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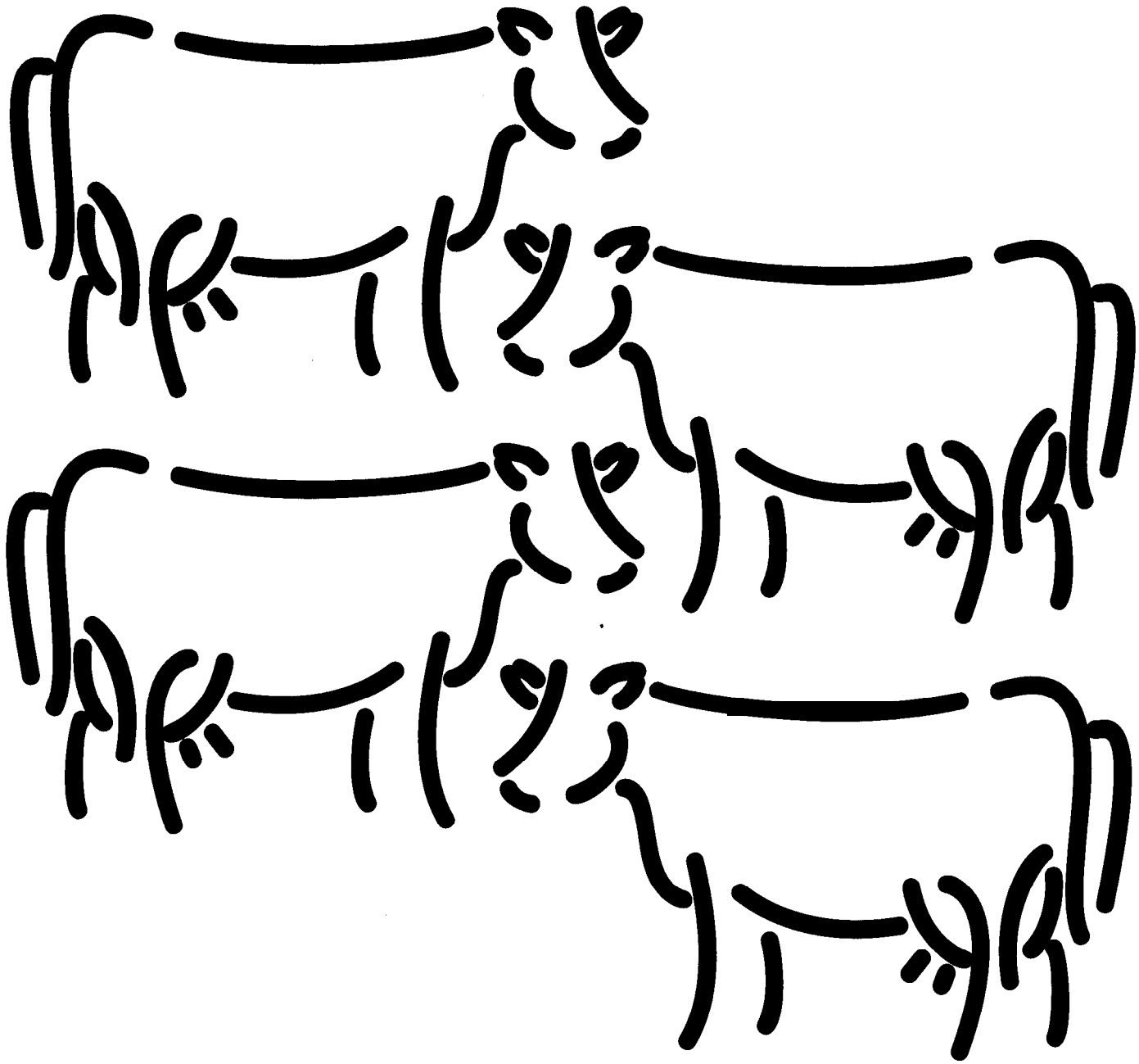
A Strategic Planning Study of the Dairy Herd Improvement System



Abstract

A Strategic Planning Study of the Dairy Herd Improvement System

James J. Wadsworth

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This report provides an overview and strategic planning study of the dairy herd improvement (DHI) system, concentrating on assessing current trends and conditions of the industry and how DHI organizations are structured within it. Information is provided for the principal DHI organizations to carry out strategic planning. Opinions from DHI managers provide an internal assessment of where the industry is headed and in what areas leaders need to plan to better position their organizations for the future. A strategic planning model is developed to analyze industry trends, define available strategies, and evaluate alternative directions DHI organizations can take as they strive to achieve organizational and systemwide goals.

Keywords: dairy herd improvement, goals, strategic direction, planning

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Preface

The dairy herd improvement (DHI) system has a played a critical role in the advance of the U.S. dairy industry. Even today, it remains an important link in the industry. However, dairy industry changes--cow number decreases and shifts, dairy management advances, and on-farm economics-pose significant challenges to DHI. The nature of the dairy market, changing technology, and competitive pressures indicate the need for strategic planning among DHI participant organizations.

This report describes the current status of the system and provides information obtained from DHI managers on where they see the industry heading and how their organizations will fit into that industry in the future. It develops a planning model to assess possible strategies and directions for system participants, mainly the dairy herd improvement associations (DHIAs).

This study is intended to promote positive debate and thought on the current structure of the DHI system and what future system will be needed to best serve U.S. dairy producers. The intent is to spark strategic planning in DHI organizations by providing information sourced from statistics, from 27 DHI managers (more than two-thirds of the managers in the system, i.e., DHIA and DRPC managers), and by developing a strategic planning model to assess alternative strategies and directions.

The author thanks the dairy herd improvement association/cooperative and dairy record processing center managers, other leaders, and Phil Dukas of National DHIA for their valuable contributions. However, not all DHIA managers' and other DHI leaders' opinions were obtained, so this report should be viewed as an initial step toward further dialogue and planning.

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The DHI system consists of 33 affiliate DHIAs, seven dairy record processing centers (DRPCs), and numerous local DHIAs and milk laboratories. National DHIA is the centerpiece of the system and several government bodies are also intricately involved. DHI is largely responsible for the significant gains made in U.S. dairy production, but the system faces a challenging future.

The 21 DHIA managers (64 percent) contacted indicated their organizations had many strengths and few weaknesses. Financial stability, headquarter employees, the board of directors, member service, progressiveness and equipment were most often identified as major strengths. Member involvement was identified as a major weakness. Most managers said that competition was not strong; members would rate their DHIA at just above average; boards and members are progressive; and they are optimistic for the future.

Six DRPC of the seven managers identified their major strengths as efficiency, quality records, and innovation. Only a few weaknesses were identified such as cost efficiency and equipment. DRPC managers said that members would rate their operations high, but the managers themselves rated the DHIAs, whose records they process, only slightly above average.

DHI leaders understand the challenges of remaining competitive in a mature, but continually changing dairy market. The market is characterized by declining but shifting cow numbers, larger herds, and strong competition for dairy producer dollars. DHI organizations have responded to their environment by employing leadership and niche strategies and in a number of cases by exercising structural change strategies. DHIAs and DRPCs have consolidated, closed, streamlined, developed new products and services, become more competitive with their industry counterparts, and in some cases opened new markets with new clients. For the most part, the DHIAs and DRPCs in the system have been dynamic in their pursuit of a strong and continued market position.

The contacted managers advocated several themes on where DHI leaders need to focus further strategy development:

- Progressive programs and services.
- Efficiency.
- Flexibility for meeting the needs of individual dairy producers.
- Coordination between DHIAs, DRPCs, regulations, etc.
- Technological capabilities.
- Marketing, training, and DHI promotion.
- Consolidation opportunities.
- Nontraditional methods for improving system.

The DHIAs operating today, taking into account recent DHI system structural changes, follow a status quo with modifications and improvements strategic direction. Those with the ability to defend leadership strategies in traditional and new services (i.e.,

Highlights

prominent industry position) and develop niche strategies (i.e., unique opportunities) will likely continue with the status quo for some time. However, it will require a solid base of member cows, operational efficiencies, and considerable human and capital resources. Those without such attributes will find it necessary to explore and determine other directions.

Two directions likely to be considered in DHI strategic planning include consolidation and joint ventures within or outside the DHI system. How those directions are further defined and when they are explored will depend on the circumstances surrounding each DHIA and its market position. Inevitably, all DHIAs need to examine their structure and direction and determine the best path for achieving goals. In the final analysis, the future structure of the organizations in the DHI system will depend on the achievement of goals.

Eleven core and performance goals are identified for evaluating strategic direction in DHI planning. Core goals are continued member control, provision of quality member services and products, supervision of dairy records, retention of member loyalty, and competitiveness and viability. Performance goals include maintaining and expanding membership, gaining efficiencies, maintaining financial strength, developing new opportunities, being technologically innovative, and being an industry leader. If other goals can be defined, DHI leaders need to identify and evaluate them.

Changes in the DHI system will eventually reduce the structures. Several directions of change are likely. These will probably be fewer DHIAs, DRPCs, and milk labs, more streamlined regulations, more direct information flows, and more outside working relationships. Surviving DHI organizations will be able to position themselves in the market in a way that allows them to be flexible enough to deliver the varying types of programs producers demand, efficient enough to be affordable, and resource-strong enough to be progressive and viable.

This report voices some opinions and ideas from DHI leaders. They can provide focus and stimulation for further discussions by DHI managers, directors, and members who must collectively brainstorm and listen to each other and the marketplace. A continuing dialogue requires progressive steps for planning and action. Sound strategic planning by DHI organizations will help determine avenues for future success. Alternative strategies and directions must be explored in light of industry conditions and with a keen eye on crucial organizational and systemwide goals.

A Strategic Planning Study of the Dairy Herd Improvement System

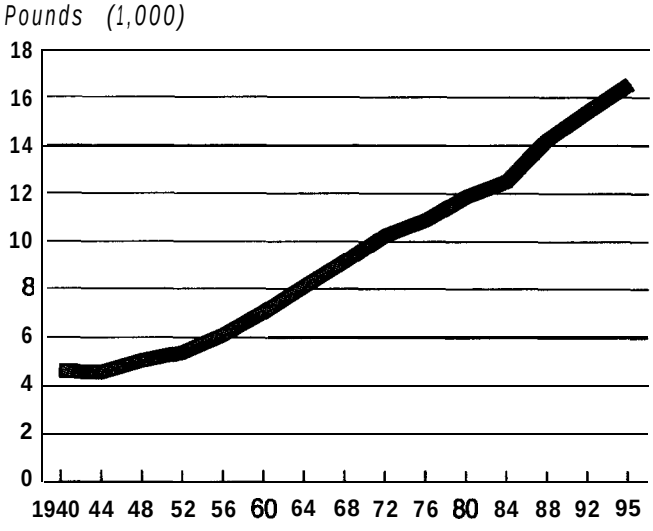
James J. Wadsworth
Agricultural Economist

The DHI system has played a critical role in advancing the U.S. dairy industry Its provision of production and management records, services to dairy farmers, and contribution of information to industry organizations, universities, and Government agencies, has been one of the vehicles directly responsible for gains in milk production and dairy farm herd management efficiencies.

Milk production per cow (figure 1) has markedly increased during the latter half of this century. Production per cow increased 259 percent from 4,600 pounds in 1940 to 16,500 pounds in 1995. Total milk production increased from 109 billion pounds in 1940 to 156 billion pounds in 1995, up 43 percent (figure 2), even though cow numbers decreased 60 percent during the same period from 23.7 million to 9.5 million (figure 3).

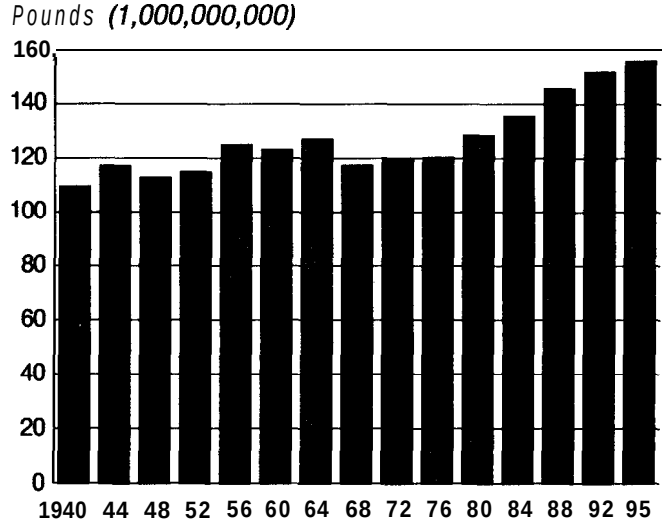
While these changes are partially the result of DHI system success, they also create a dilemma for the cur-

Figure 1- Milk Production per Cow, 1940-95



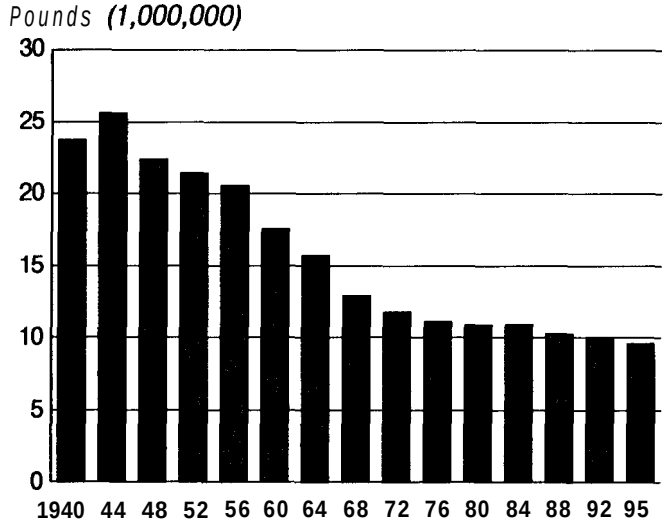
Source: NASS, USDA

Figure 2— Milk Production, 1940-95



Source: NASS, USDA

Figure 3— U.S. Dairy Cow Numbers, 1940-95



Source: NASS, USDA

rent structure. On-farm economics pose significant challenges to DHI organizations because the system's traditional source of revenue is based on the dairy cow. Changes in cow numbers, where they are located, and how they are managed all have an impact.

