia. Care has been taken to explain terminology and the structure of various aspects of the agricultural industry as it relates to Virginia. Each chapter is independent so a chapter of particular interest can be read by itself. The publication begins with a brief overview of modern beef production and how Virginia fits into this production system. Succeeding chapters go into more detail about how the cattle industry has changed in the past 40 years and how beef cattle impact the environment and economy. An attempt is made to give a prospectus of the beef industry for the future. It is the desire of the Virginia Cattle Industry Board and the authors to present the most accurate and factual information available regarding the impacts of the beef cattle industry in Virginia. Information from the United States Department of Agriculture, Virginia Department of Agriculture and Consumer Services, and Virginia's land grant universities constitute the foundation for this document.

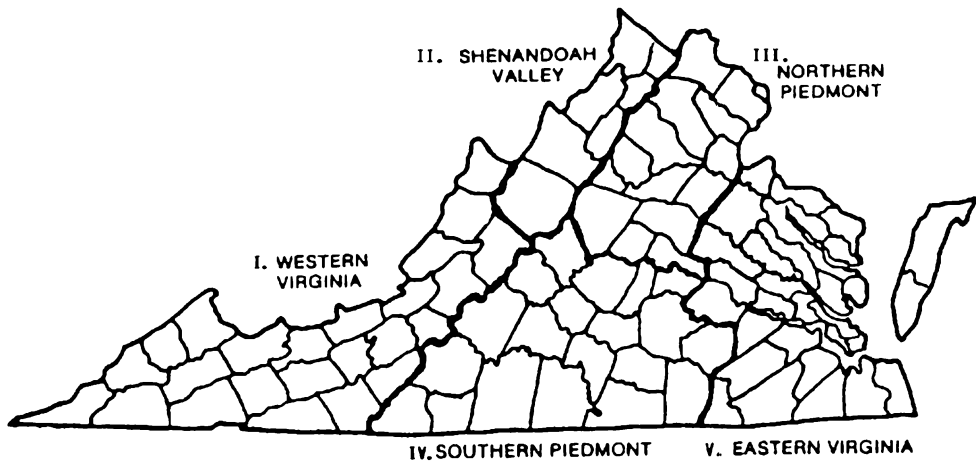


Figure 1.0
Five Agricultural Production Regions of Virginia

CHAPTER 1

AN OVERVIEW OF VIRGINIA'S PLACE IN THE U.S. BEEF INDUSTRY

Virginia's beef cattle industry is an important part of the state economy and also plays an important role in preserving a sound environment for all Virginians. According to the January 1, 1993 U.S.D.A. Cattle Inventory Report, Virginia has 1.78 million cattle and calves. Approximately 84 percent or 1.49 million of these are beef cattle and 735,000 are beef cows. Virginia ranks 19th in total cattle numbers, 18th in number of beef cows in the U.S. In both categories, Virginia ranks above Wyoming, Ohio, Washington, Georgia, and other states well known for beef production. There are approximately 28,000 Virginia farms which report beef cattle and 25,000 which report beef cows. According to the 1987 census of agriculture, over 59 percent of Virginia farms with beef cows have fewer than 19 head and 48 percent of operators report they worked 200 or more days off the farm. A 1992 Virginia Beef Producer Survey reveals that 39.5 percent have off-farm employment. These figures indicate that a large share of the Virginia beef industry is part-time in nature and has the family farm as its foundation.

The sale of cattle and calves leads in providing income to Virginia's farmers. (Table 1.1, Figure 1.1).

Table 1.1
Gross Cash Receipts for Virginia Agricultural Commodities 1991 (\$1,000)

Rank	Item	Value
1	Cattle	\$412,125
2	Broilers	305,087
3	Milk	269,325
4	Tobacco	197,171
5	Turkeys	122,934
6	Soybeans	88,468
7	Peanuts	86,938
8	Hogs	85,204
9	Corn	40,961
10	Apples	36,898

Although the largest contributors to Virginia's economy are the service industries, trade, finance and federal employment, production agriculture is responsible for a significant fraction of the gross state product (GSP). Income from cattle and other agricultural commodities has a ripple effect that moves through the service, trade and other sectors of the economy adding to its importance. Cattle farms typically contribute more in county tax revenues than they require in services, thereby subsidizing county services to residential areas. Furthermore, cattle farms contribute to Virginia's natural beauty and land value. Although it is difficult to put a dollar value on aesthetics, the natural beauty of cattle farms undoubtedly serves to attract people and commerce to Virginia.

2 Beef cattle in Virginia are produced primarily in an extensive pasture and forage-based pastoral setting largely on privately-owned family farms. This is in stark contrast to the poultry and swine industries which are largely produced under confinement and are primarily grain consumers. Broiler chicken and turkey production is a totally integrated process and swine production is quickly moving in that direction where large corporations control both production and processing. Both swine and poultry demand a large capital outlay for confinement buildings and waste management systems. Beef producers in Virginia are independent business people which allows them to utilize land, labor, and other resources as they choose. Beef cattle enterprises typically require relatively low investments in equipment and labor. This characteristic has allowed both large and small family farms in Virginia to remain operable and preserve the family's heritage in farming.

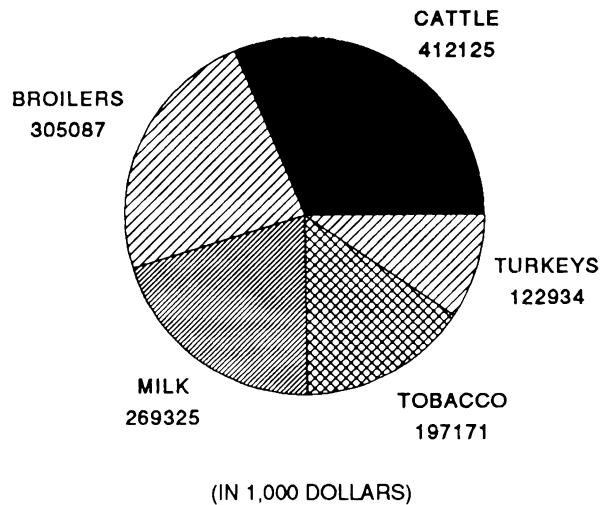


Figure 1.1
Gross Receipts for Top Five Virginia Commodities, 1991

Virginia cattle producers fit into a nationwide beef production system which provides healthful and nutritious beef food products for the American consumer. The U.S. beef industry can be divided into four distinct sectors which are:

1. Cow/calf production.
2. Stockering/backgrounding operations.
3. Cattle finishing (feedlot) operations.
4. The processing/retailing sector.

The first three segments involve the growth and development of the live animal, while the processing/retailing sector is involved with cattle slaughter and preparation of meat and byproducts for sale.

Beef production begins with the cow/calf segment, the enterprise which engages the majority of Virginia's cattlemen. Cow-calf production involves maintaining breeding females and bulls on forage-based programs, producing a crop of calves annually which are weaned at 7 to 9 months of age. At weaning, calves may be sold to a backgrunder or finisher or may be retained to be sold later as feedlot-ready feeder cattle. Weaned calves may be referred to as "stockers."

The backgrounding phase of production is defined as the period of time in which these young weaned calves are allowed to grow and develop before they move on to the finishing (feedlot)

phase of production. Calves typically weigh 400 to 600 pounds at weaning and are generally backgrounded on forages (high fiber plant materials such as pasture, hay or corn silage) until they weigh 700 to 900 pounds and are 10 to 18 months old. Backgrounded yearling cattle are referred to as "feeder cattle" and are ready for the finishing phase of production. Virginia cattlemen sell approximately 450,000 feeder cattle annually to buyers located in Pennsylvania, eastern corn belt states of Ohio, Michigan, Indiana and Illinois, and western feeding states of Iowa, Kansas and Nebraska.

The finishing (feedlot) phase completes the live production process. The finishing period is typically 100 to 150 days in duration producing finished cattle weighing 1000 to 1300 pounds which are less than 2 years of age. The feedlot operator typically utilizes high energy rations including substantial amounts of grain which allows for rapid and efficient weight gain. This regimen enables cattle to achieve the desired composition of lean and fat, producing a beef product which has the composition and flavor the consumer demands. Though cattle are finished in nearly all areas of the country, this sector has, in recent years, moved in large measure to the central portion of the country including Iowa, Nebraska, Kansas, Eastern Colorado, Texas and Oklahoma. These areas are favored by availability of relatively low-cost feed grains, availability of large numbers of feeder cattle, and dry climatic conditions which favor efficiency of weight gain.

Finished cattle are sold to meat packing plants which slaughter the animals and prepare the meat for shipment to the retail sector. The largest cattle slaughter and processing facilities are located near the predominant cattle feeding areas and are controlled by a small number of companies.

Virginia's climate, topography, and soils provide lush pastures and an abundance of forages and by-product feedstuffs. This makes the state ideally suited for the cow/calf and backgrounding phases of production. Some 86 percent of Virginia cattlemen report the ownership of beef cows. The other 14 percent reporting beef cattle have either backgrounding and or finishing operations exclusively. According to a 1992 survey of Virginia cattle producers, some 50 percent of Virginia cow/calf operators report that they sell calves at weaning to feedlots or other producers who background them. The other half of Virginia's cow herd owners background their own calves. A larger fraction of the total production from the Virginia cow/calf enterprise is backgrounded in the state now than in the past. There is opportunity to increase beef cattle profit by further increasing the backgrounding enterprise. The 1992 Virginia beef producer survey indicates that 10 percent of cattle farms specialize in backgrounding and or finishing cattle. Most backgrounders purchase stocker calves at weekly livestock auction markets, through special graded sales or by private treaty from cow herd operators. There are relatively few cattle finishing operations in Virginia due to the humidity of Virginia's climate, a limited feed grain supply and the lack of competitive bidding for slaughter cattle by distant meat packers. Some Virginia farms, however, have the capability of producing economical corn yields, thus making cattle finishing economically feasible. There were 40,000 finished cattle marketed in 1990 in the state.

Some 6 percent of Virginia beef cows are purebred which produce seedstock for commercial and other purebred herds. The production and sale of purebred seedstock is an integral part of the successful beef industry in Virginia and the mid-Atlantic region. Seedstock breeders of a number of breeds produce the 30,000 bulls which inhabit Virginia's pastures and service the commercial cow herd which produce the calves that go into commercial channels.

Virginia beef producers, located in virtually every county, are fortunate to have a cattle production and marketing infrastructure to support their endeavors. This infrastructure includes an

4 advanced cooperative marketing system involving a network of special graded feeder and slaughter cattle sales and 33 weekly livestock markets. These outlets offer a competitive market for feeder and slaughter cattle on a year-round basis. The Virginia Cattlemen's Association, The Virginia Cattle Feeders Association, 20 local feeder cattle marketing groups, and a state livestock markets association provide leadership. Tel-O-Auction service for field tel-o-auction sales and in-barn special sales is available through the Mid-Atlantic Marketing Association. Eleven state breed associations and a beef cattle improvement association are in place to support improvement and marketing of purebred seedstock cattle. Cattle grading and marketing assistance and service is provided through the Virginia Department of Agriculture and Consumer Services. Feed, equipment, and pharmaceutical supplies are widely available as are private veterinary services. Strong educational and technical support is available through Virginia Cooperative Extension from the state's senior land-grant university, Virginia Polytechnic Institute and State University. An industry check-off promotional program is operational and contributed to by all cattle producers. Virginia has a thriving beef cattle industry and possesses the infrastructure to support expansion of beef cattle production in the years ahead.

CHAPTER 2

THE CONTRIBUTION OF CATTLE PRODUCTION TO VIRGINIA LOCALITIES

Virginia faces the challenge of stimulating economic growth while not giving up the resource which is among the commonwealth's most valuable: the natural beauty of its rural countryside. Throughout Virginia, in growing metropolitan areas, some of the most highly sought-after properties are those well-adapted for cattle production. Beef cattle farms in Virginia are basically low density, pasture-based, privately run businesses that are a valuable ingredient to Virginia's beauty and economy.

Most of the commonwealth's countryside is privately owned. It was on the green hills of Virginia that our nation in its youth won independence from Great Britain and thereby guaranteed the right of the individual citizen to own land and reap the benefits of such ownership. Though citizens value their independence as property holders, the actions of these private land owners affect the community of which their land is a part. For example, the manner in which the holder of a flood plain, wetland, watershed, or timber stand chooses to utilize that resource can affect the lives of other citizens.

Virginia's cattlemen recognize the importance of their holdings to their fellow citizens and manage their farms so as to conserve and enhance the community. However, Virginia cattle producers are under a wide array of ever increasing pressures. First, a Virginia farmer's land is very valuable. Table 2.1 shows how Virginia's farmland values have increased over the past twenty years. In 1991, Virginia's farmland brought prices which ranked thirteenth in the nation. Eight of the states ahead of Virginia were in the heavily populated Northeast and the other three were California, Florida, and Illinois. Second, profitability on Virginia farms has not been good over the past 20 years and Virginia farmers continue to operate on comparatively low profit margins. Third, the mean age of the Virginia cattle farmer in 1987 was 56. Aging cattle farmers planning for retirement too often see no recourse but to sell their property or some portion of it to pay expenses associated with retirement. Often such land is sub-divided for residential or other non-farm use. These three factors combined put Virginia's pastoral countryside in jeopardy.