Complicating the situation are the multiple roles, given recent technological gains, that DHIAs are being pressured to accept. DHIAs must be technological innovators, facilitators, and providers, in addition to carrying out their traditional roles of testing, collecting data, and providing reports. With such pressures, many DHIAs face an increasingly arduous future. Given the circumstances of the current environment, DHI organizations need to look closely at how well they are positioned in their industry today and will be in the future. What will DHIAs need to look like to remain active players in the industry; what strategies and direction would be best to pursue?

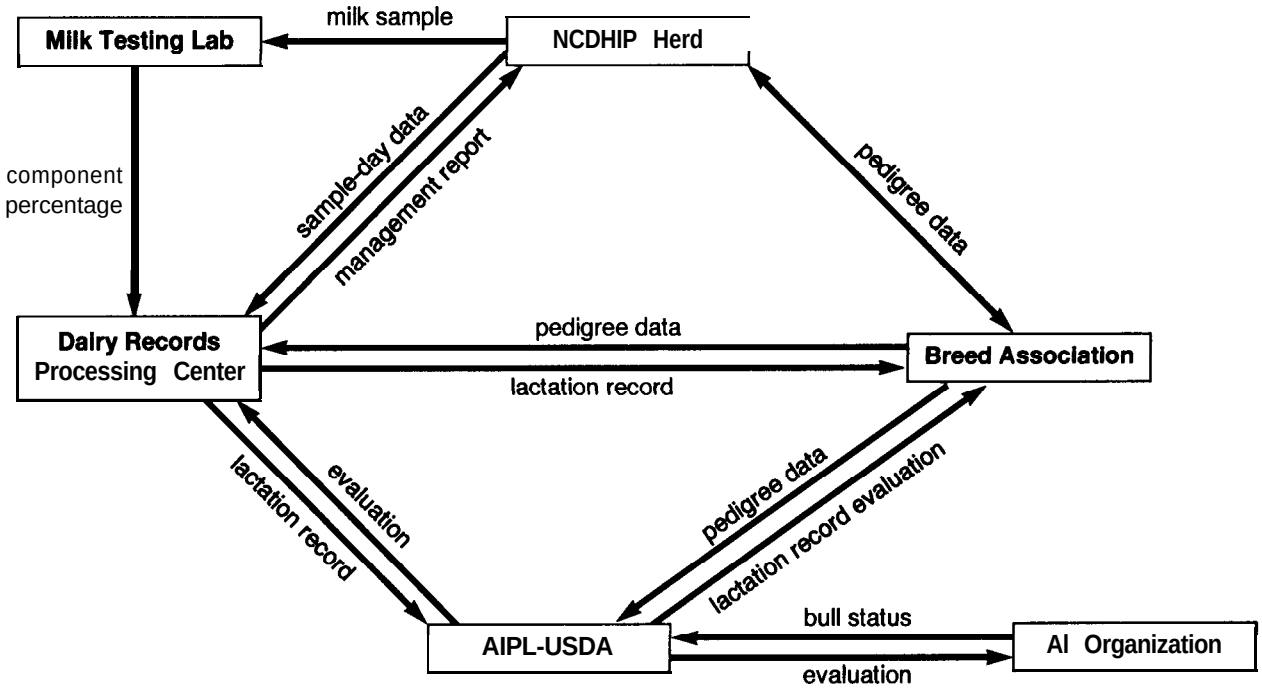
DHI organizations need strategic planning to focus on the future. It must be continuous and holistic. Every DHI organization needs to regularly examine and define its mission, goals, strategies, and direction. Each must envision how it will continue to fit into the dairy services sector and what it needs to do in strategy and structural terms to do that.

This report provides an overview' and strategic planning account of the DHI system, concentrating on the structure and operations of the organizations that carry out the specific functions. These include collecting dairy records, processing them, and providing services to farmers, specifically DHIAs and Dairy Record Processing Centers (DRPCs). The focus is on their status and future. DHI managers were asked about their organizations and where the industry is headed. Those who responded provided significant information.

DHI system leaders have been discussing changes, voicing needs for the future, modifying and adapting their organizations, and providing ideas on what DHI needs to be over time. This report consolidates DHI manager thoughts and offers an outside perspective on the status and strategic direction of the major players in the system. More than two-thirds of the DHIA affiliate and DRPC managers in the system were contacted,

[1] **For an extensive history** and **more detailed description of the DHI system, please see "Dairy Herd Improvement Letter," ARS, USDA, Vol. 49, No. 4, July-August-September, 1973.**

Figure 4— Flow **of NCDHIP Information**



Source: G.R. Wiggins, "National Genetic Improvement Programs for Dairy Cattle," Journal of Animal Science, no. 69, 1991.

providing a significant body of thought. With their input, this report provides an initial step toward further dialogue and planning.

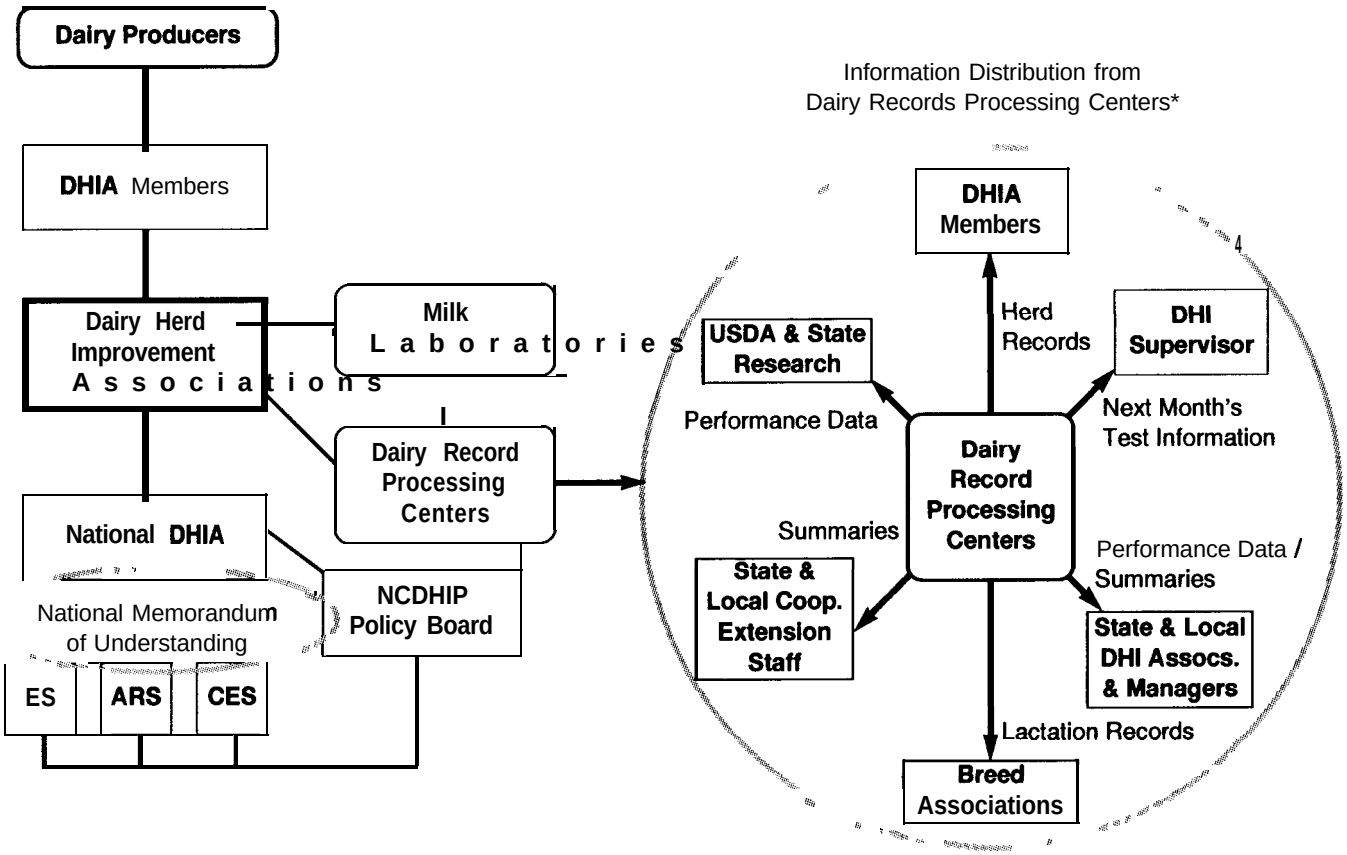
General Background and Status of DHI System

The DHI system is composed of a rather complex combination of organizations working together to serve dairy producers and other aspects of the dairy industry with dairy herd records and management information systems. This system combines organizations that work in conjunction and in competition with one another to carry out the National Cooperative Dairy Herd Improvement Program (NCDHIP). The system is decentralized, reflecting the highly information-intensive nature of the genetic improvement dairy record system. Much of the data collected by DHI flows among a number of institutional entities (figure 4), including DHI organizations, artificial insemination (AI) businesses, pedigree associations, USDA, universities, extension personnel, and, of course, dairy producers. The complexity involved with testing, collecting, analyzing, and sharing of data is managed by dividing the system into separate functions and delegating these to different organizational entities, one of which is the NCDHIP.

Figure 5 provides a truncated organizational chart of the DHI system. The left side shows the linkage from dairy producers as DHIA members to other system participants, such as National DHIA, the DRPCs, USDA, and Extension.

The foundation of the NCDHIP is the collection of dairy cow records from farms. Records are collected by weighing each cow's milk on a monthly basis. A milk sample is taken to determine milk fat, protein, somatic cell count, and other attributes. DRPCs process collected data and return the results (i.e., records) to herd owners. These records are the sole property of the herd owner and are used to provide a comprehensive herd recordkeeping system and assist in dairy herd management decisions (e.g., feeding and breeding). While private property, dairy cow records are also used for research and industry-related purposes such as USDA

Figure 5— **Snapshot of the DHI System**



Source: Fact Sheet A-7,1985, Page 3, NCDHIP Handbook

sire summaries with the requirement that individual herd-owners' data be kept confidential.

The centerpiece of the DHI system is National DHIA, a federation of affiliate DHIAs started in 1965. It provides farmers with a national vehicle for setting policy and developing and enforcing rules associated with the NCDHII? Its mission statement says it "is a liaison between DHIAs and supporting institutions for delivering dairy management information systems to the industry which aids dairymen's profitability." National DHIA, headquartered in Columbus, Ohio, is governed by a 12-member board of directors elected from dairy producers from four U.S. regions (Northeastern, North Central, Western, and Southern).

Affiliated DHI associa tions are organized at State and regional levels. These membership organizations conduct the business of the NCDHIP and collect cow milk samples. The resulting records are analyzed, processed, and returned to their members. DHIAs also provide a range of services such as distribution of farm management systems (e.g., computer software programs).

Seven DRPCs process records. Some are owned and operated by DHIAs and merely are an operational function of the organization. Others are stand-alone. These processing centers analyze the numbers associated with the dairy record data collected.

A National Memorandum of Understanding (MOU)[2] provides the framework for carrying out the functions of NCDHIP. The MOU among NCDHIP sponsoring groups outlines the responsibilities of each party and the general manner in which the program will be conducted.

Sponsoring groups include National DHIA, Agricultural Research Service (ARS), and the Cooperative Extension System (CES). Their functions are:

- National DHIA—enforces the rules, policies, and quality certification standards of the NCDHIP.
- ES-provides national coordination and leadership of Extension education programs in record collection, evaluation, and use.
- ARS—conducts the national genetic evaluation research program using NCDHIP data.
- CES and the state DHIA-guide how the NCDHIP is conducted and have responsibility for record certification within that State via the MOU.

Authority for NCDHIP rules, policies, and quality certification standards is vested in the NCDHIP Policy Board. Representatives on the 12-member policy board come from National DHIA, CES, ARS, the National Association of Animal Breeders (NAAB), and the Purebred Cattle Association.

Participation in NCDHIP Testing Plans

More than 30 DHI testing plans are presently recognized by NCDHIP. Improvements have been developed in line with the demand for plan flexibility by dairy producers. Plans are designated as official and nonofficial. Official testing plans comply with Official Rules and the combined rules for Official Dairy Herd Improvement Registry (DHIR) as established by the

[2] General information on National DHIA, sponsoring groups, and the MOU was obtained from NCDHIP Handbook, B and C series Fact Sheets.

Table 1—Cow and herd participation In NCDHIP plans.

	1989	1990	1991	1992	1993	1994
Cows	4,576,521	4,722,222	4,826,961	4,695,775	4,783,026	4,693,457
Percent of total cows	45	47	48	48	49	49
Herds	56,798	56,837	56,711	53,945	52,724	50,649
Average herd size	81	83	85	87	91	93
Total cows in U.S.	10,126,000	10,127,000	9,992,000	9,839,000	9,705,000	9,532,000
Plan Changes	1989-90	1990-1991	1991-92	1992-93	1993-94	1989-1994
Cows (percent)	3.18	2.22	-2.72	1.86	-1.87	2.56
Herds (percent)	0.07	-0.22	-4.88	-2.26	-3.94	-10.83

Source: NCDHIP Handbook.

NCDHIP policy board.[3] Records from these plans are accepted by the dairy industry for many purposes such as management, research, and genetic evaluation, for example. Nonofficial testing plans do not have to meet all the rules and thus, are not certified. Records from these plans are referred to as management records. In several management plans some official rules apply. DHI testing plans are regulated by standards from National DHIA quality certification programs to certify uniformity.

About 49 percent of the nation's milk cows are on some form of DHI test, up from 45 percent in 1989 (table 1). In 1994, this reflected about 4.7 million dairy cows and 50,000 herds (table 1 and appendix figure 1). The bottom part of table 1 shows the changes in plan participation. From 1989 to 1994, the number of cows participating in all NCDHIP plans increased 2.6 percent, reaching a peak in 1991. The average herd size of DHI participators increased from 81 in 1989 to 93 cows in 1994.

The number of cows enrolled in official plans increased by 14 percent from 1989 to 1994, while the number enrolled in nonofficial or management plans decreased by 24 percent. In 1994, 77 percent of all cows enrolled in NCDHIP plans were in official plans. The average herd size of those in official plans was 102 cows in 1994 while that of management plans was 70 cows, suggesting that more small herds tend to go the nonofficial route.

[3] For more information on NCDHIP Rules see the NCDHIP Handbook, Fact Sheet series E.

Most Commonly Used Plans

Twenty-four percent of DHI participating producers used the DHI plan[4] in January 1994, down from 36 percent in 1989 (table 2). AP-based[5] plans are gaining in popularity. In 1994, the DHI-AP-T (T refers to an on-farm DHIA-approved timing device) plan was used with 18 percent of DHI participating cows, up from 13 percent in 1989. With AP-based plans, a DHI supervisor records milk weights and collects milk samples for one milking each month (the specific milking time-a.m. and p.m.-is alternated). AP-based plans (several types) were used with more than 40 percent of the cows signed up for DHI participation. All other plans-with variations of milkings, weighing, sampling, and testing-have more limited participation (2 to 10 percent).

Producers participate in DHI testing plans through direct contact with a DHIA. While there are subtle, and in some cases not so subtle, differences between the DHIAs, each organization tailors its operations to suit its members.

Plan Changes

Member needs continue to change. Some producers are purchasing on-farm electronic metering systems and using them in conjunction with their dairy management software programs. This technology has

[4] In the DHI plan milk weights are recorded and milk samples are collected by a supervisor for all milkings in a 24-hour period each month.

[5] AP-abbreviation used to describe alternate morning/evening monthly types of testing plans (NCDHIP Fact Sheet A-6).

Table 2—Cow participation in some common NCDHIP plans.

	1989	Percent	1992	Percent	1994	Percent
DHI	1,660,327	36.28	1,337,574	28.48	1,115,849	23.77
DHI-AP-T	569,093	12.87	866,035	18.44	843,613	17.97
DHI-APCS	367,632	8.03	375,991	8.42	378,784	8.07
DHIR	438,432	9.58	395,355	8.42	329,128	7.01
DHIR-AP-T	61,104	1.34	109,323	2.33	137,404	2.93
DHI-AP	338,094	7.39	375,202	7.99	640,777	13.63
DHI-OS	467,548	10.22	343,251	7.31	274,547	5.85
DHI-OS-AP	242,156	5.29	274,227	5.84	277,3577	5.91
Total	4,576,521		4,695,775		4,693,457	

Source: NCDHIP Handbook.

encouraged some producers to voice opposition to DHIA procedures (i.e., use of on-farm testers (technicians) for record surveillance and record processing) and the fees charged for records.

National DHIA is developing herd and cow profiles[6] to meet the challenges posed by legal issues (e.g., law suits from dairy producers charged with record fraud), changes in farm management practices, and computer technologies. Descriptions of herd and cow profiles will replace traditional DHI record labels. Profiles will define a herd's records using graphs of herd averages, lactation curves, and comparisons of milk shipped and test-day milk totals, etc. These profiles are intended to get DHIAs out of the increasingly difficult practice of enforcing NCDHIP rules and policing members to ensure that records are valid. Herd profiles, and in some cases cow profiles, will be available to end users such as breed associations, AI organizations, and cattle buyers to determine record integrity. Under this concept, policing will occur through a system of open disclosure of dairy profiles. Broad access to these profiles would work as a form of peer pressure to reduce the possibility of fraudulent acts (e.g., falsifying cow data) by dairy producers.

DHI Boundary Restructuring

For nearly 90 years, DHIAs operated within fairly strict State and county boundaries. However, in 1993, delegates to National DHIA approved a restructuring plan that eliminated county, State, and regional boundaries. Dairy producers can freely choose from whom they get their DHI field and lab service and where their records are processed. Under the restructuring plan, the organizations in the National DHIA federation are now called service affiliates rather than State and regional DHIAs.[7]

The absence of boundaries gives DHIAs the opportunity to court producers outside their traditional jurisdictions. One result has been increased competitive pressure on many of the local/regional DHIAs. Because of this pressure, as well as other influences such as fewer dairy cows and changing dairy-cow-population demographics, some DHIAs consolidated in recent years. Iowa and Illinois formed Dairy Lab Services; North Carolina and Virginia formed United Federation of DHIAs; and six Plains States-North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Arkansas-created Heart of America DHIA. DHIAs also have consolidated internally-some federated structures have centralized by unifying local associations. For example, PA DHIA, once a federated structure, is now centralized. Most former county (local) DHIAs consolidated into a single statewide organization.

DHIAs

Some DHIAs are organized as cooperatives while others are not-for-profit associations. DHIA activities range from only collecting milk samples to operating laboratories to analyze the samples of only their members. Others check samples of other DHIAs and a few analyze samples for non-DHI organizations such as dairy plants (Gray and Butler). The laboratories vary in their technical sophistication. Some have simple machines that only measure butterfat. Others measure protein, somatic cell count, butterfat, and other attributes such as milk urea nitrogen. A number of DHIAs use several laboratories to test their milk samples.

Some DHIAs process their own records in house (e.g., PA DHIA, AgSource Cooperative Services, and MI DHIA). Others "farm out" their processing to other DRPCs and some affiliates use more than one DRPC.

Presently, National DHIA has 33 affiliate DHIAs, down about 20 percent from more than 40 in 1989 due to mergers and consolidations among States and organizations. Recently, two new DHIAs affiliated with National DHIA-Tulare DHIA in California and Lancaster DHIA in Pennsylvania.

A number of affiliate DHIAs operate under a federated structure that has numerous local (county) association members. (Some have a modified federated structure where some locals have been merged or centralized into the State or regional affiliate while others continue to be members with federated characteristics.)

The 33 DHIAs and the States with whom they are associated are identified in table 3 and figure 6. The Mississippi River evenly divides the number of DHIAs, although western associations are larger and more dispersed than their eastern counterparts. Some DHIAs operate primarily in one State while others serve multi-State regions.

Affiliate Manager Opinions

Twenty-one affiliate managers were contacted for their opinions and information about their organizations and operations. They represented 3.9 million

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[6] Information obtained from the DHIA Communicator newsletter, November-December, 1994.

[7] While the name change is recognized, this report will continue to use the terminology DHIA rather than Service Affiliate.

cows (83 percent of total cow participation in NCD-

Financial strength . Fifty-seven percent of the managers said their organization's balance sheet was strong with sound financial ratios, 24 percent called their balance sheets fairly strong but needing some improvement, 10 percent called their's passable but needing improvement in a number of areas, while 10 percent felt their balance sheet was fairly weak.

Affiliate strengths and weaknesses . DHIA managers were asked to indicate their organization's major strengths and weaknesses from a given list[8] (table 4). More than 50 percent identified financial stability, headquarter employees, the board of directors, member service, progressiveness, and equipment as major strengths. Other strong points were field personnel, innovation, operational efficiency, product consistency, and service quality.

Although fewer weaknesses were identified, most managers saw member involvement as their primary weakness. Some managers felt DHIAs were overly tied to DRPCs, and, there was too much reliance on the local structure.

Table 4—Strengths and weaknesses of 21 affiliates.

	Strength	*Weakness*
Financial stability	15	3
Member service	12	5
Member loyalty	5	4
Member involvement	3	10
Member representation structure	3	4
Board of directors	14	2
Headquarters employees	15	0
Field personnel	10	2
Progressive	12	4
Innovative	10	2
Equipment	11	1
Facilities	3	2
Operational efficiency	9	1

Managers identified the given strength or weakness traits in these categories.

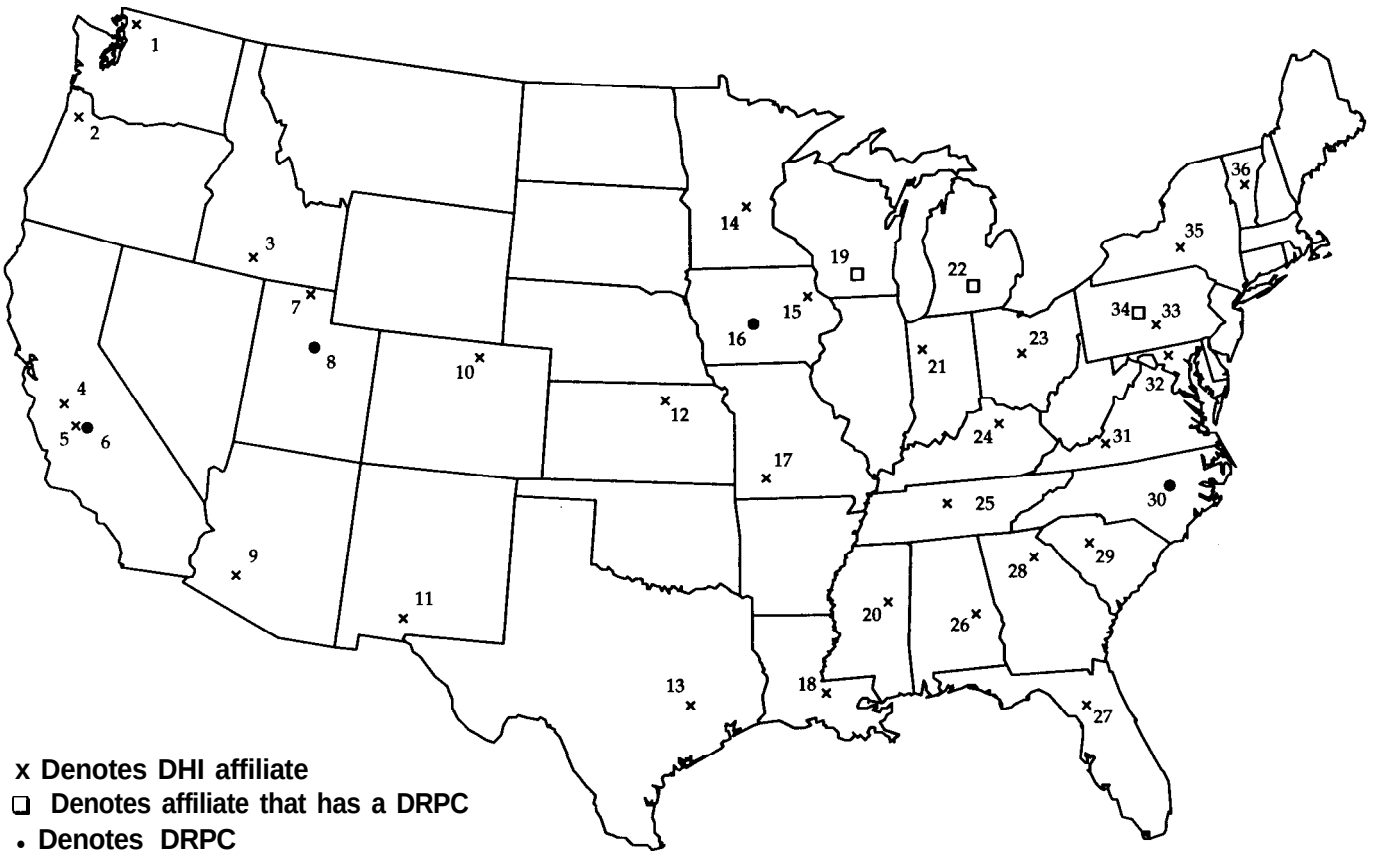
[8] **The list was developed to contain attributes commonly associated with well-governed, well-organized, and well-operated member associations or cooperatives.**

Table 3—DHIA affiliates and associated States, 1995.

(1) Alabama DHIA	AL	(16) Mississippi DHIA	MS
(2) Arizona DHIA	AZ	(19) Missouri DHIA	MO
(3) California DHIA	CA	(20) New Mexico	NM
(4) Tulare DHIA	CA	(21) Northeast DHIA	NY, CT, MA, RI, ME, NH, NJ
(5) Colorado DHIA	c o	(22) Oregon DHIA	OR
(6) DHI, Inc.	OH	(23) Pennsylvania DHIA	PA
(7) Dairy Lab Services	IA, IL	(24) Lancaster DHIA	PA
(6) Florida DHIA	IL	(25) Puerto Rico DHIA	PR
(9) Georgia DHIA	GA	(26) Rocky Mountain DHIA	MT, UT
(10) Heart of Am DHIA	KS, SD, ND, NE, OK, AR	(27) South Carolina DHIA	SC
(11) Idaho DHIA	ID	(26) Tennessee DHIA	TN
(12) Indiana DHIA	IN	(29) Texas DHIA	TX
(13) Kentucky DHIA	KY	(30) United Fed. of DHIAs	NC, VA
(14) Louisiana DHIA	LA	(31) Vermont DHIA	VT
(15) Michigan DHIA	MI	(32) Washington DHIA	WA
(16) Mid-East DHIA	MD, WV	(33) AgSource Coop. Serv.	WI (formerly Wisconsin DHIC)
(17) Minnesota DHIA	MN		

Associated States are the primary **States covered by the affiliate.**
Source: NCDHIP Handbook.