Table 2.1
Number of Farms, Land in Farms, and Farmland Values Virginia 1970-1992

Year	Number of Farms (Number)	Farm Land (1000 Acres)	Average Farm Size (Acres)	Avg. Acre Value of Farmland (Dollars)
1970	76,000	11,400	150	286
1975	62,000	10,100	163	558
1980	58,000	9,800	169	1,028
1985	54,000	9,500	176	1,112
1990	46,000	8,900	193	1,516
1992*	44,000	8,700	198	1,363

*Preliminary

6 Society must recognize the value of open space. Channeling growth and planning development to conserve pastoral countryside will protect the environment, benefit the economic health of rural localities, and attract new people and industry to Virginia. Virginians must search for ways to protect open space and at the same time protect the land owner who depends on the true market value of land as the major source of long-term financial security.

Through the 1970's and 80's Virginia has been among the top 10 states in population growth rate in the nation. This influx of people into Virginia has taken place primarily in the Northern Piedmont and Eastern Virginia. As an example, consider Albermarle county where the amount of farm, forest, and open space decreased by an average of 1408 acres per year from 1970 - 1982 while the acreage for residential use increased by 988 acres per year and land for commercial and industrial uses increased by 274 acres per year. A study of Culpeper county in 1988 revealed each residential unit annually cost the county \$2,167 while generating only \$1,738 in revenue, a net loss of \$429. It was also shown that each new residential unit in Culpeper county would cost an additional \$813 because growth requires expansion of school and county service facilities, resulting in a net loss of \$1242 for each new residential unit. These deficits are subsidized by revenues from farm, forest, and commercial/industrial properties.

Most counties appreciate the contribution agricultural land makes to the county treasury. These counties, including the counties described in this chapter, have what is called "use value taxation," a system whereby farmland is taxed according to its potential for generating income from agriculture, as opposed to its fair market value which is often much higher. Some would like to eliminate this tax benefit because they believe farm land owners are not paying their fair share in taxes. A study conducted in Fluvanna county reveals that a typical 100 acre farm contributes more to the county treasury than it requires in services (Table 2.2).

Table 2.2
Fluvanna County Case Study

Item	Tax Revenue Provided	Value of Services Demanded	Net Gain For County
100 acre farm with house (2.6 people), barns, and land	\$3,124	\$2,975	+\$153
2 acre lot with house (2.6 people)	\$2,793	\$2,905	-\$112

Cattle farms generate more tax revenue than they demand in services because cows do not attend school. As silly as this may sound, 60 to 80 percent of a typical county budget is devoted to operating the school system, a service utilized largely by the occupants of residential properties. Commercial and industrial properties, like agricultural land, demand very little in services relative to the money they contribute to the county treasury. However, commercial and industrial properties, when they are successful, stimulate residential growth and thus can offset any positive impacts they may have on a county's revenue resources. Table 2.3 contains information compiled by the Piedmont Environmental Council for some counties of the Northern Piedmont. The PEC's studies demonstrate how residential areas demand from \$1.16 - \$1.28 in services for every dollar they contribute in tax revenue. Farmland, on the other hand, demands very little in services while contributing significantly to a county's tax revenue.

Table 2.3
Ratios of Tax Revenue to Services Required
Selected Non-Metropolitan Virginia Counties
Revenue Dollars Generated : Dollars Demanded in Services

County	Residential Land	Farmland and Open Space
Albermarle	1.00 : 1.16	1.00 : 0.21
Clarke	1.00 : 1.26	1.00 : 0.15
Culpeper	1.00 : 1.25	1.00 : 0.19
Fauquier	1.00 : 1.18	1.00 : 0.15
Loudoun	1.00 : 1.28	1.00 : 0.11
Rappahannock	1.00 : 1.39	1.00 : 0.17

The point is not that economic growth is bad. On the contrary, economic growth and diversity contribute to long term prosperity for all Virginians. The point is that counties that are anxious to attract new people and industry need to plan this growth in advance so economic diversity can be maintained and the natural beauty and agricultural productivity of Virginia can be preserved. There are ways to cluster and arrange homesites so that people are occupying space at high density rates but surrounding views retain a rural nature for the community. An example of this type of planning is the community of Reston in Fairfax county. If all of Fairfax county were planned as Reston was, fully two-thirds of Fairfax county (population 830,000) would still be rural. In the past 20 years, Virginia has experienced a 33 percent increase in population and a 36 percent increase in numbers of beef cattle. The low density, pasture-based business of producing beef cattle is clearly sustainable and compatible with population growth. The pastoral nature of Virginia's landscape is one of the greatest assets in terms of environmental quality, aesthetic appeal, and economic health of rural communities. Virginians from rural and metropolitan areas need to work together and strive to further the prosperity and quality of life enjoyed in the commonwealth.

Traditional approaches to controlling development such as county comprehensive plans, zoning ordinances, subdivision controls, and site plan reviews are extremely important in guiding land use. However, the guidelines laid down by these methods are often applied inconsistently or are ignored. These traditional approaches to development planning can be changed or completely overturned with one blow of a council chairman's gavel.

Agricultural districting is one method by which land owners can band together to protect their land from development. Under this system, land owners can establish an Agricultural/Forestral District from a minimum area of 200 contiguous acres. There are provisions allowing for additional properties to be part of the district that are not contiguous with the core 200 acres. The land in an Agricultural/Forestral district is unavailable to subdivision or development for a period of 4-10 years, the length of time being decided by the land owners. Property in Agricultural/Forestral districts automatically qualifies for use-value taxation benefits. Furthermore, state and local power of eminent domain becomes limited, giving the landowners a more powerful say should the state wish to put a road or powerline through the district. Local governments are prohibited from enacting laws or nuisance-type ordinances which would unreasonably restrict or regulate farm structures or farming practices within the district. Agricultural/forestral districts can protect open space for a short period of time. However, if property values increase as they have in many parts of Virginia, the land owners ultimately will feel pressure to capture the windfall from the sale of their land.

8 A more permanent means of preserving open space is a Conservation Easement. Conservation Easements enable a farmer to permanently preserve his farm and lock out development or subdivision. The farmer retains the right to sell the property (in whole) or pass the property on to whomever she/he chooses. The Virginia Outdoors Foundation is the government agency that serves as custodian of these properties to make sure no unauthorized building or development occurs on land under easement.

Agricultural Districts and Conservation Easements are dependent upon land owners voluntarily sacrificing at least some of the economic benefits associated with owning Virginia agricultural land.

Transferable development rights are one way a community can designate open space for preservation while still protecting the land owner's right to capture some of the true market value of undeveloped land in that community. Transferable development rights would allow a developer to buy units of land from a farmer even though the actual development would occur at some prearranged location in the community. Approaches to controlling development such as transferable development rights, agricultural districting, and zoning ordinances can be quite controversial. The fact remains that some means of preserving open space while treating the land owner equitably needs to be found.

All Virginians have a vested interest in the contribution cattle farms make to the quality of life enjoyed in the commonwealth. By planning now, Virginia can in the future enjoy the prosperity that comes from economic growth and still preserve the natural beauty and clean environment harbored by cattle farms.

CHAPTER 3

BEEF CATTLE AND ENVIRONMENTAL QUALITY

Over the past 20 years, virtually every citizen has experienced a heightened awareness of how humans are affecting the environment. Today, in the face of a burgeoning population and limited resources, people are aware of the need to be good stewards of the environment. Beef cattle production can play an important role in protecting the environment and preserving the diversity of Virginia's forest and grassland ecosystems.

Beef cattle are members of the suborder *Ruminantia* and the family *Bovidae*. Cattle, deer, sheep, elk, and goats are all ruminants. These animals are unique in the animal kingdom because their stomach is a four compartment system that harbors a huge population of microorganisms that can break down plant fibers. Because of this population of microorganisms, cattle can consume forage (fibrous plant materials such as grass and hay) and non-protein nitrogen (inorganic nitrogen such as ammonia) and convert these compounds into meat and milk for human food. Beef cattle are great resource utilization tools ready to serve the human population while coexisting with other species in Virginia's grassland ecosystems.

There are approximately 3.5 million acres of pastures and 1.2 million acres used for the production of hay in Virginia. Some 45 percent of Virginia's non-forest land is covered with forage that can be utilized by cattle.

Pastoral agricultural systems provide a permanent cover of vegetation for the land and do not require tillage of the soil. Beef cattle production in Virginia is almost entirely forage-based. Most cattlemen do utilize some grain feeding to sustain cattle, particularly during the winter when the grass is dormant and has a low nutrient content. Virginia's feeder cattle ultimately go to feedlots for a brief period of grain feeding before slaughter. The fact remains that over 70 percent of the total retail weight of beef is derived from fibrous plant materials. This is in direct contrast to poultry and pork products that are produced from animals fed grain exclusively throughout their lives.

Grazing by ruminants plays an integral part in maintaining the biodiversity of a grassland ecosystem. Grazing by these animals must be managed to effect optimum utilization and prevent overgrazing. Virginia's most successful cattle producers realize that long-term profitability is maximized when careful stewardship of the resource base is observed. Well-managed grazing stimulates plant growth and diversity and provides the ingredients for a habitat which can also support a wide array of wildlife. A continual effort on the part of Virginia's land-grant universities and Virginia Cooperative Extension to further educate cattle producers on the latest approaches to optimize the use of their land and forage resources is needed.

Virginia is a land of diverse natural resources. In addition to its grasslands, Virginia has an immense system of water ways, many of which empty into the Chesapeake Bay. About two-thirds of Virginia's land area is drained by rivers flowing into the Chesapeake. Virginia comprises about one-third of the Bay's total drainage area. A study by the Environmental Protection Agency (EPA) in 1983 revealed the Bay's ecosystem was in trouble. Aquatic vegetation was disappearing and total harvests of fish and oysters were diminishing. Furthermore, analysis of the water column

revealed depressed oxygen concentrations, extreme algal blooms, increased turbidity, and unacceptable concentrations of heavy metals in sediments. The problems were caused by excess levels of nutrients and toxic pollutants entering the Chesapeake via its contributing water-ways. Excessive levels of nitrogen and phosphorus from point and non-point sources were found to be a particularly serious problem.

Initial efforts to bring the pollution problem under control concentrated on the point sources. Point source pollution is the result of a single and identifiable outlet releasing contaminants into the environment. A great deal of progress was made in the early 1980's in reducing quantities of phosphorus being released by waste water treatment facilities that had outlets into Bay tributaries. Point source pollution is generally more easily brought under control than non-point source pollution.

Non-point source (NPS) pollution is pollution released over a very large area that accumulates in surface and ground waters as a result of the movement of water over and through the earth. Research sponsored by the EPA indicated that in a year of average rainfall, non-point sources contributed 67 percent of the nitrogen and 39 percent of the phosphorus entering the Bay. The proportions of nitrogen and phosphorus stemming from non-point sources vary among drainage areas but were found to be higher in river basins draining more rural areas. For example, the rural Rappahannock River's nitrogen and phosphorus contributions to the Chesapeake Bay are primarily from non-point sources (Table 3.1). In contrast, the James River, which runs through several of Virginia's major metropolitan areas, contributes nitrogen and phosphorus primarily from point sources.

Table 3.1
Nutrient Loads from Point and Non-Point Sources:
Nitrogen and Phosphorus by Basin

Basin	% of Total Load				Total Load (millions of pounds)	
	Nitrogen		Phosphorus		Nitrogen	Phosphorus
	Point Source	Non-Point Source	Point Source	Non-Point Source		
Potomac ¹	44%	56%	59%	41%	35.00	2.87
James	62%	38%	81%	20%	20.49	3.83
York	39%	61%	35%	65%	2.33	22
Rappahannock	13%	87%	39%	61%	2.94	28

¹42% of this basin is in Virginia

Source: Chesapeake Bay: A Framework for Action, U.S. EPA, Region 3, Philadelphia, PA, September 1983
(data compiled from Basin profile)

The Potomac River drainage area is a large contributor of nitrogen and phosphorus to the Bay and Virginia's Shenandoah Valley region drains into the Potomac. The Shenandoah Valley only covers 9 percent of Virginia's land area, but in 1990 this region produced 64 percent of Virginia's broilers, 98 percent of Virginia's turkeys, and contained 30 percent of Virginia's dairy cattle. These animal production enterprises, especially the poultry industry, are dependent on large quantities of grain which is mostly imported into the Shenandoah region from the midwest or from eastern Virginia. This results in a net importation of nutrients into this watershed.

The most common non-point source pollutants of Virginia's surface waterways are nitrogen and phosphorus. Cropland fertilizers and animal waste both contain high levels of these elements. Research conducted by the EPA indicates that land used for the production of corn, wheat, soybeans, and other crops is the primary source of non-point source nitrogen and phosphorus (Table 3.2). Cultivated crops require supplemental nutrients which are provided in the form of chemical fertilizer or animal waste. Rain water run-off carries these nutrients into surface waters.