Figure 6— **DHI Affiliate and DRPC Locations**



1 WA DHIA	10 CO DHIA	19 WI DHIC	28 GA DHIA
2 OR DHIA	11 NM DHIA	20 MS DHIA	29 SC DHIA
3 ID DHIA	12 Heart of America	21 IN DHIA	30 DRPC @ Raleigh
4 CA DHIA	13 TX DHIA	22 MI DHIA	31 United Federation of DHIAs
5 Tulare DHIA	14 MN DHIA	23 DHI Co-op Inc.	32 Mid-East DHIC
6 Agri-Tech Analytics	15 Dairy Lab Svs	24 KY DHIC	33 Lancaster DHIA
7 Rocky Mtn. DHIA	16 Mid-States DRPC	25 TN DHIA	34 PA DHIA
6 DHI Computing Service	17 MO DHIA	26 AL DHIA	35 Ne DHIA
9 AZ DHIA	18 LA DHIA	27 FL DHIA	36 VT DHIA

Competition*[9]. *Only 27 percent of those contacted called competition from other DHI organizations "very strong" or "strong," while 73 percent said it was "moderate," "weak," or "non-existent." However, 14 managers (67 percent) said their organizations are working on strategies to be more competitive.

Thirty-three percent of the managers said they expect the number of herds and cows they serve to increase in the next 3-to-5 years, 14 percent anticipate serving the same number, and 29 percent expect a decrease. Two reasons were given by those seeing an increase-_(l) their organization was in a region where cow numbers are increasing and ***(2) their*** organization was developing and employing competitive strategies to gain market share.

Satisfaction with DRPCs. Ten managers (48 percent) were "very" satisfied with the level of DRPC service they receive, five (24 percent) were satisfied, and five were not satisfied.

[9] **Competition for a DHIA implies that the organization is working to increase the number of cows enrolled in its testing plans by "going after" additional business in other territories traditionally held by other DHIAs.**

Members' rating of DHIAs. When asked how members would rate their organizations overall (e.g., services, operations, member representation) on a scale of 1 (poor) to 7 (excellent), managers ratings ranged from a low of 3 to a high of 7. Most felt members would rate their organization just above average.

Progressiveness[10] of board members and members . Eighteen (86 percent) of the 21 managers said their organization's board of directors was progressive in accepting and adopting new technology on their farms. Only 3 managers (14 percent) said their boards were not progressive.

Managers said about a quarter (26 percent) of their members are "very" progressive, half (48 percent) are progressive, and the rest not amenable in accepting and adopting new technology on their farms.

Optimism for the future . A healthy 95 percent of the managers are either very optimistic or optimistic about their organization's ability to adjust to dairy industry changes and pressures and succeed in the future as indicated by their comments:

- optimistic-but DHI is not moving structure fast enough to use technology and gain efficiencies,
- optimistic-because of available people and finance resources,
- very optimistic-because our organization is strong and progressive without being radical,
- optimistic-because we've had planning sessions on how to adapt,
- optimistic-our role will change but the need for milk recording will continue,
- very optimistic-because we believe we have a unique product to market,
- optimistic-you have to adjust to change or be passed by,
- optimistic-we're making headway (service orientation),
- very optimistic-our only concern is individual dairymen and we deliver,
- very optimistic-excellent personnel and equipment,
- optimistic-but local milk market is unstable.

One manager felt changes were coming too fast for the leaders (board of directors) to handle.

DRPCs

In recent years, DRPCs have become more competitive, with performance a major focus. The centers have pared down record turnaround time and provided more flexibility in designing custom records processing. Conversion to electronic input and new printing technology have cut the time from when data is gathered by a DHIA, received by the DRPC, analyzed, and returned to dairy producers in processed form.

Seven DRPCs within the DHI system process data and mail reports to dairy producers for the local and affiliate DHIAs:

- Agri-Tech Analytics, Tulare, CA,
- Mid-States DRPC, Ames, IA,
- Michigan DHIA, Inc., Lansing, MI,
- DRPC at Raleigh, Raleigh, NC,
- Pennsylvania DHIA Service Center, State College, PA,
- DHI Computing Service, Inc., Provo, UT, and

[10] Progressiveness, in this context, implies that an individual or organization is assertive **in learning about new technology and taking** an active role in employing it.

Table-Number of cows handled by each DRPC, 1989 and 1994.

	1989	Percent	1994	Percent	Percent Change
Agri Tech Analytics	414,474	9.05	561,144	12.38	35.46
Mid-States DRPC	450,876	9.84	363,893	8.02	-19.29
Michigan DRPC	154,596	3.38	156.157	3.44	1.01
Minnesota DRPC	339,127	7.4	331.239	7.3	-2.33
Cornell Dairy Records	493,562	10.78	457,717	10.09	-7.26
DRPC @ Raleigh	773,274	16.88	914,705	20.16	18.29
Pennsylvania DHIA	350,546	7.65	276,250	6.09	-21.19
DHI Computing Service	795,524	16.37	757,880	16.71	-4.73
AgSource Coop. Serv.	808,313	17.65	716,924	15.8	-11.31
Total	4,580,292		4,536,207		

Source: NCDHIP Handbook.

- AgSource Cooperative Services (formerly Wisconsin DHIC), Madison, WI.

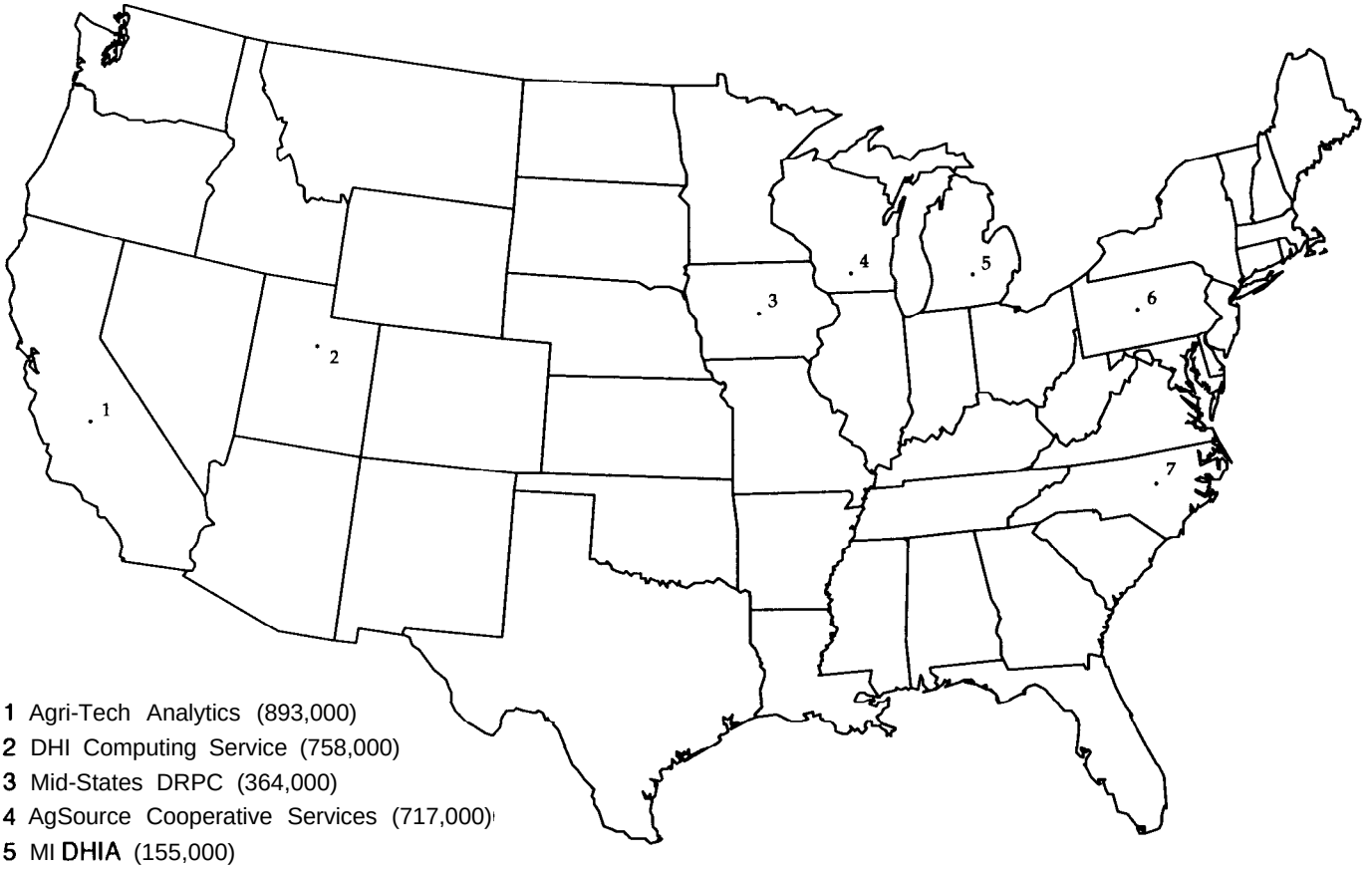
The figure 7 map shows the location of these centers. Two processing centers recently closed—Minnesota DHIA and Cornell Dairy Records (formerly associated with Northeast DHIA).

Table 5 shows the number of NCDHIP cows handled by each processing center for 1989 and 1994. In 1989, AgSource Cooperative Services (Wisconsin DHIC), DHI Computing Service (UT), and Cornell Dairy Records (NY) were the top three processing centers, respectively, in terms of number of cows handled. By 1994, the top three in order were DRPC at Raleigh (NC), DHI Computing Service, and AgSource Cooperative Services (WI). (Appendix table 4 shows the number of cows handled by each DRPC by State for 1994.)

In 1994, four DRPCs—Michigan, Minnesota, Pennsylvania, and Wisconsin's AgSource Cooperative Services-handled records primarily for their respective States. The other five DRPCs had multi-State business. DRPC at Raleigh and DHI Computing Service provided records on cows from 21 States, Cornell Dairy Records served 10 States, and Agri-Tech Analytics (CA) and Mid-States DRPC (IA) each provided records on cows in 9 States.

From 1989 to 1994, many changes occurred in the number of cow records processed by the centers. Two DRPCs had double-digit increases in cow records processed and three had double-digit decreases (table 5; see appendix table 5 for changes in herds served). DRPC @ Raleigh had an 18 percent increase and Agri-Tech Analytics increased 35 percent. Pennsylvania DHIA records declined 21 percent; Mid-States DRI'C, 19 percent; and AgSource Cooperative Services, 11 percent. The four others had more moderate changes: Michigan DHIA was up 1 percent, DHI Computing

Figure 7— **DRPC Locations and Records Handled**



1 Agri-Tech Analytics (893,000)
2 DHI Computing Service (758,000)
3 Mid-States DRPC (364,000)
4 AgSource Cooperative Services (717,000)
5 MI DHIA (155,000)
6 PA DHIA (276,000)
7 DRPC @ Raleigh (1,372,000)

Number in parenthesis indicates estimated number of cow records handled by DRPC, using 1994 statistics and recent changes.

was down 5 percent, Cornell Dairy Records was down 7 percent, and Minnesota DHIA was down 2 percent. (Appendix table 6 shows the States where numbers of cow records either increased or declined between 1989 and 1994 for each processing center.)

Because of the DRPC closings in Minnesota and at Cornell, record processing has shifted to Agri-Tech Analytics for Minnesota DHIA and DRPC at Raleigh for Northeast DHIA. Figure 7 indicates that DRPC at Raleigh will handle about 1.4 million records (estimated using 1994 data and the recent change), making it the largest of the remaining seven DRPCs. Michigan is the smallest with about 155,000 records.

DRPC Manager Opinions

Six of the seven DRPC managers were asked about their operations, DHIAs, general industry conditions, and future needs. This section summarizes their views.

DRPC strengths and weaknesses . Table 6 shows the strengths and weaknesses of the six DRPCs as indicated by the managers. They indicated that their operations had many strengths and few weaknesses. Employees, records quality, efficiency (both cost and turn-around time), progressiveness, and innovation were cited as major strengths. One manager felt that flexibility was a major strength.

Two managers identified cost efficiency and facilities as weaknesses and in citing a weakness, one manager said software development time was too slow.

Members' rating of DRPCs . Based on a scale of 1 (poor) to 7 (excellent), managers said their members would give their processing operations high ratings. Four managers said that members would rate them at 6, one said 7, and one said 5.

Rating of DHIAs. Figure 8 shows how DRPC managers rated the DHIAs-whose records they process-overall and according to progressiveness, member service, and leadership. Ratings were above average for all four categories with progressiveness rated slightly higher than the other areas.

Rating of affiliate field staff. Three job characteristics of technicians or supervisors were rated by DRPC managers (figure 9). Accuracy of data collection received a relatively high rating of 5.5 followed by quality of data collection rated at 5.3. Knowledge of record features received a rating of 4.2.

Milk Testing Labs. The six DRPCs receive data for processing from a total of 56 milk labs. The average was 9 and numbers ranged from 1 to 18. Managers were satisfied with the quality and performance of the labs. Five were "very" satisfied and one felt overall satisfaction but said a number of things could be improved.

Competition . Two managers said that competition was "strong" from other DRPCs and three indicated that it was "moderate." Only one manager indicated that competition was "weak." While competition was not felt to be strong overall, five managers indicated they are employing strategies to be more competitive.

Future service expectations . Four of the six managers said they expect to process more cow records in the next 3 to 5 years. One manager felt that cow record processing would decrease greatly.

Table 5--Strengths and weaknesses of DRPCs.

Trait	*Strength*	*Weakness*
Cost efficiency	4	2
Employees	6	0
Efficiency of turn-around time	5	0
Progressive	5	1
innovative	4	0
Quality of records (consistency)	6	0
Equipment	3	1
Facilities	3	2

Numbers indicate strength and weakness traits as identified by the managers.

Figure 8— **Rating of DHIA's by 6 DRPC Managers**

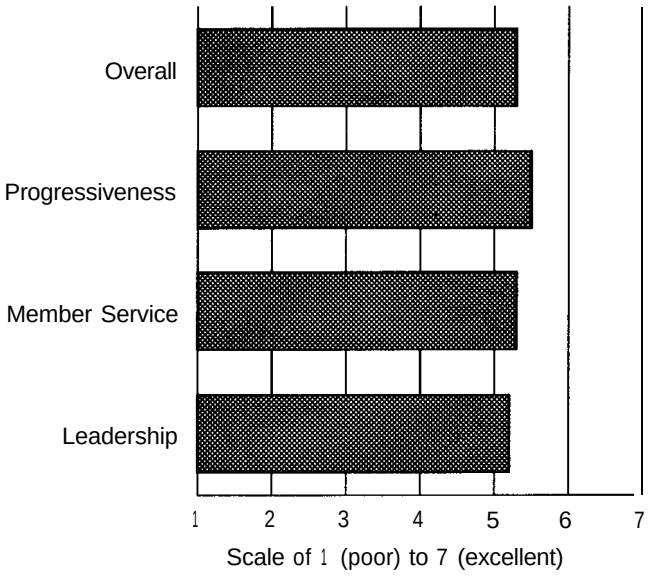
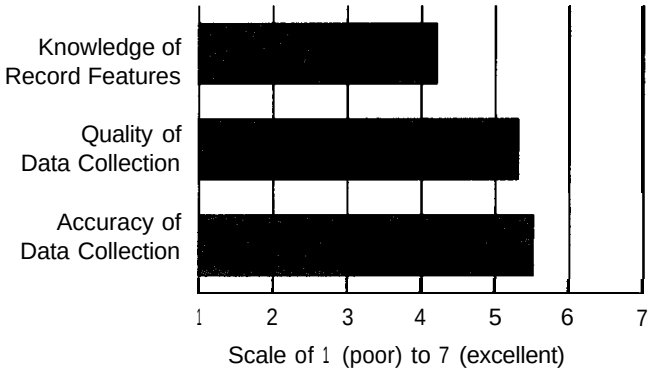


Figure 9— **Rating of DHIA Supervisors/ Technicians by 6 DRPC Managers**



Optimism. All the DRPC managers were optimistic to very optimistic about the ability of DHI organizations to adjust to industry changes and pressures and succeed in the future. Degree of optimism and comments included:

- very optimistic-DHIA managers are enthusiastic and have good leadership skills,
- very optimistic-organizations have shown ability to adapt in the past,
- optimistic-the quality of technical and support people makes me optimistic,
- optimistic-they can look ahead to meet future demands,
- very optimistic-DHI organizations have shown the ability to succeed, and
- optimistic-DHI organizations are making changes now.

Progressiveness . DRPC managers believe that the DHIAs using their service are "somewhat" to "very" progressive in adopting new technology and responding to change.

Status of DHI—Summary

The number of DHIAs and DRPCs have declined in recent years largely due to consolidations and closings. The number of cows participating in NCDHIP plans increased from 1989 to 1994, while the number of herds decreased to a larger extent, indicating an increase in producer-participant herd size. NCDHIP testing plans are being customized and management information systems developed to better meet producers varying needs.

The DHIA managers said their organizations have many strengths, although some areas could be improved. Overall, affiliate financial strength was found to be adequate (most were fairly strong, although about 20 percent indicated significant improvement was needed). Three-fourths of the managers said competition was "weak" but indicated that they were working at being more competitive. Most of the managers were optimistic about the future and indicated that their board and members are progressive. At the same time, interestingly, the managers indicated that members would probably rate their organizations only slightly higher than average.

In 1995, the field of DRPCs decreased. Three of the remaining seven increased records processed between 1989 and 1994, and the other four decreased in varying amounts. In 1996, the largest DRPC will be at Raleigh and the smallest will be Michigan DHIA.

Similar to their DHIA counterparts, DRPC managers identified numerous organizational strengths and few weaknesses. The managers also said their members would rate them high. On the other hand, managers rated the DHIAs and their associated field staff at just above average, although they think the DHIAs are progressive. Milk testing labs were given high satisfaction ratings. While only two managers felt that competition among DRPCs was strong, most indicated they are working at being more competitive (i.e., working to increase records processed through cheaper fees, greater efficiency, and flexibility). Four of the six managers expect service (cow records handled) to increase in the next 3 to 5 years and all six were optimistic about the future.

Strategic Planning: Heading into the Future

The information provided through industry leader contact indicates DHI leaders have a positive view of their organizations and are optimistic about the future. All managers expect that changes will continue to occur in the dairy industry and additional adjustments will be needed to better position their organizations. In addition to providing information on the status of DHI and their organizations, the managers provided substantial ideas and opinions on the future of their industry and what changes need to occur for DHI to remain a viable system.

This section uses those ideas and opinions in conjunction with a strategic planning model to provide a framework for discussing goals, industry trends and conditions, strategies, and possible strategic direction.

Strategic planning helps guide organizational adjustment and positioning in an industry. The proce-

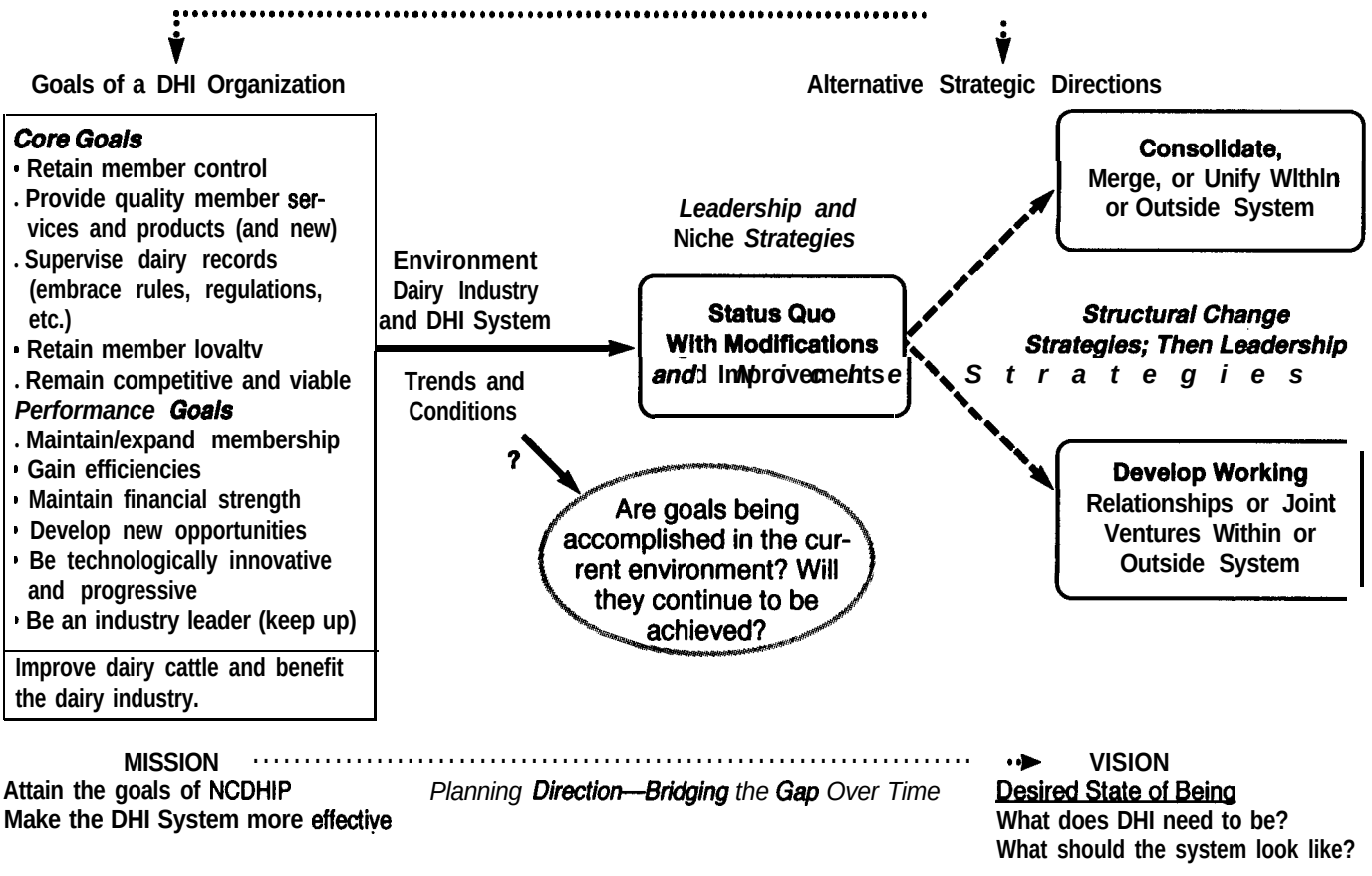
Figure 10— Industry Dictated Strategic Positioning

dures to this approach are intended to explicitly identify goals, review the current operating environment, and evaluate strategies and alternative directions.

Figure 10 presents a general view of the strategic positioning that firms must evaluate because of industry trends and change. The figure shows the emergence of trends and conditions that cause an industry to change or consider change. The movement from trends and conditions to industry change creates situations that require organizations to adjust, plan, and position themselves in the changing environment. Certain strategic directions will be more effective than others in responding to industry change. They will also vary in facilitating the achievement of goals. The process of decisionmaking converges to evaluation of alternative strategies and directions. Figure 10 demonstrates activities taking place in the DHI industry quite well.

Figure 11 provides a detailed view of strategic planning as it specifically relates to DHI organizations. The left side of the diagram shows some of the goals of a DHI participant organization. Goals can be distinguished between core and performance. Core goals

Figure 11— Strategic Planning: Evaluating the Future



represent a standard rationale for an organization that are less likely to be revised over time. In contrast, performance goals are continuously reviewed for accomplishments and revisions in light of emerging industry trends. Effectiveness in accomplishing goals establishes important criteria for guiding decisions about strategies and direction. Using this approach helps industry participants identify potential tradeoffs between one direction and another.

Emerging trends and conditions of the dairy industry and DHI system are causing DHIAs and DRPCs to adjust their operations, creating the need for evaluating alternative strategic directions. From the information collected from DHI managers, three potential directions emerged: (1) status quo with modifications and improvement, (2) consolidate, merge, or unify within or outside the system and (3) develop working relationships or joint ventures within or outside the system.

How well DHIAs and DRPCs survive will depend on the strategies employed and what direction they choose. These will be contingent on whether they are accomplishing expected goals in the face of industry changes.

The major theme in strategic planning is to bridge the gap between the mission of participating organizations and the DHI system and the vision of what a DHIA and the DHI system needs to be in the future. In general, the DHI mission is to attain the goals of the NCDHIP and to make the DHI system as effective for dairy producers as possible. To attain the vision, DHI leaders need to clearly define what the system should look like to remain a viable and involved player in the dairy industry Once that is specified, leaders will be better able to refine their goals and determine the strategies and direction necessary to close the gap from mission to vision.

DHI Goals

Potential core and performance goals are listed in figure 11. The core goals are a synthesis of the goals or missions of DHIAs, while performance goals reflect DHIA intentions for operating, progressing, and positioning in their industry. The ultimate goal of a DHIA (DRPC) is to "improve dairy cattle and benefit the dairy industry" Core and performance goals work toward that common end.

Core *Goals*

- Retain member control.
- Provide quality member services and products (and new ones).
- Supervise dairy records (embrace NCDHIP rules, regulations, etc.).
- Retain member loyalty.
- Remain competitive and viable.

Performance Goals

- Maintain/expand membership.
- Gain efficiencies.
- Maintain financial strength.
- Develop new opportunities.
- Be technologically innovative and progressive.
- Be an industry leader by keeping up with industry counterparts.

For a DRPC, these goals could be narrowed and revised. For core goals, a DRPC needs to provide quality service and record processing and work with DHIAs in meeting their, and NCDHIP, goals. For performance goals, DRPCs need to expand services (e.g., be flexible to their customers), maintain or increase the number of cow records processed, gain efficiencies (e.g., be cost efficient and competitive in turn-around time), remain price-competitive and financially sound, and be technologically innovative and progressive.

These goals will be discussed later in assessing the strategies and strategic directions available to DHI organizations. But first, further review of the dairy industry and DHI system is provided.

Industry Trends and Conditions

This review further explores the dairy and DHI industry by providing the opinions of DHI managers, reviewing the dairy cow population and where DHIAs are in relation to cows, examining trends of dairy producer income and assessing the system's market life cycle.

How Managers See the Industry

The DHIA and DRPC managers contacted provided these opinions on the trends and conditions of the dairy and DHI industry:

Structural Changes

- Fewer but larger dairy herds.
- Declining overall cow numbers.
- Greater milk productivity.
- Continued tough economics on dairy farms (e.g., low milk prices, financial stress).
- Changing demographics of the cow population.
- Increasing DHI competition on a national level.
- DHIA consolidation and/or forming alliances or special relationships.

Processing and Management Tools

- More technology on farms (e.g., computers, electronic meters, bST, etc.).