The four major sources of animal waste in the state are poultry, dairy, swine, and beef production. Poultry, dairy, and swine production are usually conducted under more intensive confinement conditions. The waste from these animals must be removed from their housing areas and spread on surrounding land. Most of the land surrounding these intensive livestock production facilities is cropland which has had animal waste applied for several consecutive years. Animal waste is a very effective fertilizer and nitrogen and phosphorus are key nutrients for crop production. However, planted row crops only utilize these nutrients during specific times of the year. Waste from intensive animal production is being produced year-round. In 1990, the Virginia poultry industry alone produced over 213,000 tons of poultry litter (used bedding and manure mixed) which is equivalent to over 8,500 tractor-trailer loads. Beef production in Virginia, unlike poultry, dairy, and swine production, is primarily low density and pasture-based. Pastures provide the soil a permanent cover of vegetation with a dense root system. Pastures contribute a comparatively small proportion of non-point source nitrogen and phosphorus to the Chesapeake Bay (Table 3.2).

Table 3.2
Nutrient Loads Reaching the Chesapeake Bay:
Non-Point Source Portion by Land Use Types

Land Use Type	Total Nitrogen From NPS	Total Phosphorus From NPS
Cropland	45 - 70%	60 - 85%
Pasture	4 - 13%	3 - 8%
Forest	9 - 30%	4 - 8%
Urban/Suburban	2 - 12%	4 - 12%
Subtotal for Agriculture (Cropland + Pasture)	49 - 83%	63 - 93%

Source: Chesapeake Bay Program Technical Studies: A Synthesis, U.S. EPA, Washington, D.C., September 1982 p.18

This is not to imply Virginia's beef industry has no part in non-point source pollution. Beef cattle producers and environmentalists alike are concerned that cattle having unlimited access to streams may be a non-point source of nitrogen and phosphorus. Some have gone so far as to suggest that cattle utilizing water from streams be somehow restricted, though there are no data to support such action. There are literally thousands of miles of streambanks on Virginia cattle farms. The cost of building and maintaining restricting structures as well as providing alternative water sources would present a severe economic hardship for most cattle producers. Virginia's farms, many of which were established over 200 years ago, are designed to provide livestock maximum access to water sources. To date, no research has been done to quantify the levels of nitrogen and phosphorus cattle with free access to streams contribute to Virginia's surface waterways.

It is important to remember that research conducted by the EPA revealed pastures contribute a relatively small proportion of the non-point source pollution to the Chesapeake Bay (Table 3.2). Cattle in Virginia are pastured at rates of one animal per one to four acres, so most of their waste is readily absorbed by the dense growth of grass on the pasture. Cattle fit naturally into a sustainable grassland ecosystem that features built-in nutrient recycling.

Most pastures are more productive when they are systematically fertilized (once every two to five years). Virginia's beef cattle pastures are able to safely utilize municipal sewage sludge as well as cattle, poultry, and swine waste as fertilizer and in so doing help to protect the environment.

In summary, the production of beef cattle helps to utilize Virginia's greatest renewable resources: its pasture lands. Beef cattle in Virginia serve to diversify and beautify the environment while effectively utilizing resources that would otherwise be of little benefit to humans. Virginia's cattlemen are committed to protecting the environment for themselves and their fellow citizens.

CHAPTER 4

CATTLE AND VIRGINIA'S FIVE PRODUCTION REGIONS

Virginia has a rich heritage of family farms which produce a diverse blend of agricultural commodities. Cattle, hogs, sheep, horses, poultry, tobacco, corn, wheat, soybeans, and apples are all products for which Virginia is famous. Today, the production of beef cattle is more important to Virginia than ever before. Data from state and national statistical services reveal that in the past 40 years Virginia farmers have, to some extent, shifted land and labor resources away from the production of intensive commodities (such as crop production and dairying) and toward more extensive forage-based beef production.

Figure 4.1 clearly shows Virginia's population has grown to an all time high with fewer farms and less of its land devoted to farming than ever before. At the same time, the production of beef cattle has increased steadily since 1950 (Fig. 4.2). The past 60 years have brought incredible changes to Virginia agriculture due to a revolution in farm mechanization and production technology. As production efficiency improved, the market for agricultural staples such as food grains and milk became very competitive. Many of Virginia's smaller farms could not keep pace with larger farms which had the capital resources to invest in new technologies that reduced labor requirements while increasing production.

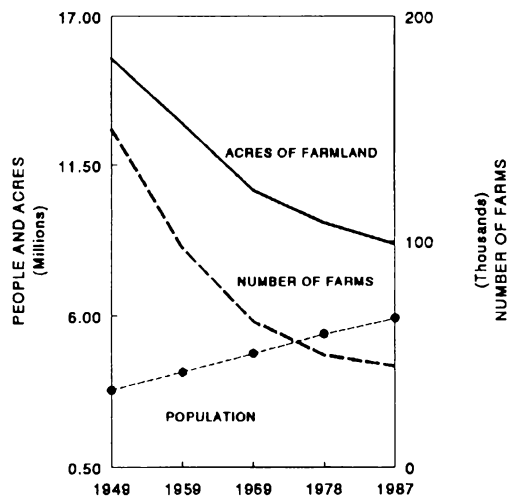


Figure 4.1
Changes in Land, Farms and People in Virginia

The development of Virginia's industrial infrastructure during and after World War II provided opportunities in non-farm employment for struggling Virginia farmers. Some farmers expanded their production base to maximize labor efficiency while others hung-on to their small farms and sought employment off-farm to supplement their income. In both of these situations, many Virginia farmers chose to produce beef cattle since beef cattle production generally requires less labor and equipment than milk or grain production.

In the eye of this storm of change have been Virginia's rich natural resources which have been nurtured and utilized by farmers for over 300 years. The unique resource base of each of the five production regions will be described in the following pages. However, some general comments can be made about Virginia agriculture that apply to all areas of the state.

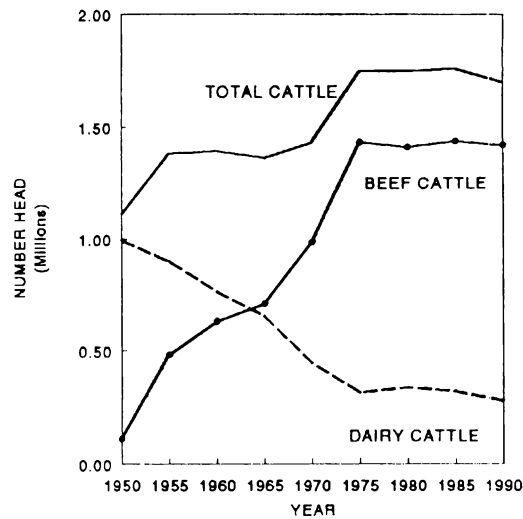


Figure 4.2
Changes in Virginia's Cattle Herd

Virginia is supplied with generous precipitation (42 inches) year-round and the climate is temperate. While Virginia possesses some very productive soils, most are of marginal quality for row crop production but are very suitable for growing forages. Much of the state's topography is rolling, hilly, or mountainous which contributes to its natural beauty but makes much land unsuited for cultivated crops. Many of Virginia's farms have low soil productivity as a result of soil erosion brought about by years of row crop farming. These farms, however, yield a lush growth of grasses which can support grazing livestock.

One of Virginia's most vibrant and productive resources is its 3.5 million acres of pasture and rangeland. An abundant growth of grasses and legumes covers Virginia's nonarable hillsides and fallow cropland. Some 45 percent of Virginia's harvested cropland is devoted to the production of hay (Table 4.1) which is consumed primarily by cattle. The remaining portion of Virginia's cropland yields large tonages of fibrous crop residues each year. Beef cattle and other ruminant livestock are the only means by which these resources can be utilized to produce human food.

Farmers today are devoting less of their land and labor resources to the production of annually planted row crops. Over 800,000 acres that, in 1950, produced wheat, corn, and other crops have been taken out of row crop production (Table 4.1). The increase in acres devoted to soybean production (373,000 acres) largely stems from the expansion of the export market for soybeans and from a relatively new farming technique called "double cropping." This practice involves growing wheat or barley from November to June and soybeans from July to October on the same acreage. So, the increase in soybean acreage only partially compensates for the acres taken out of production since much soybean acreage is also counted as being harvested for small grain. Most of the balance of these acres now produce pasture or hay.

Virginia's close proximity to large centers of population has facilitated the development of strong ornamental horticulture, vegetable, and fruit production industries in the state. However, these enterprises are very land and labor intensive, require exacting production technology, and are not a viable option for most Virginia farmers.

Table 4.1
Virginia Acreage of Harvested Crops (1000 Acres)
1950-1990 USDA Agricultural Statistics

Item	1950	1960	1970	1980	1990	1990 as a % of	
						1950	1970
Corn							
grain	899	627	458	595	365	41	80
silage	43	95	178	220	160	372	90
Total Corn	968	739	646	821	525	54	81
Wheat	376	256	165	286	260	69	158
Oats	139	90	51	20	9	6	18
Soybeans	152	320	339	610	525	345	155
Tobacco	119	89	68	66	53	45	78
Peanuts	151	104	103	103	97	64	94
All Row Crops	1,905	1,598	1,421	1,906	1,469	77	103
All Hay Crops	1,331	1,204	1,054	967	1,200	90	114
All Acres Harvested	3,235	2,802	2,475	2,873	2,669	82	108

Certain livestock enterprises are less important in Virginia now than formerly (Table 4.2). Dairy cattle numbers declined by 356,000 head from 1950 to 1990. Over the same time period, milk production per cow increased from 4,490 lbs/year in 1950 to 13,923 lbs/year in 1989. Dairying is a labor intensive and very competitive business requiring feed resources of higher nutrient content than most Virginia pastures can offer. Virginia's sheep flock has steadily grown smaller largely due to poor consumer demand for lamb, a sluggish wool market, losses to predators, and the fact that sheep require more intensive management than cattle (Fig. 4.3). The sharp decline in hog numbers is largely due to the disappearance of the small hog production enterprise (Fig. 4.3). A highlight of change in the swine industry has been the trend toward total confinement hog rearing. Total confinement facilities are very expensive and most Virginia hog producers that have left the swine industry were faced with inadequate capital or labor to expand production enough to justify confinement facilities.

Both swine and poultry have moved to more intensive, large scale, total confinement modes of production for two primary reasons. First, these animals are more easily managed and more efficiently utilize feed when raised in a controlled environment. Second, slaughter/processing plants receive animals in 'load lots' the size of a tractor-trailer unit. These plants pay a premium for "load lots" composed of animals of uniform size, breeding, and that have undergone a minimum of stress. Mixing several small groups of animals from different farms to fill a load is

detrimental to uniformity and putting together animals from different locations produces greater stress.

Poultry production is almost totally vertically integrated and swine production is moving in that direction. Total integration occurs when an agribusiness company controls the entire production process of a particular commodity from start to finish. The company contracts with farmers to raise the animals while it provides the animals, feed and other production inputs and makes all the management decisions. The farm owner provides land, facilities and labor.

Table 4.2
Virginia Livestock Populations (1,000 Head)
1950-1990 USDA Agricultural Statistics

Item	1950	1960	1970	1980	1990	1990 as a % of	
						1950	1970
All Cattle	1,108	1,394	1,432	1,750	1,700	153	119
Milk Cows	497	382	223	170	141	28	63
Beef Cows	169	371	487	710	699	414	144
Sheep and Lambs	293	326	189	160	122	42	65
Hogs and Pigs	752	689	743	750	430	57	58
Broilers Prod	40,033	53,971	69,099	126,358	195,900	489	284
Turkeys Prod	2,294	4,654	4,535	10,079	17,000	741	375

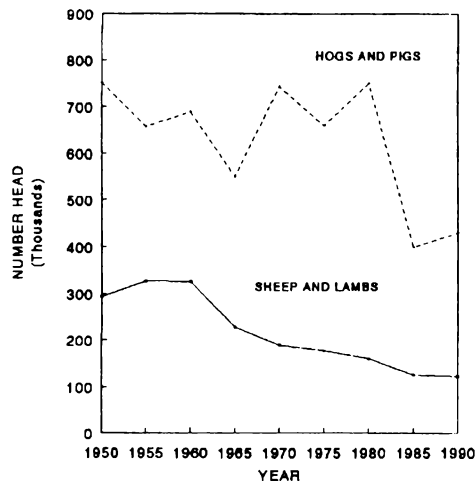


Figure 4.3
Changes in Sheep and Hog Numbers in Virginia 1950-1990

Production of poultry in Virginia has increased dramatically in the past 15 years (Fig. 4.4). Poultry companies such as Tyson, Perdue, Wampler-Longacre and Rocco have immense capital resources which empowers them to bring together feed grain from the midwest, human expertise, and

processing facilities under one corporate umbrella and thus create a totally integrated production system. The marketing power of these corporations, along with the consumer perception that poultry meat is less expensive and is a healthful food, will continue to aid in the expansion of the poultry industry in Virginia.

Virginia's numbers of beef cattle have increased in the past 40 years making beef cattle numbers the antithesis of the decline in dairy cattle numbers and the drop in acres once devoted to producing annual row crops. In 1950, just 7 percent of Virginia's corn acreage was devoted to silage. In 1990, 30 percent of Virginia's harvested corn acreage was in the form of silage (silage consists of fermented whole corn plants and is suitable only for cattle feed). In the past 40 years, the total row crop acreage harvested annually has declined 23 percent while the total hay acreage harvested has declined only 10 percent (Table 4.1). These changes serve to indicate that more of Virginia's land resources are devoted to beef cattle than ever before.