- Processing and report generation will continue to get closer to the farm while data retention and storage will be further centralized.
- Continued development of dairy management software for use by producers, DHI technicians, and industry consultants.
- Distribution and processing systems will get better and better.
- More processing on farms.
- Better computers.
- Laser printing and on-line services.
- More on-farm computers.

Member Needs

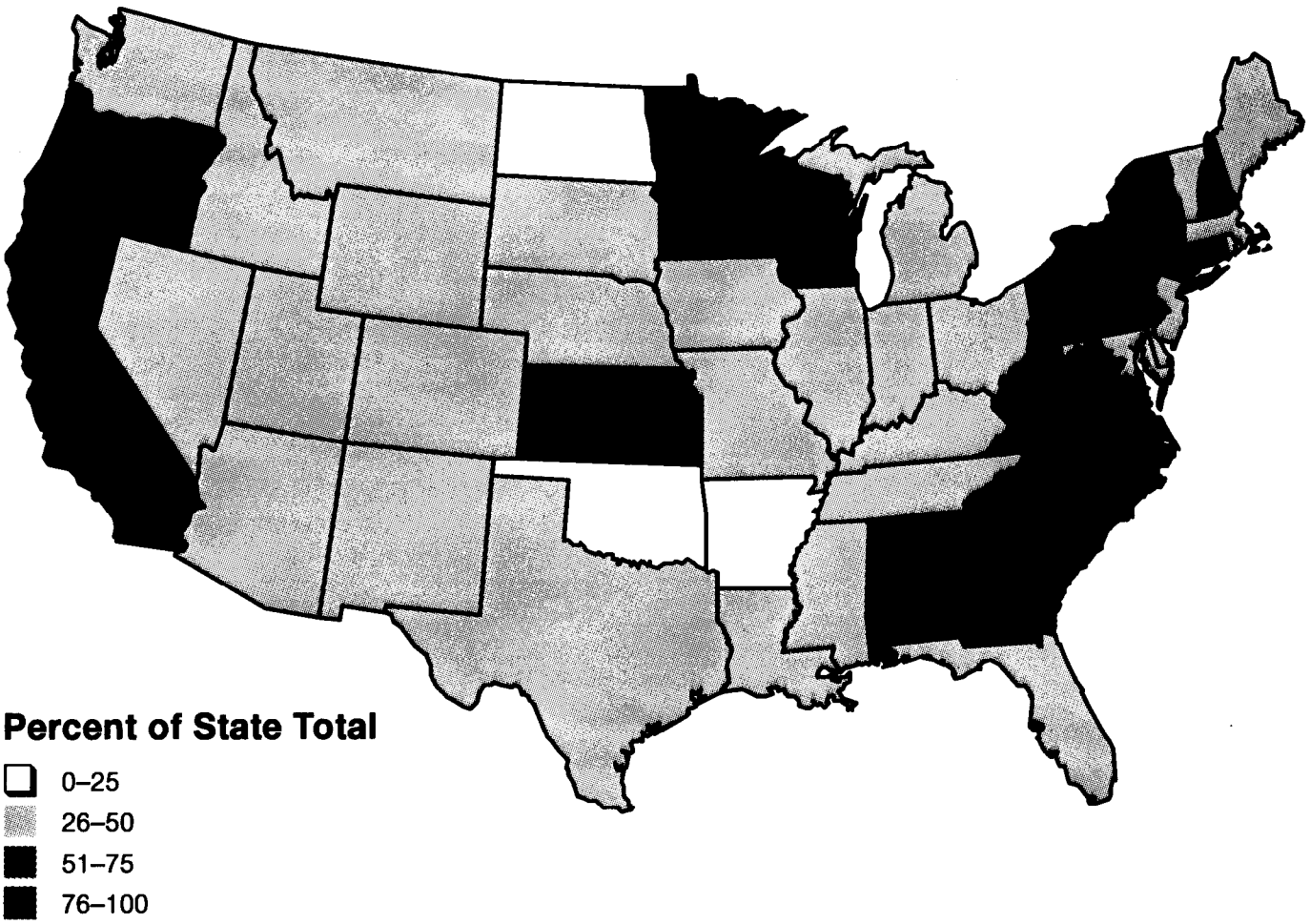
- Farmers closely watching the dollars they spend on supplies.
- Increased demand for specialized services.
- Increasing need for member loyalty.
- Less intrusive procedures on test day.
- Cow-side testing and new types of testing plans.
- Better trained and educated field technicians.

DHI managers have definite opinions about where they think the industry is headed. These observations provide part of the foundation on which to develop strategies. A closer look at U.S. cow populations will add to that foundation.

Dairy Cow Population Changes

Recent movements of the U.S. dairy cow population provide insight on emerging trends in the DHI industry. U.S. dairy cow numbers have declined significantly during the past 55 years to the current standing of less than 10 million dairy cows (9.5 million as of January 1, 1995). The U.S. maps depicted in figures 12 and 13 show that certain areas of the country continue to be strong dairy areas. The top five States in cow numbers are Wisconsin, 1,500,000 cows; California, 1,250,000; New York, 710,000; Pennsylvania, 639,000; and Minnesota, 600,000 (appendix table 3). Figure 12 shows the ranges of the percent of cows enrolled in

Figure 12— Percentage of Dairy Cows in NCDHIP, by State, 1995



NCDHIP for each State. The percents vary widely among the States, ranging from a high of 77 percent in South Carolina to a low of 18 percent in North Dakota.

Figure 13 shows ranges of dairy cow numbers by State, but there is no clear pattern across the nation. For precise cow population data, see appendix table 1. The table shows the number of cows in each State for 1985, 1990, and 1995. It also indicates 10- and 5-year changes, and the relative proportion of cow numbers in each State to the total number of cow numbers in the U.S. In 1995, the total number of cows was down 13 percent from 1985, and down 5 percent from 1990.

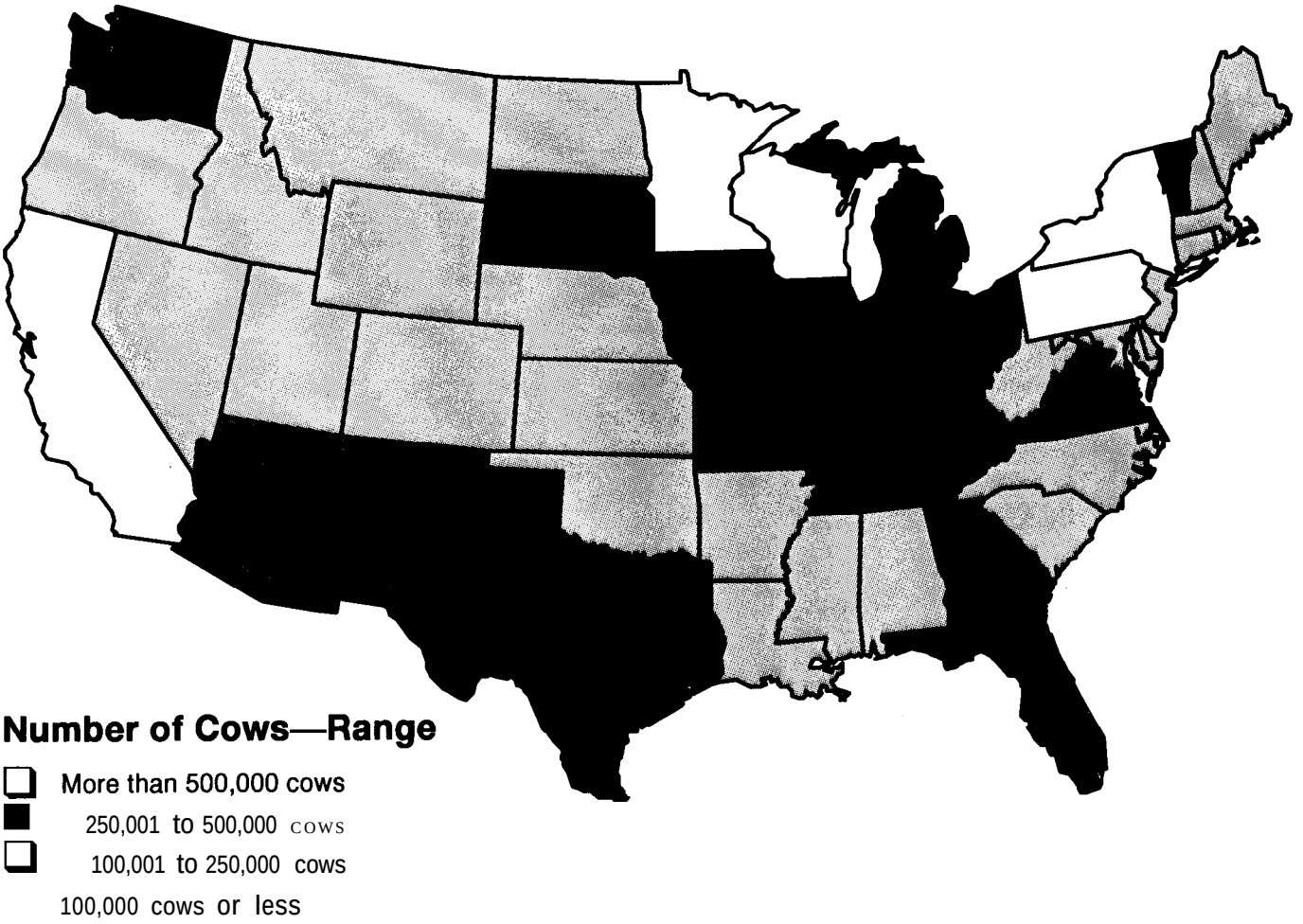
Figure 14 illustrates cow changes from 1990 to 1995. The map shows the States that increased in cow numbers, had cow numbers decrease slower or faster than the average of 4.95 percent from 1990 to 1995 (appendix table 2). Cow numbers in 11 States increased while the rest declined. Numbers increased in the western and southwestern regions of the country while decreasing over the rest of the U.S. The largest increases (in numbers not percents) from 1990 to 1995 were in California, New Mexico, Idaho, Washington, and Arizona, while the largest decreases were in Wisconsin, Minnesota, New York, Ohio, and Pennsylvania. While total cow numbers are not expected to decline much in the near future, the location of dairy cows in the U.S. will likely continue to change.

DHIA Location and Cow Populations

In assessing how the present DHIAs will fit into the future DHI system, it is important to examine DHIA locations in relation to the cow populations.

Figure 15 outlines the four regions identified by National DHIA. The Western region has 2.3 million or 25 percent of the nation's cows and 9 affiliates, the North Central region has 3.8 million or 40 percent of the cows and 8 affiliates, the Northeastern region has 1.8 million or 19 percent of the cows and 5 affiliates, and the Southern region has 1.6 million or 16 percent of the cows and 11 affiliates. Interestingly, the Southern region

Figure 13— **U.S. Dairy Cow Population, by State, 1995**



has the most affiliates even though it has the lowest number of cows and the lowest percent (42 percent) of its cows enrolled in NCDHII? The Western region has the highest percent of cows enrolled in NCDHII?

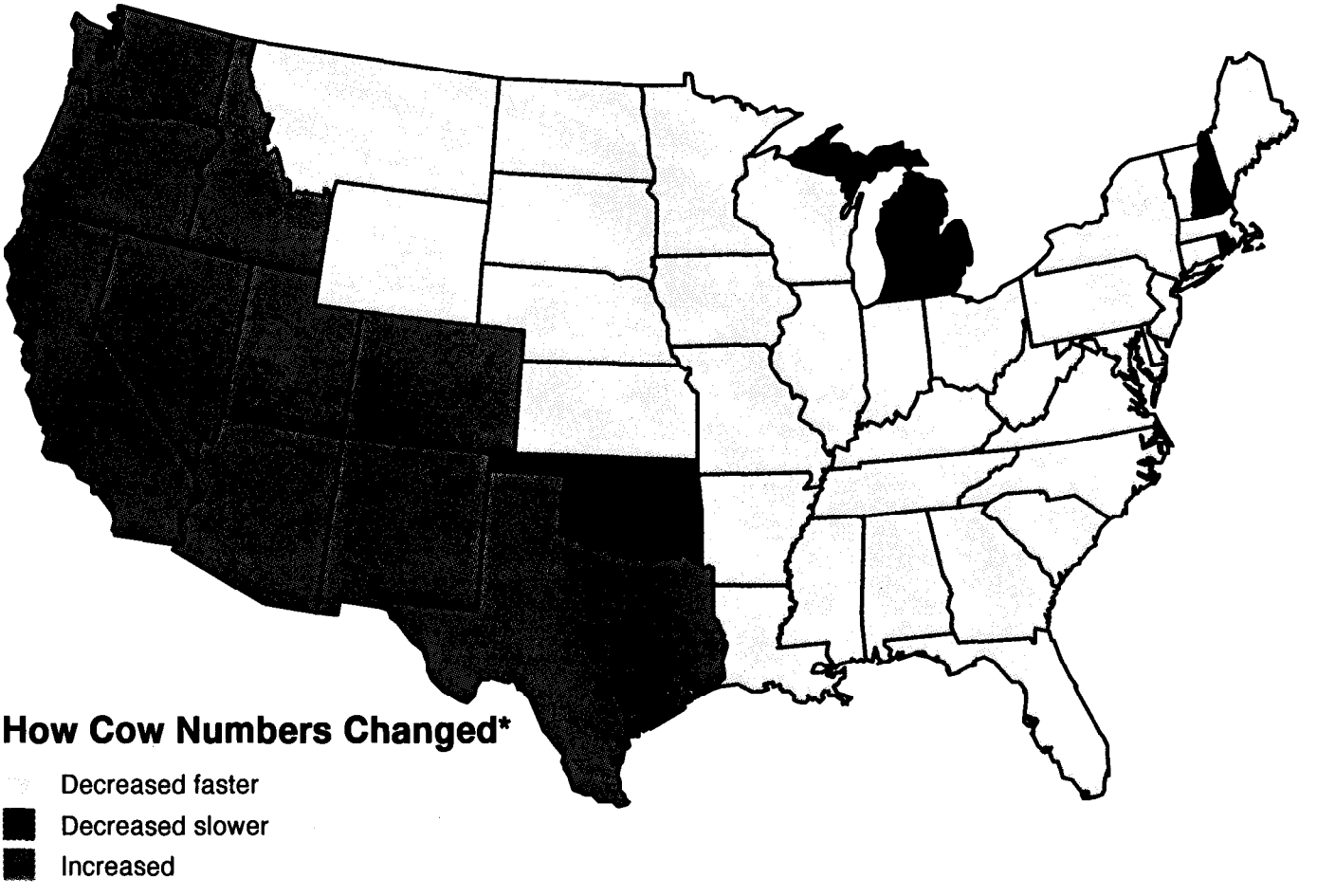
This analysis is not meant to suggest that the cows in the various regions are linked to the DHIAs of the same region. Some enrollment crosses over the depicted regional boundaries to other regions. However, this map does suggest considerable disparity in the number of cows available geographically for handling by DHIAs. For example, some DHIAs, such as those in the Southwest have a much greater population of cows for potential enrollment than other DHIAs such as those in the Southeast.

Trend of Dairy Producer Income

While studying cow numbers is necessary, it is also important to examine the income available to dairy producers to fund the many needed operational supplies. As service providers to a specific sector of the farm economy, DHI organizations must be concerned with how receptive dairy producers will be to paying for dairy management records and the other services that DHI organizations can provide.

Figure 16 illustrates the trend in dairy producer gross income. In real terms, using cash receipts from dairy products as a proxy, gross farm income of U.S. dairy producers decreased from 1984 to 1992, from $18 billion to $14.4 billion. Unfortunately, this suggests dairy producers face increasing pressure related to the quantity and type of operational supplies and services they can afford. As these costs increase without complimentary increases in income, those experiencing any economic hardship will find it necessary to pick and choose what they can afford. While DHIAs and many dairy producers fully understand the value of farm records and management information for the successful operation of a dairy farm, other producers, including some presently using DHI, may become increasingly reluctant to pay for DHI services if the

Figure 14— **Dairy Cow Number Changes, 1990-1995**



** Decreased faster and slower refer to changes in cow numbers relative to the average decrease of 4.95 percent.*

trend shown in figure 16 continues and they can't find ways to shave other operational expenses.

In addition, some question the ability of small- and moderate-size dairy farms to survive in the future. A study reported in Feedstuffs[11] (carried out by Knutson, et al.) of dairy farm performance relative to the status quo and alternative potential government dairy legislation indicated that many smaller dairies (55-cow herd size) will continue to struggle into the future no matter what dairy legislation is enacted. Conversely, larger dairies will be better equipped to thrive in future years.

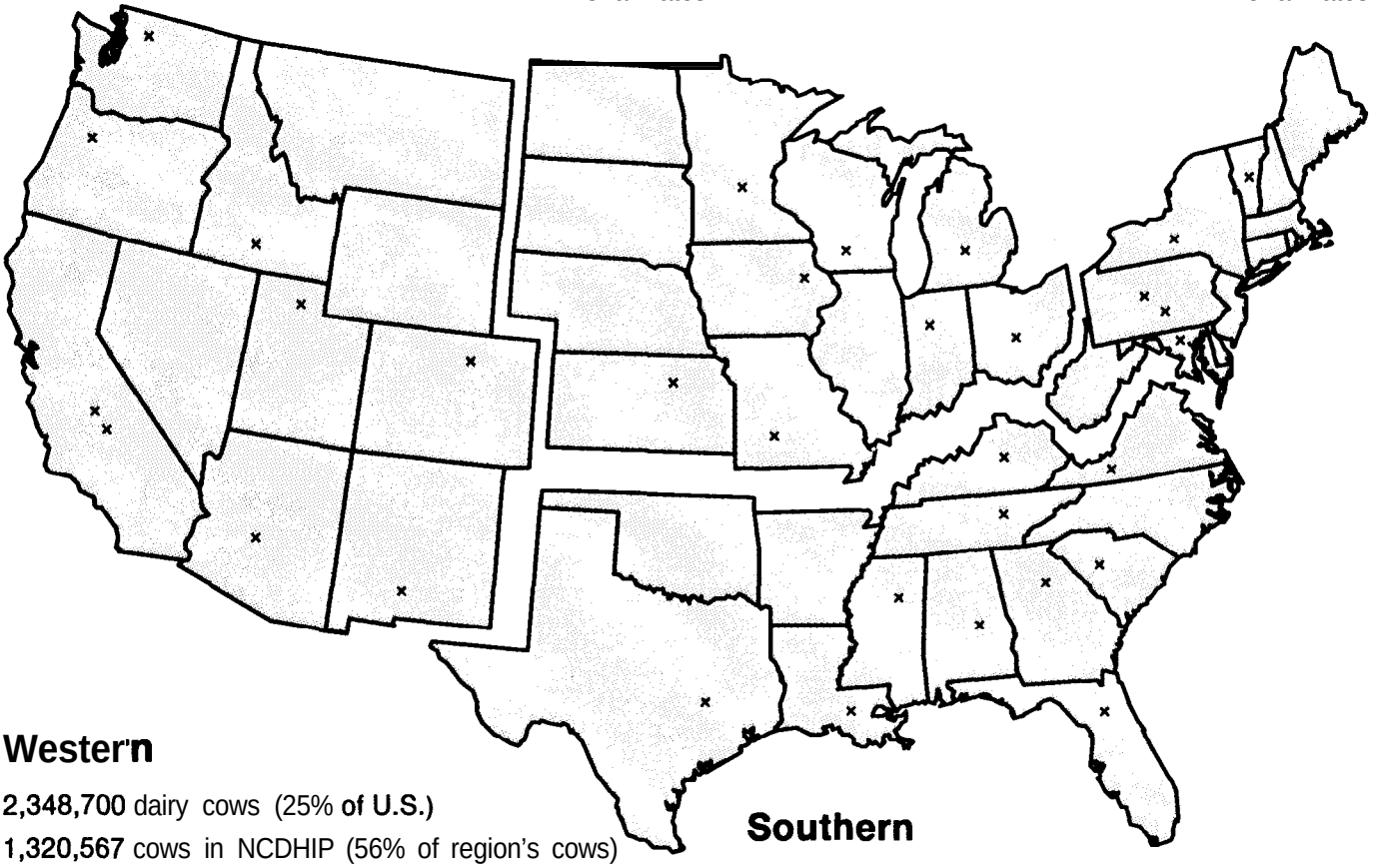
These findings and general concern for the fate of small dairy farms given current trends toward larger operations suggest that DHIAs need to be aware of how well the smaller dairy farms are fairing. Those with a proportionately large population of smaller farms in their total member base must consider this in future planning.

Assessment of Overall Market Conditions

The information outlined throughout this report strongly suggests that the DHI system is confronted

[11] Article by House, Charles. "Congress Can't Stop Trend Toward Large Dairy Farms, Economist Says," Feedstuffs, Volume 68, Number 11, March 11, 1996, p.10.

Figure 15— 1995 Dairy Cow Numbers and Those in NCDHIP, by Region

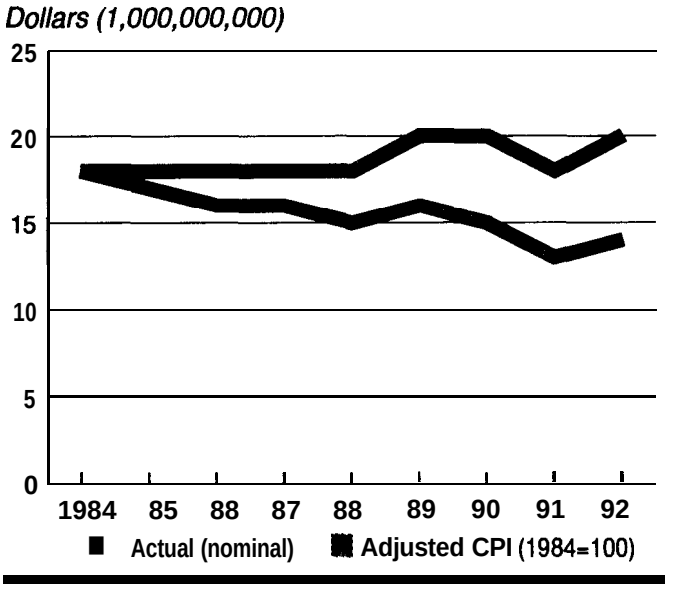


X Denotes DHI affiliate location.

with a mature market. While changes are continuing, the market in the traditional sense of DHI service, is stagnant. In the business world, a stagnant market is considered to be mature when characterized by such factors as choice among brands and competitors, little product/firm differentiation, strong competition, broadening product lines, prevalent service and deals, fewer customers for traditional cash cows, price competition, and lower margins and profits. All of these factors are present in the current DHI industry. (See appendix figure 2 for an illustration of the four phases of the industry/business/product life cycle.)

In the maturity phase, a number of strategies are available to firms. Which ones to pursue depend on a firm's position compared with competitors and its outlook of the future.

Figure 16— Gross Farm Income from Dairy Products (cash receipts)



Market strategies. Figure 17 indicates major strategies available in a mature market under three organizational positions. If a firm has strengths relative to competitors, the strategies to pursue are leadership and niche-position/scope (A). Leadership is seeking a prominent or leading position in terms of market share and working to increase and hold it. For DHIAs, this clearly is the strategy being pursued in continuing the service of providing dairy records and management information. A niche strategy is creating and employing a special opportunity in a particular segment of the market. DHIAs are also doing some of this. Examples include business activities outside of traditional services, such as selling computer hardware

Figure 17— Strategies in a Mature Market Environment

Position/scope	*Strategies to Pursue*
(A) Have strengths relative to competitors; continue on course	Leadership Seek a leadership position in terms of market share. Niche Create and/or defend a strong position in a particular segment (products/service) (Breaking into or developing new markets).
(B) Seeking new or renewed opportunities for synergy and enhanced strength	***Consolidation*** Seek partners for consolidation or merger to develop or maintain leadership ***Joint Ventures*** Seek partners for joint venture or partnership activities to gain economies of size in certain areas.
(C) Lack strengths relative to competitors; make structural change or get out	***Harvest or Divest*** Manage a controlled disinvestment taking advantage of strengths, or liquidate (Usually not a palatable option for any firm. It normally comes about only as a last resort-when things have gone from bad to worse and no other strategy is feasible.) If not an option, look again to (B).

Source: Porter, Michael. Competitive Strategy

and software or testing soil and forage samples. Over time, successful niche strategies diverge to leadership.

Often, a firm in a mature market will seek new or renewed opportunities for creating synergies or enhancing position and strength-position/scope (B). Consolidation or joint venture opportunities are two such strategies to pursue for firms looking in that direction.

(1) Consolidation. Combining operations with a compatible organization carrying out the same activities in a nearby geographic region is a strategy for maximizing the probability of maintaining a leadership position. The individual DHIAs that combined to form the three recently unified DHIAs (Heart of America DHIA, Dairy Lab Services, and United Federation of DHIAs) took this approach.

(2) Joint venture. Developing a joint-business arrangement with other associations/firms to gain size economies is also a strategy to enhance strength and perhaps secure a brighter future (AgSource Cooperative Services is using this approach as a joint-function of Cooperative Resources International-the holding company that includes AgSource Cooperative Services and three artificial insemination cooperatives as subsidiaries).

Unification and/or joint-venture strategies often come into play through the sheer force of market pressures. In other words, not every organization operating in a mature market can maintain a leadership position or be successful at developing niche markets. Eventually, some will be pressured into consolidation or joint-working relationships, or, will be forced to take other actions. Leadership and niche strategies are not mutually exclusive from the structural change strategies. In fact, they usually interlock-firms often pursue consolidation and joint-venture strategies to gain a position that will enable them to better employ leadership and niche strategies.

If an organization lacks strength relative to competitors-position/scope (C)-and lacks the resources or market presence to make leadership or niche strategies successful, it may need to either look at restructuring (i.e., consolidate or develop working relationships as in position/scope (B)), or, divest its assets. Divesting is not a very palatable option for any firm, and even less for a cooperative or member-oriented service organization such as a DHIA formed by producers.

In sum, these strategies, given current market conditions, suggest that DHI organizations have limited strategic directions available. The next section outlines three primary directions.

Alternative Strategic Directions

A necessary part of strategic planning is anticipating and evaluating alternative strategic directions where organizations in the industry are headed or may be headed. Given industry conditions and the mature market DHIAs are facing for carrying out traditional services, three strategic directions are defined in figure 11:

(1) continue status quo with modifications and improvements,

(2) consolidate within or outside the system, and

(3) develop working relationships or joint ventures inside or outside the system.

While these directions may be rather vague, a myriad of choices or alternative sub-strategies fit within each. This section describes these directions-what they entail and how they fit into the scope of operations for DHI organizations.

Status Quo With Modifications and Improvements

Status quo in the DHI context using the terms "modifications and improvements" indicates that under existing conditions a framework is in place for pursuing change given the climate. Most DHI organizations are following this strategic direction-working with what they have and striving to be more member responsive, more efficient in carrying out their basic DHI functions, and in some cases, providing additional services beyond their traditional roles. Under status quo, DHIAs use leadership and niche strategies to modify and improve their organizations. They seek a leadership position in the area they serve by capitalizing on their traditional strengths (e.g., laboratory analysis, dairy record provision, and information resources). Many also work to identify and develop niche markets for new products and/or services (e.g., working to take advantage of new technology-i.e., computer hardware and software-being achieved at the farm level). An explicit example of a niche strategy is the water-testing outside service recently developed by AgSource Cooperative Services.