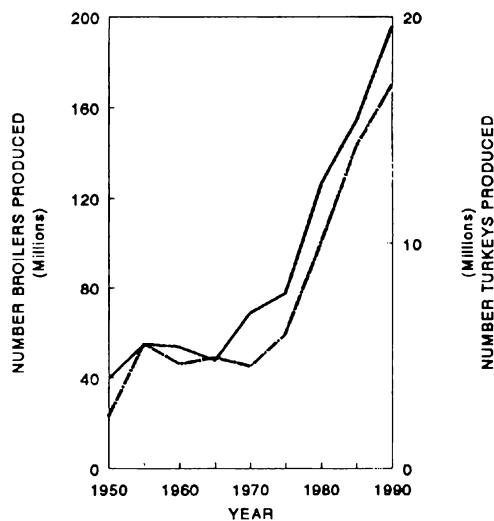


Figure 4.4
Annual Production of Broilers and Turkeys in Virginia 1950- 1990

Many Virginia farmers produce beef cattle because cattle utilize a resource they already have in abundance: grass. Beef cattle are very hardy animals which require less attention than more labor intensive livestock such as dairy cattle, hogs, or sheep. Beef cattle harvest a large portion of their own feed through grazing and require relatively little special attention except during winter months when supplemental feeding is required or when cows are calving.

In summary, total agricultural production in Virginia has declined in the past 40 years. Soybean production has increased due to an expanded international market and the farming technique called "double cropping." Poultry production has expanded due to the influence of large agribusiness companies that import grain from the midwest and contract with Virginia farmers to raise the company's birds. Beef cattle production has grown in Virginia due to the tremendous forage production potential of pastures, other forages, and residue feeds and because beef cattle are less labor and capital intensive than many other agricultural enterprises. Cattle are the major enterprise on many farms but are secondary to other enterprises or are a part-time enterprise on a growing number of farms.

The five Virginia production regions (Figure 4.0) are so designated because of the general similarity of topography, soils, climate and human populations in each.

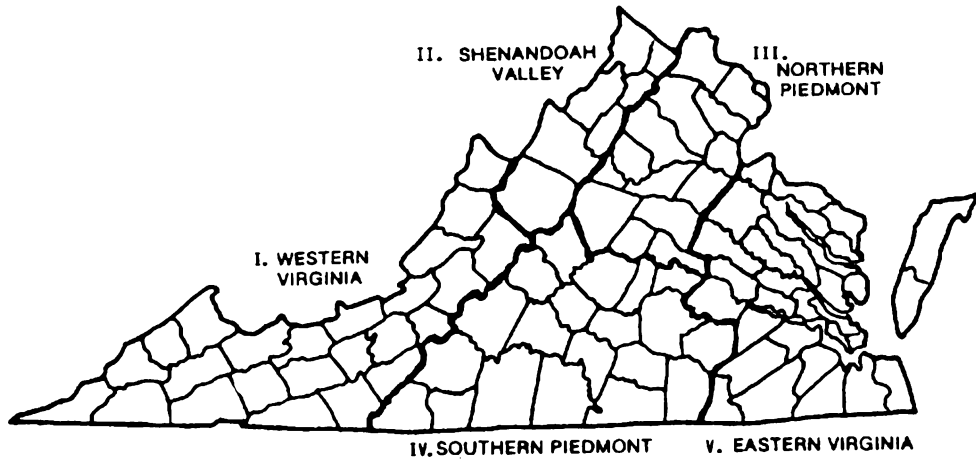


Figure 4.0
Five Agricultural Production Regions of Virginia

REGION I - WESTERN

The Western region consists of 24 counties that cover 27 percent of the state's land area. Sixty-five percent of the Western region is forest land. Population of the Western region stood at 838,900 in 1990 giving it the lowest population density of the five regions. Much of far Southwestern Virginia has lost population while the Roanoke Valley area shows a modest increase (Table 4.3).

Table 4.3
Western Characteristics 1990

Item	Acres/Numbers	% of State
Human Population	838,869	14
Land Area	6,800,800	27
Corn (grain)	18,800	5
Corn (silage)	40,600	25
Total Corn	59,400	11
Tobacco	10,745	20
Sheep	56,300	34
Hogs	16,000	3
Total Cattle	551,500	32
Dairy Cattle	67,700	24
Beef Cattle	483,800	34
Broilers	0	0
Turkeys	231,518	2

Western Virginia can be described as alternating mountains and valleys with a wide variety of soil types. Crops grown in the region are primarily for livestock feed. Of the total farm income for harvested row crops, 75 percent is from the sale of burley tobacco. The topography of the Western region is not conducive to crop production on a scale which is competitive in the grain market.

The region has long been an important producer of livestock but the livestock industry has changed over the past 20 years (Table 4.4). Hog production in the Western region has declined 75 percent since 1970 (Fig. 4.5). Dairy cattle numbers have dropped by 47 percent, or 60,300 head, since 1970 (Table 4.4). This is largely because few of the region's former dairy farms had enough land which could consistently support high yields of corn and alfalfa (Fig 4.6). The poultry industry has had little influence on Western Virginia agriculture. It appears none of the poultry companies have plans to expand contract production of birds into the Western region in the near future. Sheep numbers have declined 48 percent in the past 20 years due to depressed prices for lamb and wool and persistent predator problems from domesticated dogs and coyotes (Fig. 4.5). This drop is significant in light of the fact the Western region currently has 45 percent of the state's total sheep.

Table 4.4
Western Changes in Agriculture

Item	1970	1990	% Change
Corn (grain) (acres harvested)	34,200	18,800	-45
Corn (silage) (acres harvested)	52,800	40,600	-23
Total Corn (acres harvested)	87,000	59,400	-32
Sheep	108,700	56,300	-48
Hogs	63,900	16,000	-75
Total Cattle	438,100	551,500	+26
Dairy Cattle	128,000	67,700	-47
Beef Cattle	310,100	483,800	+56

The agriculture economy of Western Virginia is truly a pastoral economy considering that livestock are the primary users of farmland in the region. Total numbers of beef cattle have increased by over 173,000 head, up 56 percent, since 1970 (Fig.4.7). Currently, this region has 32 percent of all cattle and 34 percent of all beef cattle. Grazing beef cattle appear to be filling the void left by disappearing dairy cattle, hogs, and sheep. The Western region produces large numbers of beef cattle in both cow herds and backgrounding operations because of its vast resources of pasture and hay land. Feeder cattle production is predominant and markets are strong. Beef cattle will continue to grow in prominence as a resource utilization and profit-producing enterprise in Western Virginia.

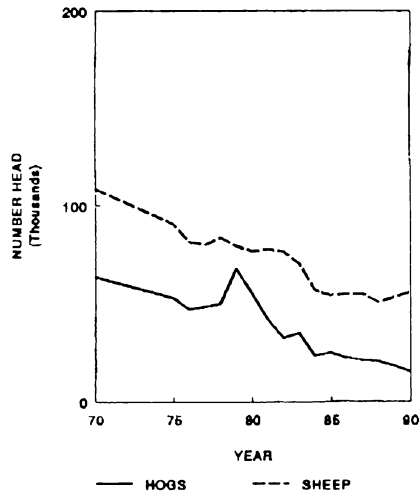


Figure 4.5
Changes in Sheep and Hog Numbers, Western Region 1970-1990

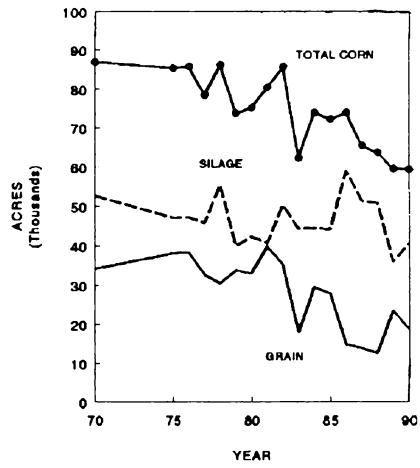


Figure 4.6
Changes in Harvested Corn Acreage, Western Region 1970-1990

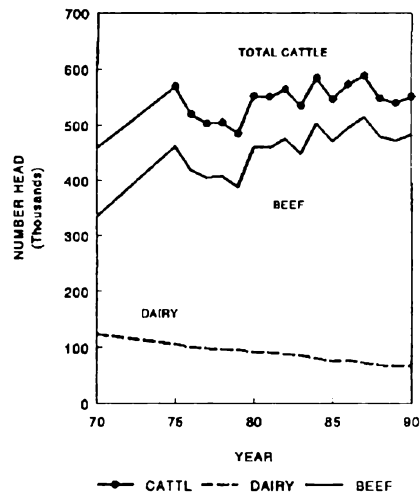


Figure 4.7
Changes in Beef and Dairy Cattle, Western Region 1970-1990

Seven counties and 2.25 million acres comprise the Shenandoah Valley region which makes-up 9 percent of Virginia's land area. The region had a human population of 345,000 in 1990 which gives it a population density that ranks third among the five regions (Table 4.5).

Table 4.5
Shenandoah Valley Characteristics 1990

Item	Acres/Numbers	% of State
Human Population	345,100	6
Land Area	2,256,000	9
Corn (grain)	35,447	10
Corn (silage)	43,945	28
Total Corn	79,392	15
Sheep	74,400	45
Hogs	30,265	7
Total Cattle	330,000	19
Dairy Cattle	82,343	29
Beef Cattle	247,657	18
Broilers	89,550,085	64
Turkeys	12,709,729	98

The Shenandoah Valley region is among the most famous agricultural production areas in the nation. This area has been a highly productive region since colonial times. Some very productive soils are found, particularly through the central part of the valley in Rockingham and Augusta counties. There are also large areas of nonarable hillsides with more shallow soils which are suitable only for pasture. The Shenandoah Valley in 1990 had 29.3 percent of the milk cows, 45 percent of the sheep, 18 percent of the beef cattle, produced over 64 percent of the broilers, and about 98 percent of the turkeys (Table 4.5). This region is also known for apple and peach production and has a growing grape industry. The Shenandoah Valley region is a highly concentrated area of agricultural production.

Row crops are used primarily as livestock feed on the farms where the crops are raised. Total corn acreage has increased modestly over the past 20 years, unlike the other four regions of the state. Corn acreage harvested as silage increased by 12 percent from 1970 (Table 4.6 and Fig. 4.8).

The Shenandoah Valley region is the only region in the state where dairy cattle numbers have increased in the past 20 years. In 1990, dairy cattle numbers were up 26 percent from 1970. Dairying is not expected to expand further in the Shenandoah Valley because the market for milk and milk products is very competitive. Swine production has declined 58 percent in the Shenandoah Valley region since 1970. Many swine producers have gone out of the hog business because they lacked the capital to build total confinement facilities and to withstand the variability of returns to the swine enterprise. Sheep production is an important enterprise in the Shenandoah Valley. (Table 4.6, Fig. 4.9).

Table 4.6
Shenandoah Valley Changes in Agriculture

Item	1970	1990	% Change
Corn (grain) (acres harvested)	32,700	35,447	+8
Corn (silage) (acres harvested)	37,900	43,945	+16
Total Corn (acres harvested)	70,600	79,392	+12
Sheep	63,800	74,400	+17
Hogs	72,500	30,265	-58
Total Cattle	260,500	330,000	+27
Dairy Cattle	65,400	82,343	+26
Beef Cattle	195,100	247,657	+27

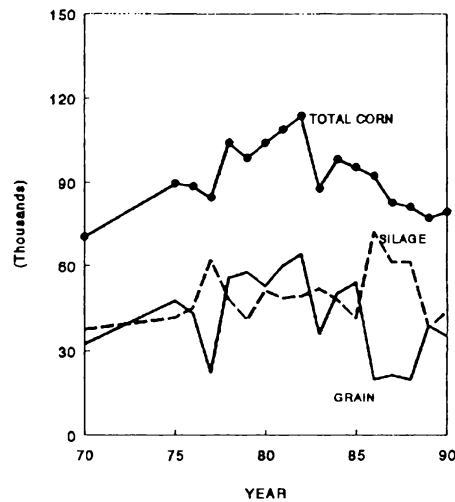


Figure 4.8
Changes in Harvested Corn Acreage, Shenandoah Region 1970-1990

Poultry production has become a major source of income for Shenandoah Valley farmers over the past 15 years. Large poultry companies have built feed mills in the Harrisonburg area and import feed grains into the region from midwestern states and Eastern Virginia. The poultry companies offer farmers the opportunity to raise birds on a contract basis. Under this contract, the company provides the birds, feed, and management expertise. The contracting farmer must provide labor, facilities that meet the company's specifications, and dispose of the animal waste. All four of the poultry companies currently contracting in the Shenandoah Valley region have plans to expand production through the 1990's. However, the ability for the region to accommodate this expansion could be modified considering the problem farmers are facing disposing of the poultry waste. Each 1,000 birds (broilers or turkeys) that are produced yield approximately 1 ton of litter that has a high content of nitrogen and phosphorus. Because poultry production is so highly concentrated

around the Harrisonburg area, soil accumulation of excess nitrogen and phosphorus is becoming an environmental concern. According to 1990 production figures, the Shenandoah Valley produced well over 100,000 tons of poultry litter (a mixture of manure, bedding and spilled feed). This is equivalent to over 4600 tractor-trailer loads. Beef cattle producers can help alleviate this problem because poultry litter has been proven to be a safe and effective protein supplement feed for cattle.

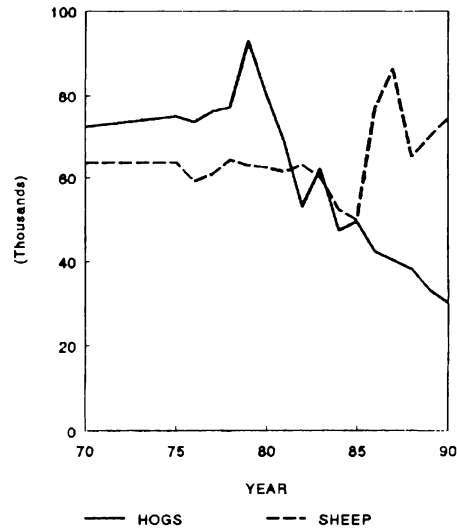


Figure 4.9
Changes in Sheep and Hog Numbers, Shenandoah Region 1970-1990

Beef cattle numbers have increased by 27 percent in the Shenandoah Valley region over the past 20 years (Fig 4.10). Corn stalks, straw, poultry litter and other by-products of agriculture production are a low-cost feed resource being utilized by cattle. Apple pomace, a fibrous residue of the apple juice extraction process, is commonly utilized by Shenandoah beef cattle as a winter feed. The Shenandoah Valley is also home to thousands of acres unsuitable for crop production. These hillside pastures that beautify the Valley are covered with grass that would go to waste were it not for grazing livestock, primarily beef cattle.

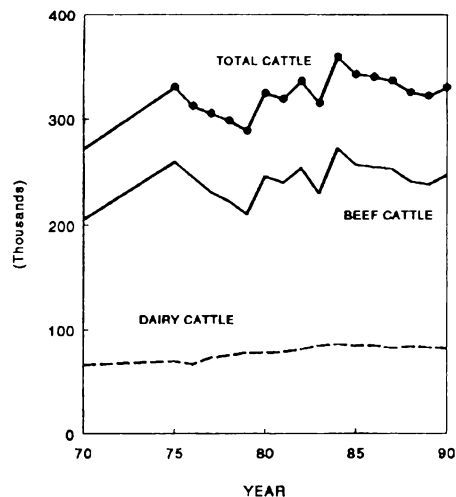


Figure 4.10
Changes in Beef and Dairy Cattle, Shenandoah Region 1970-1990

Though Virginia only produces 30-50,000 finished cattle each year, a large share of them are produced in this region. Both cow herd and backgrounding operations are very important in the Valley counties.

The Shenandoah Valley region will continue to be an important farming region for Virginia. While poultry companies may wish to expand, the environmental costs of such expansion will no doubt increase. Dairy production will continue to be land and labor intensive and very competitive. Dairy farmers that are forced out of the business of producing milk are most likely to turn to beef cattle in order to utilize their land and other resources. Beef cattle will continue to be a vital resource-utilization enterprise for Shenandoah Valley farmers and some expansion should continue for the foreseeable future. Feeder cattle production will be dominant.

REGION III - NORTHERN PIEDMONT

The Northern Piedmont region consists of 15 counties and encompasses 15 percent of Virginia's land area. With a population of 1.89 million people in 1990, the region has the highest population density of the five regions (Table 4.7).

Table 4.7
Northern Piedmont Characteristics 1990

Item	Acres/Numbers	% of State
Human Population	1,886,194	30
Land Area	3,750,000	15
Corn (grain)	57,652	16
Corn (silage)	29,455	18
Total Corn	87,107	17
Sheep	17,100	10
Hogs	29,977	7
Total Cattle	323,000	19
Dairy Cattle	44,590	16
Beef Cattle	278,410	20
Broilers	780,400	1
Turkeys	0	0

The region has been one of the most rapidly developing areas in the nation through the 1980's. The Washington D.C., Charlottesville, and Fredericksburg metropolitan areas in combination with the appeal of the rolling foothills of the Blue Ridge have stimulated a 62 percent increase in population since 1970. Except for beef cattle, sheep, and horses, production of most other agricultural commodities has declined in this region since 1970 (Table 4.8 and Fig. 4.11). The Northern Piedmont exemplifies how expansion in Virginia's beef cattle industry and population growth are compatible.

Table 4.8
Northern Piedmont Changes in Agriculture

Item	1970	1990	% Change
Corn (grain) (acres harvested)	63,300	57,652	-9
Corn (silage) (acres harvested)	52,000	29,455	-43
Total Corn (acres harvested)	115,300	87,108	-25
Sheep	14,750	17,100	+16
Hogs	61,000	29,977	-51
Total Cattle	318,200	323,000	+2
Dairy Cattle	74,900	44,591	-40
Beef Cattle	243,300	278,410	+14

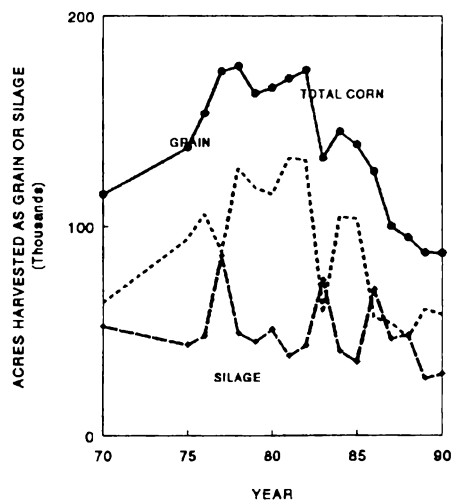


Figure 4.11
Changes in Harvested Corn Acreage, Northern Piedmont Region 1970-1990

The Northern Piedmont is characterized by rolling hills, 56 percent of which are covered with forest. Some soils of the region are only marginal for crop production although they respond well to fertilization. While the region continues to maintain strong horse and beef industries, dairy cattle numbers and acres of corn harvested have dropped by 40 percent and 25 percent, respectively, since 1970 (Table 4.8).

Hog numbers have dropped by 31,023 head, or 51 percent, since 1970 (Fig. 4.12). A few poultry production facilities have been established in the Northern Piedmont due to expansion of totally integrated poultry companies. Broiler producers have all feed grain brought to them, mainly from the centralized mills operated by the poultry companies in the Shenandoah Valley.

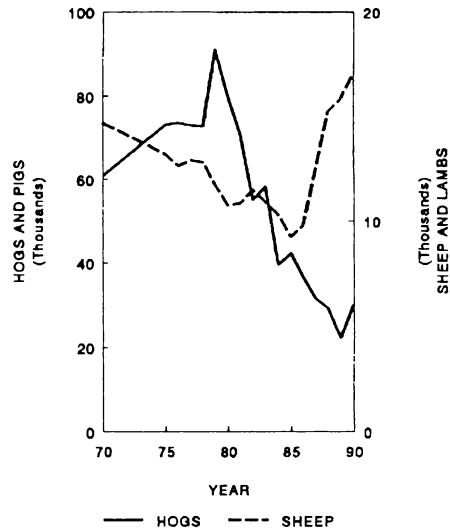


Figure 4.12
Changes in Sheep and Hog Numbers, Northern Piedmont Region 1970-1990

An agricultural resource that is readily available on every farm in the Northern Piedmont is forage in the form of pasture and hay. Farmers have sought to maximize the utilization of this inexpensive and renewable resource by expanding their production of beef cattle and sheep. The Northern Piedmont has added over 35,000 beef cattle to its inventory since 1970 (Fig. 4.13). Beef cattle production is more important than ever to the Northern Piedmont which has 20 percent of the state's beef cattle population. While other agricultural enterprises have declined, cattle numbers have increased 14 percent from 20 years ago. Beef cattle will continue to be a primary enterprise for the Northern Piedmont to utilize and realize a profit from its land resources. Cattle finishing will further decline but feeder cattle production will remain strong and continue to grow.

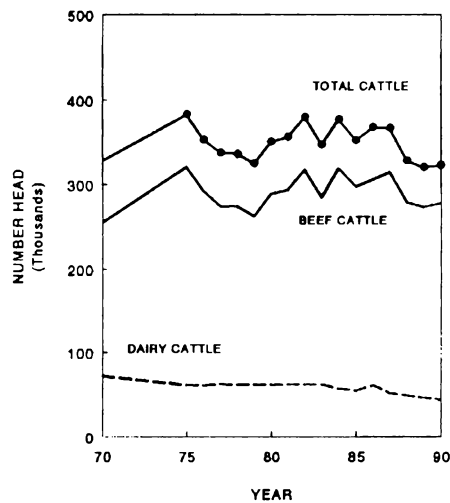


Figure 4.13
Changes in Beef and Dairy Cattle, Northern Piedmont Region 1970-1990

The Northern Piedmont region will continue to urbanize in the years ahead. Environmental concerns will be prominent in the region so open space and clean water are valuable assets cattle can help preserve. Pastoral cattle production should prosper and continue modest increases.

There are 22 counties and 6.59 million acres in the Southern Piedmont which occupies 27 percent of Virginia's land surface. The 1990 census indicates the region has 885,600 people. This is 14.3 percent of the state's population and the second lowest population density of the five production regions (Table 4.9).

Table 4.9
Southern Piedmont Characteristics 1990

Item	Acres/Numbers	% of State
Human Population	885,630	14
Land Area	6,590,000	27
Corn (grain)	43,400	12
Corn (silage)	38,240	24
Total Corn	81,820	16
Tobacco	41,518	78
Sheep	13,043	8
Hogs	116,796	27
Total Cattle	419,000	25
Dairy Cattle	75,773	27
Beef Cattle	343,227	24
Broilers	26,204,775	18
Turkeys	0	0

The Southern Piedmont is characterized by rolling hills with soils that are marginal in their capability to produce row crops. However the region is well adapted for the production of pasture and hay. Like the rest of the state, Southern Piedmont farmers have moved away from crop production and toward pasture, hay and pastoral enterprises in the past 20 years.

The Southern Piedmont markets approximately 75 percent of Virginia's tobacco and tobacco accounts for about 76 percent of the Southern Piedmont's total income from row crops. Tobacco is a land and labor intensive enterprise. Two acres of tobacco demands the equivalent of one full time worker during the growing season. Considerable migrant labor is utilized in tobacco production.

During the last 20 years, beef cattle, sheep, and broiler chicken production show marked increases while hog numbers have remained about constant and dairy production has declined (Table 4.10). Other than timber, the most abundant resource that blankets the Southern Piedmont are pastures and hay fields. Farmers of the region are depending more and more on grazing cattle to market these forage resources.

Some 27 percent of Virginia beef cattle are found in the Southern Piedmont where commercial cow herds predominate and backgrounding is increasing. Thus, feeder cattle production is a

growing enterprise. There were 62 percent more beef cattle in the Southern Piedmont in 1990 than in 1970 (Fig 4.14). With the increase in beef cattle numbers, the declines in dairy cattle, and the decline in acreage devoted to corn grain production, it is clear that farmers of the Southern Piedmont are choosing to produce forage and market that forage through the sale of beef cattle (Table 4.10 and Fig 4.15). It would appear that more expansion in beef cattle production should be expected in this large, rural area where much land is under-utilized.

Table 4.10
Southern Piedmont Changes in Agriculture

Item	1970	1990	% Change
Corn (grain) (acres harvested)	85,100	43,400	-50
Corn (silage) (acres harvested)	57,200	38,420	-33
Total Corn (acres harvested)	142,300	81,820	-43
Sheep	7,100	13,043	+84
Hogs	114,400	116,796	+2
Total Cattle	314,400	419,000	+33
Dairy Cattle	101,900	75,773	-26
Beef Cattle	212,500	343,227	+62

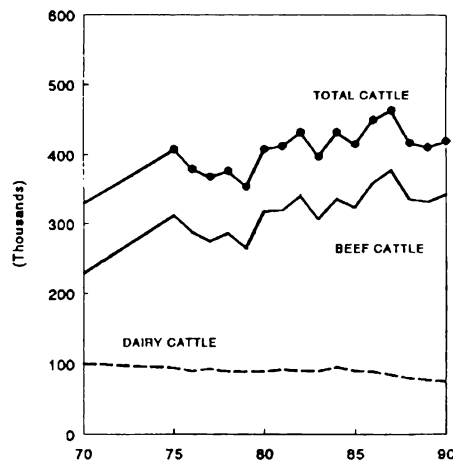


Figure 4.14
Changes in Beef and Dairy Cattle, Southern Piedmont Region 1970-1990

Poultry numbers have increased thanks to one totally integrated company that imports feed grain into the region. This company sponsors all the broilers raised in the Southern Piedmont and they are all concentrated in the counties of Amelia, Buckingham, Chesterfield, Cumberland, Nottoway, and Prince Edward. The region's broiler output constitutes about 18 percent of the total state production.

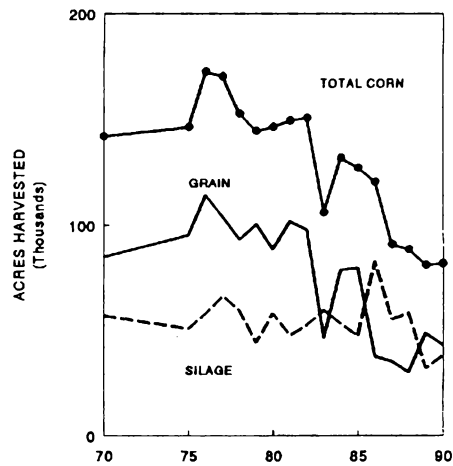


Figure 4.15
Changes in Harvested Corn Acreage, Southern Piedmont Region 1970-1990

The number of hogs in the Southern Piedmont appears, on the surface, not to have changed since 1970. There were 114,400 hogs and pigs in the Southern Piedmont in 1970; this number dropped to 65,178 in 1986; and rebounded to 116,776 in 1990 (Fig. 4.16). During this 20 year time span, Southern Piedmont hog production has changed from many small swine herds to fewer but larger herds that are raised in total confinement facilities. The move toward total confinement production and the premiums paid for uniform "load lots" serve as underlying reasons why many farms have stopped producing hogs. Farmers are left to utilize the resources they already have and the most significant of these resources is their land.

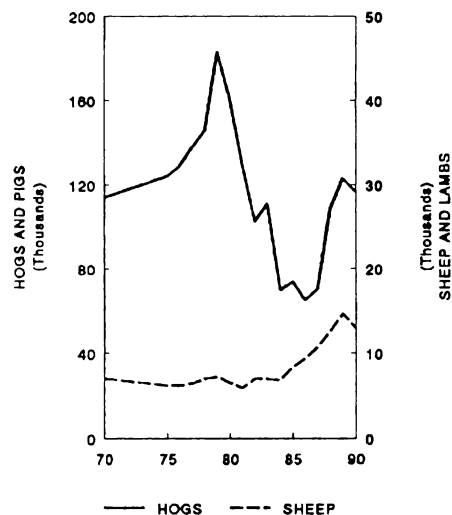


Figure 4.16
Changes in Sheep and Hog Numbers, Southern Piedmont Region 1970-1990

Beef cattle could substantially increase in their importance to Southern Piedmont farmers as a source of income and a means to utilize abundant forage resources which are currently vastly underutilized. The production of feeder cattle will be dominant.

REGION V - EASTERN

There are 26 counties and 15 independent cities in the Eastern region which encompasses 22 percent of Virginia's total land area. The Eastern region had 36 percent of Virginia's population in 1990, exceeding 2.24 million, and is the most populous of the five regions. The Eastern region has experienced tremendous population growth in the past 20 years. Since 1970, the region's population has grown by almost 420,000, an increase of 23 percent. The Hampton Roads deep sea harbor and Norfolk areas have been the nucleus for much of this growth as well as the commerce along the I-95 corridor which passes through Petersburg, Richmond, and Fredricksburg. The Eastern region's agricultural base has shrunk as people have migrated into the area (Table 4.11).

Table 4.11
Eastern Characteristics 1990

Item	Acres/Numbers	% of State
Human Population	2,249,734	36
Land Area	5,500,000	22
Corn (grain)	209,700	57
Corn (silage)	7,580	5
Total Corn	217,280	41
Soybeans	423,500	81
Peanuts	93,480	96
Small Grain	340,000	64
Sheep	273	3
Hogs	244,394	56
Total Cattle	76,500	5
Dairy Cattle	10,293	4
Beef Cattle	66,207	5
Broilers	24,249,734	17
Turkeys	0	0

Since Eastern Virginia is largely coastal plain, it is the state's foremost region for the production of grains, soybeans, and peanuts. Eighty percent of Virginia's soybean acreage and 96 percent of Virginia's peanut acreage are in this region. Approximately 60 percent of Virginia's corn grain acreage and 64 percent of its wheat acreage are harvested in this part of Virginia (Table 4.11).

Eastern Virginia's terrain is gently rolling to flat and it has soils which are highly productive given proper fertilization and moisture. These factors combine to make the area highly conducive to the large scale production of feed grains using the most advanced and highest capacity field crop equipment.

Peanut production is unlikely to expand in the future due to the market dependence on government production control and price supports. Corn continues to be an important crop for many Eastern Virginia farmers although the export market for corn, in a very competitive domestic

market, has not been as strong as for other grains and the government price support program is not as generous as that for peanuts. Total corn acreage declined 20 percent between 1970 and 1990 (Table 4.12 and Fig. 4.17). This decline has been due to the price competitiveness of midwestern corn and the year to year uncertainty of rainfall. Cotton production is experiencing a rebirth in the southern tier of counties and may become important in those counties.

Table 4.12
Eastern Changes in Agriculture

Item	1970	1990	% Change
Corn (grain) (acres harvested)	251,700	209,700	-20
Corn (silage) (acres harvested)	21,100	7,580	-64
Total Corn (acres harvested)	272,800	217,280	-20
Sheep	5,000	3,907	-22
Hogs	306,200	244,394	-20
Total Cattle	113,500	76,500	-33
Dairy Cattle	32,100	10,293	-68
Beef Cattle	81,400	66,207	-19

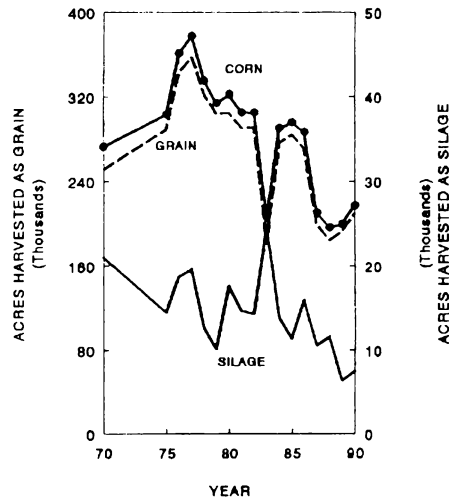


Figure 4.17
Changes in Harvested Corn Acreage, Eastern Region 1970-1990

The Eastern region is also an important producer of hogs and poultry. Over 55 percent of Virginia’s hogs are in the Eastern region which is also home to Smithfield Foods, Inc. This slaughter/ processing company is the largest pork processor on the East Coast, yet it must import over 80 percent of its hogs for slaughter from other states. Despite the presence of such a large user of market hogs, which also produces 500,000 market hogs annually in a vertically integrated

production operation, hog production in the Eastern region has declined 20 percent in the past 20 years (Fig. 4.18). Most farmers that have stopped raising hogs suffered high feed costs and lacked the capital to build total confinement facilities. The Eastern region is home to most of the state's existing large commercial swine farms and it appears that this region will continue to be the major producer of hogs in Virginia. Contract production will no doubt become more important.

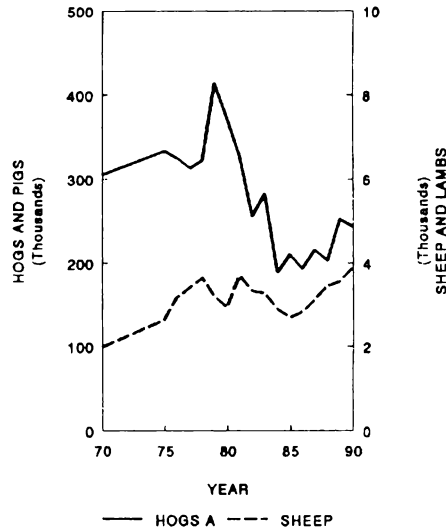


Figure 4.18
Changes in Sheep and Hog Numbers, Eastern Region 1970-1990

Poultry numbers have increased thanks to two totally integrated poultry companies that import a large share of their feed grain into the region. These two companies sponsor all the broilers raised in the Eastern region and they are all concentrated in the counties of Accomack, Hanover, Isle of Wight, Southampton, and Suffolk. The region's broiler output constitutes about 17 percent of the total state production.

Total cattle numbers in the region have declined as the competition for land between farmers and urban dwellers has increased. Like most other regions of the state, dairy cattle numbers in the Eastern region are down considerably from what they were in 1970, having declined 68 percent. Beef cattle numbers have declined but not to the extent other livestock numbers have, down only 19 percent (Fig. 4.19). The Eastern region has only 5 percent of the state beef cattle (Table 4.11), though there is considerable potential for expanded beef cattle production. Cattle finishing, once important in the region, has virtually disappeared due to high production costs and the loss of a local market for slaughter cattle. This area annually produces large tonnages of crop residues which are underutilized. Plant residue from crop fields can be utilized as a cattle feed resource after crops have been harvested. Furthermore, cover crops of small grain blanket the region's corn and peanut fields each winter and these could be grazed November through March. Also, broiler litter is available and offers a relatively cheap cattle feed resource.

An additional opportunity may exist to mesh the region's swine production with expanded cattle numbers. As pressure grows to safely dispose of swine wastes, a surge in forage production could be generated. Grass can utilize high amounts of swine waste as fertilizer. The potential exists to market this forage production and address waste disposal problems with cattle produc-

tion. The Eastern region's beef cattle producers are in a good position to exploit an abundance of inexpensive cattle feeds and produce feeder cattle successfully. Given the feed resources of the region, there is a definite opportunity for greatly increased backgrounding of stocker calves.

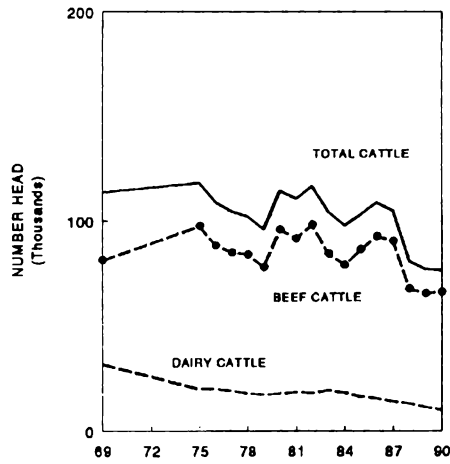


Figure 4.19
Changes in Beef and Dairy Cattle, Eastern Region 1970-1990

CHAPTER 5

MARKETING VIRGINIA'S CATTLE PRODUCTION

Virginia has an excellent climate for production of beef cattle and should see increased growth in years ahead. Cattle production should further contribute to the economy of the state. Marketing of Virginia's cattle production is a key element in causing the industry to maintain profitability and expansion in the future.

Table 5.1 contains information from the January 1, 1993 USDA Cattle Inventory Report and serves to indicate the scope of the beef cattle industry in the state with an estimated beef cattle inventory of 53 head per farm and an average farm inventory value of \$29,945. It is evident that cattle represent a major investment on a large number of farms in the state. It is also quite evident that the average herd size is relatively small and that the average number of cattle marketed annually from each herd is also fairly small. The average beef cow herd is 29 head and the estimated average number of feeder cattle sold per herd is 20.

Table 5.1
Cattle & Cattle Farms in Virginia
(January 1, 1993 USDA Cattle Inventory Report)

Item	Number Head	Number Farms	Number Head/Farm
Total Cattle	1,780,000	30,000	59
Milk Cows	135,000	2,500	54
Beef Cows	735,000	25,000	29
Total ¹ Beef Cattle	1,500,000	28,000	53
Number Feeder ² Cattle Sold	492,450	25,000	20
Approximate value of each beef herd		53 head X \$565 ³ /head \$29,945	

¹Total Cattle - (2 X No. milk cows)

²No. beef cows X .67

³USDA average inventory value

If Virginia's beef industry is to remain viable, a continual effort must be made to improve profitability for Virginia cattle producers. Virginia beef producers face challenges in marketing their cattle both from the standpoint that herd size is relatively small and because Virginia is distant from major cattle markets.

It has been pointed out that Virginia agriculture has a comparative advantage over other states because the commonwealth is within 500 miles of 60 percent of the U.S. population. While this may be an advantage for many Virginia products such as fruits, vegetables, dairy products and

ornamental plants, it is not the case for beef cattle. As has been pointed out, Virginia cattle producers only make finished slaughter cattle of about 40,000 head annually. The balance of the slaughter cattle are cull cows and bulls. The large majority of Virginia's cattle production is marketed as feeder cattle that must be shipped to cattle finishers in the Pennsylvania area, the eastern corn belt and the western corn belt.

It is quite evident that Virginia does not market a large quantity of beef ready for the retail market. Virginia's beef industry is part of a nationwide three phase production system. This production system is outlined in Table 5.2.

Table 5.2
Phases of Beef Production in the US

Phase	Feeds Used	Weight and Age of Product
Cow/calf	grass and hay	8 month-old Stocker calf 500 pounds
Backgrounding	grass and hay	12-18 month-old Feeder cattle 800 pounds
Feedlot	grain and hay or silage	20 month-old Finished cattle 1200 pounds

VIRGINIA'S LOGICAL MARKETS

Since there is not a large scale slaughtering facility for fed cattle in the state of Virginia, most of the 30,000 to 50,000 cattle finished annually are slaughtered in the state of Pennsylvania. There is one large processing plant in the Philadelphia, Pennsylvania area and several other small plants in that state. Slaughter cows which are culled from beef herds on a regular basis are generally sold in small groups with most going through weekly auction markets and slaughtered in relatively small plants from North Carolina to Pennsylvania.

Many feeder cattle go to feedlots in Pennsylvania and Ohio and are slaughtered and processed by small to moderate size plants in the Ohio valley and northeastern states. While these states have been important for cattle feeding and slaughter in the past, the eastern corn belt is not the center of the cattle finishing and slaughter industry that it once was. (Figure 5.1 and 5.2) Approximately a quarter of Virginia feeder cattle currently move North to the Pennsylvania area. A similar percentage of feeder cattle move to Ohio, Indiana, Illinois and Michigan and finished cattle are marketed in this area and some into Canada, but the number of packing plants in this region has declined as has the number of cattle fed. The nation's predominant feeder cattle market today is located in the western cornbelt states of Iowa, Nebraska, Kansas and the High Plains of Eastern Colorado, Texas and Oklahoma. An increasing percentage of Virginia's feeder cattle are trucked into these feeding areas which means that great distances are traveled from Virginia into these major feeding areas. The majority of the nation's cattle feeding industry has moved to this area of the country where feed grains are less expensive and where major cattle

slaughter facilities have been developed. Figure 5.1 graphically illustrates how the cattle feeding industry has shifted over the past 30 years. Figure 5.2 shows how commercial cattle slaughter has also shifted toward the western region particularly in the last 10 to 15 years.

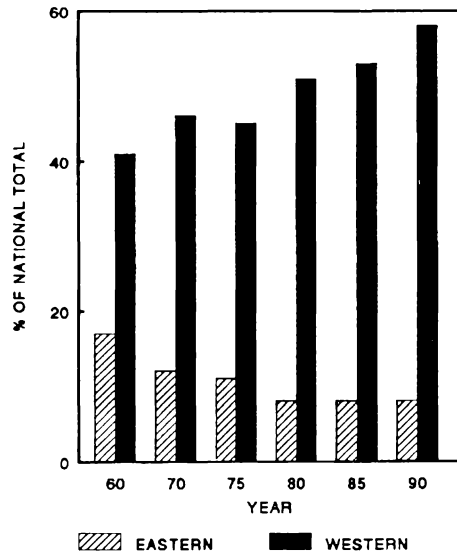


Figure 5.1
Cattle on Feed: January 1, % of National Total

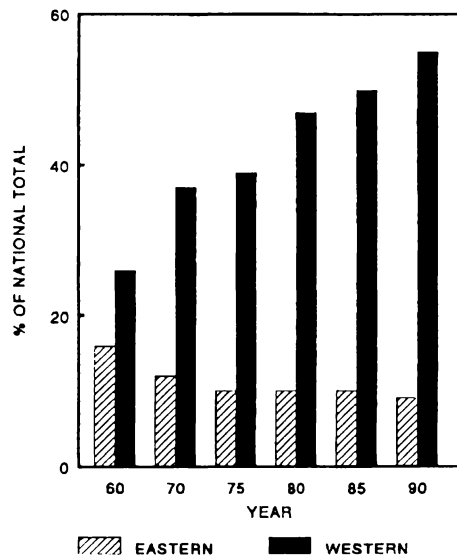


Figure 5.2
Commercial Cattle Slaughter: January 1, % of National Total

Because of distance to market, Virginia cattle producers experience a price discount compared to feeder cattle produced in states which are closer to the major cattle finishing areas. (Table 5.3) Current transportation costs amount to approximately \$.40 per hundred pounds of live weight per 100 miles of transport.

Table 3.3 gives average feeder cattle prices for Virginia and for other states which are closer to the western cornbelt and High Plains feeding areas and indicates a considerable price differential primarily due to distance from market. When put in index terms, Virginians receive a price 4-10 percent lower than prices received by cattlemen for comparable feeder cattle in the states of Kansas, Texas, Missouri and Kentucky.

Table 5.3
Price of Feeder Cattle (700-800 lbs)
Selected States, 1975-1990

State	Year			
	1975	1980	1985	1990
Actual Prices				
Kansas	34.63	71.98	64.96	87.52
Texas	34.04	71.56	64.30	85.69
Missouri	34.60	71.27	63.71	86.67
Kentucky	33.43	68.58	58.43	82.67
Virginia	32.47	63.07	55.57	79.31
Price Index, Virginia = 100				
Kansas	106.7	114.1	116.9	110.4
Texas	104.8	113.5	115.7	108.0
Missouri	106.6	113.0	114.6	109.3
Kentucky	103.0	108.7	105.1	104.2
Virginia	100	100	100	100

NEED FOR MORE COOPERATIVE MARKETING

The quality of feeder cattle produced in Virginia is very comparable and even higher than similar cattle produced in other regions of the country. Due to small herd size and thus small numbers being marketed at any one time by the average Virginia producer, many cattle are sold at a price disadvantage because of the needed service of making tractor-trailer load lots of these feeder cattle. Feedlots at distant locations ship feeder cattle in tractor-trailer truck loads of 48,000 to 50,000 pounds. Thus, virtually every feeder animal leaving Virginia must fit into that transportation configuration. Beef producers ship more than 450,000 feeder cattle out of Virginia each year. In addition to the cattle that are produced in beef cow herds, some 25,000 feeder steers come from dairy herds, primarily Holsteins. Feeder cattle typically weigh 700 to 900 pounds so equate to 55 to 70 head per tractor-trailer load. In the case of lighter calves, the number of head per load is greater.

Since the average Virginia cattle producer sells less than 25 head of feeder cattle per year, these small lots of cattle from individual farms must be combined into load lots. Dealers and order buyers provide an important service to the Virginia cattle industry by purchasing small groups of cattle and putting them together with other producers' cattle before they are shipped in load lots to distant cattle feeders. A cattle dealer is an individual who purchases cattle at a price which will allow him to receive a higher price once he puts together and ships a load. The order buyer is one who is paid to purchase cattle for a particular producer, generally a backgrunder or cattle finisher with a large-size operation.

There are a number of marketing methods or alternatives available for Virginia cattle producers. The cattle producer should select the alternative which offers the advantage of a competitive price, giving him a "retail price" for his production rather than a "wholesale price." Many animals sold in small groups are obviously sold for a wholesale price since time and money must be spent by dealers, order buyers, feeder cattle marketing associations and others in putting cattle together in load lots. The basic marketing alternatives for cattle producers are as follows:

1. **Private Treaty** - Producers may sell cattle privately to a neighboring backgrounder or feeder or to an order buyer or dealer. Private Treaty sales are generally very convenient and marketing costs are low. However, with this method there is generally less competition in the bidding process and indeed many groups of cattle sold by private treaty are sold on a single bid. Thousands of Virginia's feeder cattle from backgrounders that do sell load lots are marketed by this method.
2. **Weekly Auction Markets** - There are 33 weekly auction markets scattered throughout the state that have sales each week. The largest percentage of feeder cattle and cull cows and bulls from small herds move through these weekly auction sales. The auction market offers competitive bidding and convenience because of its proximity to most cattle producers. Farmer feeders and backgrounders buy a large percentage of stockers or feeder cattle they utilize in their operations through weekly auction markets. Order buyers and dealers put together loads of animals of like weight, sex and quality through these outlets.
3. **Graded Special In-barn Sales** - Virginia has a long heritage as a pioneer in special graded feeder cattle sales with more than 50 years experience with this method of marketing. The Virginia Cattlemen's Association is the lead organization in promoting and organizing this network of sales which market some 20 to 25 percent of the feeder cattle produced in Virginia. Producers of feeder cattle consign calves or yearlings and deliver them to the specified sale where cattle are weighed individually and graded by Virginia Department of Agriculture and Consumer Services, and are penned by weight, grade, sex and breed prior to the auction sale. This method offers an opportunity for larger numbers of like cattle to be put together which augments the job of putting together trailer-load lots for shipment. Consequently, prices through special graded sales have historically been higher than for cattle sold in weekly auction markets. In addition to order buyers and others who frequent these sales, a Tel-O- Auction (conference telephone call) system is utilized which allows buyers from distant locations to purchase cattle from these sales. A strong reputation has been built for Virginia cattle through these special graded sales of calves and heavier feedlot-ready yearling cattle. In the Shenandoah Valley and Northern Virginia areas, several similar-type sales operate on a regular basis for slaughter cattle. Slaughter cattle are consigned to these special sales and are delivered where they are weighed and graded individually and penned according to weight and grade. They are then sold at auction in a similar fashion to that used for feeder cattle. Some 125,000 feeder and 25,000 slaughter cattle are sold annually in these sales.
4. **Field Tel-O-Auction Sales** - Today, many more feeder cattle are being backgrounded on farms in Virginia. Many cattle producers today specialize in producing feedlot-ready feeder cattle in load lots. A field tel-o-auction sale system is operated by the Virginia Cattlemen's Association on behalf of such cattlemen. Some 25,000 feeder cattle are sold annually

utilizing this system. Feeder cattle are graded by Virginia Department of Agriculture and Consumer Services representatives on the farm where they develop a description of each load of cattle. Every other week feeder cattle are merchandised utilizing the tel-o-auction (telephone conference call) method where as many as 50 to 75 buyers at distant locations can bid on loads of cattle. This system has worked extremely well for merchandising load lots of feeder cattle. Utilization of this system continues to grow each year. The conference call equipment is furnished by the Mid-Atlantic Marketing Association which does business over a several state area. Slaughter cattle are also merchandised utilizing the tel-o-auction system and are sold on a carcass (grade and yield) basis. The Virginia Cattle Feeder's Association is heavily involved in this phase of slaughter cattle marketing.

Virginia has a very workable infrastructure for marketing various classes of cattle utilizing cooperative marketing methods. Considerably more backgrounding of light weight feeder cattle is being done across the state today than in the past. There is still a great opportunity for more backgrounding and production of feedlot ready cattle in Virginia which would more fully utilize Virginia's vast forage and by-product feed resources.

COMPETITION IN THE BEEF SECTOR

Americans are consuming meats of all kinds at the highest level on record. Figure 5.3 shows total supplies of red meat and poultry in pounds per person annually on a retail weight basis. While the total per capita consumption has increased, the mix among the various meats has changed over time. Pork consumption tends to be the most consistent with very little change having occurred in the past 20 years. Per capita, beef consumption is down somewhat primarily because of the tonnage of beef that is being produced in the country. The great increase in consumption is poultry with the largest share going to chicken and the next largest share to turkey.

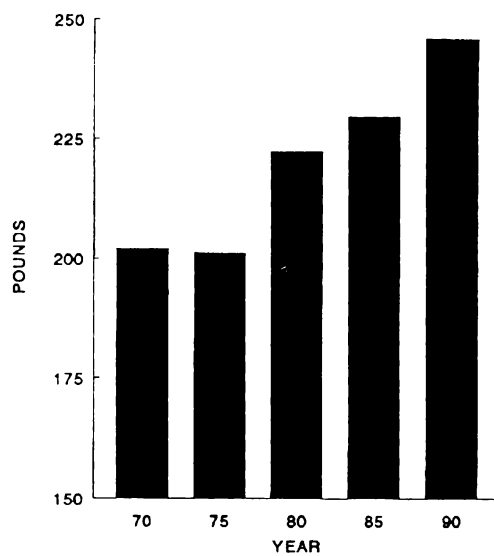


Figure 5.3
Total Supplies of Red Meat and Poultry
Pounds Per Person Annually

The single most important factor resulting in this shift away from beef has been the relative price of beef compared to other protein sources. The beef industry is challenged to lower unit production costs to prevent further loss of market share.

The challenges facing the wholesale and retail suppliers of beef affect all producers. Today's consumers prefer food products that require little or no preparation time. There is a need for further development of beef products that fall into this category. Furthermore, consumers are very careful to buy meat and other food products they perceive to be healthful and wholesome. It is unfortunate that some consumers have erroneously been led to believe beef products are unhealthful or unwholesome. Beef compares favorably with other meats in fat and caloric content (Table 5.4). Beef is an excellent source of many other important nutrients such as vitamins, iron, calcium and zinc. The American Heart Association has taken a positive position relative to lean beef as the following statement by that association indicates: "Good lean meat is hard to beat as an excellent source of protein, vitamins, and minerals, including iron. The American Heart Association says 'Yes' to lean beef as part of a balanced diet."

Table 5.4
Nutritional Comparisons of Meats and Alternatives*
(3 oz cooked servings or equivalents)

Food	Calories	Total Fat (g)	Cholesterol (mg)
Beef	189	8.4	73
Chicken	162	6.3	76
Pork	198	11.1	79
Lamb	176	8.1	78
Cod	89	.7	47

* 3 oz Composite of cuts, lean only, skin and trimable fat removed.
Source: USDA

Competition for beef from other meats will continue to be intense. The keys to profitability for Virginia cattle producers involve increasing the use of competitive marketing procedures, keeping cost of production low and managing farm resources, including pasture and other forages, for optimal production while providing high quality cattle of a type and in appropriate marketing units to meet the demands of cattle feeders, and ultimately packers and retailers.

CHAPTER 6

THE YEAR 2000 AND BEYOND

SITUATION

As the Virginia Cattle Industry moves into the 21st century, beef cattle will continue to be extremely important in the state agricultural complex. Total cattle numbers have the opportunity to increase and certainly there will be some change in the mix of important agricultural enterprises in Virginia. Currently, beef cattle make up 84 percent of total cattle and will move toward 90 percent as the dairy industry continues to gradually decrease numbers of herds and the numbers of milk cows. The cash receipts from the sale of cattle and calves, which currently amount to 20 percent of the state total from all agricultural commodities, should therefore increase to approach one-fourth of total sales. The source of agricultural income in the state is currently two-thirds from livestock and one-third from crops. This composition is expected to change slightly in favor of a larger portion from livestock, of which beef cattle will be an important component. Modest expansion in cattle production in most areas of the state will replace possible further declines in dairy, sheep and certain row crops. These changes will free up land for forage production best utilized by beef cattle.

Beef cattle production will continue to be an extensive, land-based, largely pastoral business conducted on privately owned lands with the family farm continuing as the centerpiece.

As the 21st century approaches, beef producers will find their commodity, beef, in an ever tightening ring of competition from other meats at the market place. Chicken, turkey and pork will provide the keenest competition. Seafood products will also compete for their share of the consumer's dollar. This keen competition will keep the lid on prices at the retail level and also at farm level which will probably keep in check any significant increase in beef production nationally. Profit margins through all segments of the beef industry will continue to be somewhat modest and cyclic, which means there will be year-to-year variation in profitability for all segments of the industry.

Environmental concerns will continue to be a factor that beef producers must address. Human population in Virginia will continue to grow, particularly in the eastern corridor from Norfolk to Washington D.C., east of interstate 95, as well as around other centers of industry and job market potential scattered over the state. Clean water and clean air will command the attention of state government, the farm sector and consumers. The cattle industry will need to be pro-active as laws are passed and regulations are written having to do with maintenance of a clean, healthful environment.

Beef cattle will continue to be the agricultural enterprise of choice in most counties in Virginia as beef cattle production serves to utilize resources that cannot otherwise be turned into profit. Pasture-based beef production and human population can co-exist in close proximity with no adverse effect on the environment or aesthetics.

Virginia, because of its soils, rainfall conditions and topography, will continue to be a strong pasture and forage producing state and will continue to produce crop residues, waste products

and other feedstuffs that only beef cattle can well utilize to produce human food. There will be a growing supply of broiler litter, cotton by-products, milling by-products, brewery by-products and fruit industry by-products to be utilized. By the year 2000, producers will need to put into practice management systems which will more fully utilize these fibrous materials.

It is envisioned that the current beef production infrastructure in the state will be maintained and improved as it relates to cattle production and marketing. There will need to be adequate beef production supplies, veterinary services, marketing outlets and services, and strong beef production and marketing organizations in place. Government services through the Virginia Department of Agriculture and Consumer Services, and educational services through Virginia Tech and Virginia State will be essential for growth in the industry to occur throughout the commonwealth.

Virginia will continue to be a strong feeder cattle producing state and will finish somewhat fewer cattle due to higher feed costs and a lack of competitive markets for slaughter cattle. The major market for Virginia's feeder cattle will, on the average, be farther from the borders of the state as larger numbers of cattle will increasingly be fed in the western cornbelt and southern plains states. The demand for yearling, feedlot-ready feeder cattle will continue to grow. There may be lessened demand by feedlots for freshly weaned calves. More distant markets will require more uniformity and better quality in the cattle produced and shipped from Virginia. With the shrinking local market for finished cattle, more calves will be backgrounded through winter feeding and grazing programs to utilize feedstuffs and meet the demand for yearling feeder cattle.

Value-based marketing will be in full swing by the turn of the century. This means that feeder cattle produced from Virginia's cow/calf herd must be of a size and quality which will allow Virginia producers to receive a price equal to the mainstream price at any period in time. Genetic improvement will be further required if the production from Virginia's cattle farms is to fulfill the mainstream market demand of feeders, packers and consumers.

Virginia's purebred seedstock industry should flourish. Virginia is well located in the mid-Atlantic area of the country and has the opportunity to develop and produce seedstock for not only its own needs, but for other states in the region and across the country. However, the seedstock industry will need to give greater attention to the needs of the commercial sector for a more uniform and consistent product that meets the demand for less fat and higher consumer satisfaction.

OPPORTUNITIES

Virginia's greatest agricultural opportunity for increased output and income appears to be in the beef cattle production sector. Numbers of beef cows in Virginia (currently at 735,000 head) have increased steadily since 1950. Virginia's commercial beef cow herd is expected to increase to some 850,000 cows by the turn of the century, given adequate rainfall distribution and reasonable market prices. Beef cows have the greatest opportunity for increase in the Central and Southern Piedmont areas of the state and in the Western region through Southwest Virginia. Farms that went out of the beef cow business in favor of grazing stockers to make heavier-weight feeder cattle will gravitate back to more cows because of the intense competition for calves for backgrounding programs.

Though there are larger numbers of Virginia produced calves being backgrounded today than in past years, there appears to be opportunity for another 25 million dollars of gross income if larger numbers of these Virginia-produced calves can be backgrounded in the state before being sold to out-of-state feeders. Backgrounding more calves offers the opportunity to better utilize pastures and other feed resources and keep the profit potential in Virginia as opposed to shipping weaned calves to backgrounders in other states.

Virginians have an opportunity to capitalize on beef cattle production by increasing numbers and intensifying cattle production operations while other agricultural commodities such as dairy, sheep and certain row crops will probably continue a trend toward decreasing numbers of production units.

Beef cattle will become more important on some farms as they specialize in backgrounding operations and strike a balance between this enterprise and cow/calf production. At the same time, there will continue to be a large number of part-time operations of all sizes where the land owner is fully employed off the farm. Beef cattle, particularly cow herds, will continue to be complementary to off-farm employment and to other agricultural commodities produced on farms, whether they be livestock or crops.

The seedstock industry has a bright future and a real opportunity to be a leader in the mid-Atlantic region of the country. Already, the genetic merit of purebred seedstock herds in Virginia surpasses that of herds in other states in the region. With strong breed associations, a strong state beef cattle improvement association, a state beef exposition and other parts of the seedstock infrastructure, this opportunity should be realized as the 21st century arrives.

There is great opportunity for Virginia cattle producers to overcome the obstacles of small production-unit size with improved marketing procedures. Though Virginia has an excellent system of cooperative marketing in place, the system is currently under-utilized. The leadership of the industry must innovate and cooperate at all levels to further improve the marketing function and cause stronger prices and more income to become a reality for the majority of producers. There is a need for feeder cattle to be marketed throughout the calendar year because there is indeed a year-round demand. Most feeder cattle historically have been marketed in fall or spring, creating a glut for market facilities and transportation problems because of limited numbers of available trucks. Spreading marketing out could alleviate these problems and increase the average price to the producer. Retained ownership is another opportunity and alternative that many larger producers should consider. Risk-reducing mechanisms such as futures and options have been under-utilized by Virginia cattlemen but must become a definite part of the marketing program as the 21st century approaches. Electronic marketing, currently operated primarily through conference telephone hook-ups in Virginia, must increase in the years ahead. Tel-o-auction and satellite sales are the wave of the future for those producers who can ship at least a tractor-trailer load of feeder cattle.

In their infancy at present, alliances between Virginia cattle producers and feeders and packers will provide an opportunity to better market feeder cattle, reduce risk and offer opportunities for greater profit.

Quality will be the watch word for Virginia cattle production as the 21st century draws near. Virginia ranks 19th as a state in cattle production and is located a great distance from major markets. These facts indicate that Virginia cattle producers need to produce a higher quality

product than feeders or packers can obtain from other areas of the country. Seedstock producers, commercial cow/calf operators and backgrounders must work together to ensure that a high proportion of Virginia's annual production possesses the quality needed to top the market. Quality factors must include excellent growth, superior feed efficiency and carcass merit (size, quality grade and cutability) potential as well as freedom from blemishes and drug residues. Virginia is a state of vastly under-utilized land, forage, animal waste and other inexpensive feed-stuffs. A balance of cow herds and stockers utilizing state of the art grazing and ration formulation techniques will offer an opportunity to greatly increase profits on many of Virginia's farms.

CONSTRAINTS & CHALLENGES

The future looks bright for beef cattle production in the Old Dominion, but there are a number of factors which could limit beef cattle production from reaching its potential. These are:

1. **Tradition** - Virginia farmers, in certain areas of Virginia, possess a row crop mentality and lack experience in beef cattle production and marketing. This is particularly true in the Southern Piedmont and Eastern Regions. Tradition, in terms of marketing procedures, also stands as a deterrent to expansion and profitable production. Due largely to convenience, calves from most small herds are marketed through weekly auction markets. Many of these calves are not properly prepared for market. Thus producers marketing calves sold in this manner accept a "wholesale" rather than "retail" price for their production. Tradition also causes many producers to sell cattle at one time of the year, usually in the fall, which strains the transportation system and causes lower prices to be obtained than would be the case if these animals were backgrounded and marketed at other times during the year. Many producers are fixed on traditional production systems which may have generated excellent income in the past. Advances in technology, cattle performance and market structure may have altered returns to some of these systems. Producers, in general, need to become more business-oriented and flexible in their production programs.
2. **Retail Cost of Consumer Beef Products** - Beef is innately more costly to produce than most competing meat products. Consumers accept this fact to a point because of their preference for beef but price remains an important factor in consumer choices. Intensified price competition at the consumer level will bring about increased pressure for the beef industry to lower unit production costs in order to stay competitive. Increased production efficiency will be demanded.
3. **Environmental Constraints** - Beef producers must continue to be good stewards of the soil, water, and air. Production costs may increase as beef producers strive to meet the requirements of more stringent environmental regulations. Economically and environmentally sound, sustainable production systems will be required of Virginia producers.
4. **Less land in production** - The pressures of urbanization, requiring land for dwellings, schools, roads, factories and airports, reduces the land available for cattle production. On land that has potential for cattle production, the encroachment of weeds and brush and the lack of adequate fencing further reduces the acres of pasture available to beef cattle.
5. **Price received** - As documented in this report, Virginia's producers, on the average, receive a lower price per pound for feeder cattle than is the case for producers who are closer to

major cattle feeding areas. This is simply because Virginia producers must bear the transportation costs by having them deducted from the price they are paid. This means that to be equally profitable, Virginia cattle producers must be more efficient. They must produce pounds of marketable animal at a lower cost to enhance profit margins.

6. **Fescue management** - Of Virginia's three and one-half million acres of pasture, between one and two million acres is predominantly fescue and a high percentage of this grass is infected with an endophyte fungus which can reduce cattle gains, milk production and reproduction in cattle consuming it. On the other hand, fescue is an extremely productive cool-season grass that has the ability to extend the grazing season both in late fall and early spring. Many cattle producers lack the technical and management ability to properly utilize fescue although it is the pasture forage of greatest importance in many areas.
7. **Lack of the use of economic-based management** - Most beef cattle producers do a relatively poor job of record keeping from a cost and analysis standpoint. In short, beef producers, because of the part-time nature of the enterprise in many instances, fail to take a business approach to production and marketing management. In the future, successful beef producers will be required to be successful business persons.
8. **Under-utilized cooperative marketing** - Producers of only 25-30 percent of the feeder cattle marketed in Virginia utilize cooperative marketing methods designed to enhance price received through increased competitive bidding. Small herd size dictates that cattle from most farms must be co-mingled with those from similar operations to put together tractor-trailer loads that will attract feeders at distant locations. Increasingly, larger feeder cattle producers are utilizing the field tel-o-auction method but very little use has yet been made of satellite technology for marketing cattle in Virginia. As long as convenience in marketing is uppermost in the mind of the small herd owner, unit price and total income will suffer.
9. **Lack of genetic uniformity** - Though the quality of Virginia cattle, on the average, is desirable, there is far too little uniformity in the product being produced. Size of parent stock and thus finished weight of calves produced is far too variable. Cow calf producers must institute means to reduce the variability and increase the overall genetic worth of cattle so they will be demanded by feeders at distant locations.
10. **Innovative production and marketing research** - There is a critical need for expanded field research both in the production of forages and cattle as well as research in the area of cattle marketing. Public funds for such research efforts have been almost nonexistent in recent years. If Virginia is to reach her potential in beef cattle production, priority must be given such focused research at the state's senior land-grant university, Virginia Polytechnic Institute and State University.
11. **Beef producer education** - Though Virginia Cooperative Extension has assisted the industry and individual producers with production technology, there is a need for expanded effort in the area of integrated resource management including recordkeeping and economic evaluation.
12. **Tax structure** - A compatible tax structure in counties throughout the state is needed if extensive cattle production is to remain profitable and is allowed to expand.

13. **Beef industry leadership** - Beef producers must foster statewide associations and organizations as well as those at the local level to positively influence laws, ordinances and rules which affect the cattle producer. Leaders and organizations must become pro-active, particularly in the realm of environmental concerns.
14. **Consumer education** - As the state's population continues to grow, there will be increased interaction between beef producers and their non-farm neighbors. It will be important that both groups communicate with each other so that each understands and appreciates the interests and concerns of the other. If the beef industry enhances communication with the consuming public, the overall climate for beef production in Virginia will be improved and potential conflicts averted.

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