Also implicit in this strategic direction is the ongoing strategy of working to build additional business with dairy farm operators not using DHI. Although progress has been made in increasing the percentage of dairy cows enrolled in NCDHIP, a sizeable population of cows are not enrolled (figure 12).

The status quo, as defined here, has worked well for many DHIAs for some time, but how long it can continue is questionable. In general, cooperatives try to stretch out the maturity phase of their industry life

cycle to remain a strong entity for members. However, the maturity phase can not be stretched out indefinitely and eventually industry restructuring must occur.

The status quo will continue to work for DHIAs in some areas for a fairly long time, for some in other areas for a short time, and for others it may not work much longer. The ability to remain viable taking this direction will depend on a number of factors-the pace of continuing technological change on dairy farms, the economic health of dairy producers, the location relative to cow populations, the financial strength, the willingness and propensity to make changes, and how well the DHIA leaders define and implement strategies for modification and improvement. The DHIA and DRPC managers contacted provided strategy ideas.

DHI strategy ideas . Managers were asked what adjustments their organizations have to make to increase the number of dairy producers using DHI services and to provide better service. Most said "educate and sell dairy producers on the benefits of DHI services." Others suggested (1) being more aggressive in soliciting business from dairy producers; (2) providing services cheaper; (3) providing more services; (4) adopting new technology more quickly; (5) developing more programs tailored to individual producer needs; (6) removing traditional DHIA blinders and recognize that DHIAs must be service organizations in a larger industry; and (7) emphasizing DHI as a management tool-too many perceive it as a breed improvement program.

The managers also provided a number of strategies for making the DHI system and their organizations more effective. Suggestions for improving operations/service were:

- Reduce the number of rules.
- Develop a program to work with stand-alone systems.
- Pursue lower prices for in-barn automation of data collection.
- Lessen National DHIA's involvement in the business.
- Make functions faster, simpler, and less expensive.
- Increase service value in mind of the dairy farmer.
- Establish reasonable levels of quality and enforce requirements.
- Operate the organizations in a more businesslike manner.
- Meet dairy producers needs as they change.
- Incorporate financial management into the system.
- Continue to reduce many of the artificial lines (e.g., county and State) between DHIAs.
- End National DHIA's role in mandating programs which make DRPCs less competitive with private software developers.
- Develop more uniformity within DRPCs.
- Have less top down direction and more reliance on dairy producers themselves.
- Make system less regimented; consider developing a direct tie between the producer and the DRPC for those producers not wanting lab component information.
- Continue to adapt the system to changes in technology.
- Progress quickly or DHI will find itself without anyone to serve.
- Use the wealth of data available, assume new direction, and get going-DHI was fostered through Extension involvement which has and will continue to decline.

Here are their suggestions for improving education/promotion/training:

- Develop marketing training for field forces.
- Promote the benefits of the system and its functions and de-emphasize competition among service affiliates.
- End National DHIA assistance to competing affiliates in training, marketing, or similar endeavors. Instead, National DHIA should set meaningful standards and enforce them.
- Develop more cooperation between States.
- Build more trust between DHIA affiliates and also between DHIA and other industry farmer cooperatives.
- Weed out traditional thinkers.
- Compete with the private independent organizations carrying out record services and prove to the large commercial dairymen that DHI has something they really need.
- Invest more money to push technology and information highway services related to the dairy industry.

There are many fitting strategies in this listing. However, some of the responses are general expressions of everyday DHI operations-"meet dairy producer needs as they change" and "continue moving toward change." Although these common sense concepts are well understood, they are not always well followed and are worth discussing from time to time. Indeed, such phrases emphasize focus and leaders need to take them to heart and evaluate their organizations in their regard on a regular basis. Some of the other ideas or responses are rather fresh, however, and

should be given more thought and discussion. If fitting, they should be developed into concrete strategies. For example, "develop marketing training for field forces" and "develop more cooperation between States" should be further defined and discussed.

A snapshot of the current DHI system would reveal its strategic direction amounting to the status quo with modifications and improvements. To enhance that direction further, DHI leaders should closely examine the strategies listed earlier (and even brainstorm for others) and decide which ones need more attention relative to their organizations and/or the DHI system and incorporate them into plans. DHI leaders are saying that more work is needed on the efficiency and promotion ends of operations, and concurrently, that the relationships between DHIAs themselves, and the DHIAs and National DHIA, need to be more harmonious and further refined.

Structural Change Strategies

Some organizations in a mature market will find it mandatory to look at structural change strategies. Figure 11 presents two strategies for DHIAs: (1) consolidation or (2) greater coordination, including working relationships or joint ventures. These directions can occur inside or outside the DHI system. The three DHIA consolidations previously mentioned are an example of organizations taking the former direction. AgSource Cooperative Services implemented the latter direction through the development-in conjunction with cooperatives in the artificial insemination industry-of the holding company, Cooperative Services International.

Attrition will likely reduce the number of DRPCs as evidenced by the closing of Cornell Dairy Records and the Minnesota DRPC in 1995/1996. However, this does not preclude DRPCs from pursuing structural change strategies. Further opportunities should be explored.

The structural changes (e.g., consolidations, closings, boundary changes) that have taken place are significant, but may only be just the beginning of a longer process of change for the DHI system. The DHI managers contacted were asked whether their organizations had merged or consolidated with other DHIAs in the past 5 years. Five (24 percent) said yes. Those managers were then asked to rate how well the consolidation was working in the areas of member acceptance and representation, operational efficiency, and financial performance. Three said that member acceptance and representation worked well, one said it was adequate, and the other said that there were problems but progress was being made. For operational efficiency, two said it was working beyond expectations, two said it was working well, and one said there were problems but progress was being made. One said financial performance was beyond expectations, three indicated that financial performance was strong, and the other said that progress was being made despite some problems.

Those that have undergone structural change appear to be satisfied. This finding begs the question, are further structural changes likely? Managers expressed their opinions on that.

Manager opinions on further restructuring possibilities . Twenty-nine percent of the managers said consolidation with other DHIAs is likely in the future, 62 percent said it may be likely, and 9 percent said it is not likely.

Most of the managers (62 percent) who expected consolidations said only a couple of DHIAs would make compatible consolidation partners. Twenty-four percent felt that most DHIAs would make compatible partners.

DRPC managers were evenly split on whether they thought that consolidation or linkages with other dairy-related organizations (e.g., AI or milk marketing cooperatives) are likely in the future. Two said consolidations are likely, two said maybe, and two said no. One of those who said no felt that outside linkages would foster the idea that DHI is for genetic improvement rather than a dairy management system.

In reference to the number of DRPCs, 33 percent of the DHIA managers said there are just the right number and 52 percent said there should be fewer. When asked, how many processing centers there should be, 4 was the average number.

Similarly, four of the six DRPC managers indicated that they felt there are too many DRPCs. One said that there should be more and one said that there are just the right number. Two felt that the name "dairy record processing center" didn't apply to their operation, that their processing is merely a function of their DHIA coordinated with an entire process of carrying out DHI services. Thus, these leaders may not view consolidation of their "DRPC" with another "DRPC" as an available option-i.e., any such consolidation would need to entail the whole DHIA operation. Managers offered these thoughts on restructuring:

- Merge or federate AI, breed associations, and DHIAs.
- Reduce DRPC number to three.
- Merge with neighboring state DHIAs to reduce National DHIA dues and annual fees.

- Have fewer and larger direct-member DHI cooperatives.
- Eliminate local association structure.
- Consolidate organizations.
- Maintain key elements in DHI that have helped make the U.S. dairy industry the best in the world. Management information, genetic evaluations, and all elements of industry that work in these areas must seek new and non-traditional ways to work together (merge or federate) to maintain the advancement of the U.S. dairy industry.

With 91 percent of the DHIA managers indicating that consolidation is likely or may be likely and many of the managers saying there are too many DRPCs, along with the associated statements on restructuring, there is considerable agreement that structural change strategies should be seriously examined.

Because of obvious similarities and potential compatibility of fit, consolidations and/or working relationships among DHIAs should probably be given first review. However, that does not mean that reviews of potential outside consolidations or working relationships should not be made. In fact, the references about breed associations and financial management firms made by managers may indicate that some potential consolidation outside the system is being contemplated.

Goal Evaluation

DHIAs need to determine the strategic direction that will best allow them to continue achieving their goals. In other words, what direction is needed for the future? That will depend on the circumstances surrounding each DHIA and the time period being considered. In the short run, many DHIAs will likely fare well enough to continue status quo operations. Some may be able to continue this way even for the longer run.

Those able to sustain longer-term success with the status quo will have stronger financial and human resources, a prime location relative to cow numbers, and the ability to adapt quickly to change. However, even those that fit such criteria will likely find defense of their market position increasingly difficult given the competitive pressures that steadily arise in a mature market environment. On the other hand, DHIAs in a relatively worse position in terms of resources, location, and ability to adapt, may be forced to pursue structural change.

Comparing strategic directions and the ability they present an organization in the achievement of goals is an important aspect of strategic planning. In cooperatives, as in all businesses, the ability to achieve goals is the justification for existing. Because assessing goals relative to one strategic direction versus another can be complex, planners often use a goal evaluation matrix to simplify the process.

Table 7 provides an example of a goal evaluation matrix for DHI organizations to consider. The matrix is set up in conjunction with the DHI goals and strategic directions identified in this report. Goals are listed in

Table 7—DHI goal evaluation matrix-example

	Strategic Direction			
Core **Goals**	**Status Quo**	**Consolidation**	**Joint Venture**	*other*
Member control	Advantage			
Quality services/products				
DHI record supervision				
Member loyalty				
Competitive/viable		Advantage		
other				
Performance Goals				
Maintain (expand) membership		**Advantage**		
Gain efficiencies		Advantage		
Financial soundness				
New opportunities			Advantage	
Technological innovation				
Industry leadership				
other				

Some cells are filled in merely for the purpose of example.

the far left cells of the matrix and strategic directions (or strategies) are listed along the top. The next step is to identify whether a particular strategic direction has an advantage relative to other strategic directions for achieving each specified goal. The cells would be labeled in that regard. Because of the differences in the location and operational characteristics of the DHIAs, completing a goal evaluation matrix for the entire system would be too complex an endeavor and would be ambiguous at best. Therefore, in planning, each DHIA should complete a matrix. The matrix would prove useful when done on a regional basis also, when potential parties have mutual interest.

DHIA Goal Evaluation

DHIAs completing a goal evaluation matrix relative to their goals and the strategic directions specified in this report will need to consider a number of questions. Some include:

- What is happening to the cow population in their State/region of location?
- How close are competitors?
- How loyal are members?
- How well are programs being implemented (by itself and by competitors)?
- How financially viable is the organization?

Questions such as these must be answered in the context of both the present and the future. This will help clarify whether a particular strategic direction has advantages over others for achieving given goals. For example, if a DHIA is in a region where the cow population is declining and there are competitors in surrounding States, consolidation may have an advantage over the status quo for achieving the goal of gaining efficiencies, because consolidation would generate economies of scale and provide greater resources.

In assessing the strategic directions, DHI leaders should closely examine the strategy ideas and restructuring possibilities identified by the 27 managers (21 DHIA and 6 DRPC managers). If possible, more should be defined. Then, leaders will need to determine how well those identified can be implemented given their current structure and direction. Issues, opportunities, and strategies may need to be discussed on a regional, as well as independent, basis.

For most DHIAs, structural-change directions are worth closely evaluating now. Both DHI managers and the mature market environment are saying so. Evaluation is especially needed by the weaker or smaller DHIAs in low-cow population areas. At the same time, structural-change directions do not fit some as well. For instance, the DHIAs that have recently restructured may still be working out some related problems, such as attaining the full impact of economies of size. Indeed, some may need to continue working toward realizing potential gains before looking to possible further restructuring. Furthermore, other DHIAs with established leadership positions in strong cow-population areas may not yet feel any need or pressure to consider consolidation or working relationships. Some areas may still have room for developing leadership and/or niche strategies and DHIAs in those locations should pursue those efforts.

At the same time, market conditions suggest that all DHIAs must have some concern given the overall mature market environment and technological and operational innovations (e.g., on farm milk recording systems, lower cost services) that members expect. These conditions may eventually weaken even well-established and financially sound DHIAs as competition heats up for both traditional DHI business and certain developed niche markets (e.g., computer management programs). These statements are associated with the likelihood that DHI organizations that do not, or can not, embrace change and better position themselves in the industry will be forced to make changes (e.g., significantly downsize). That would decrease their strength and ability to employ and defend leadership strategies. It can be argued that in the longer run, only resource-superior organizations that possess a broad and solid member base, operational efficiencies, and the ability to develop and implement advanced technologies, will be able to effectively achieve the core and performance goals of a DHIA.

Many factors (e.g., regional industry conditions and association attributes) will alter how each DHI organization assesses strategic direction and strategies and the associated ability to achieve its goals. The point of the goal-evaluation planning approach is that strategies and direction can be more readily and accurately determined when measured against an organization's explicit core and performance goals and how the organization sees itself fitting within its industry.

DRPC Goal Evaluation

Evaluating strategic direction is different for DRPCs given that their strategies and direction are most often simply developed in line with their customer needs and demands. However, DRPCs can use the approach of table 7 to plan their future. Most currently use leadership and niche strategies to remain technologically proficient and quality-service oriented. Given the high ratings and the number of strengths DRPC managers identified about their operations, it's

probably safe to assume that DRPCs are achieving desired goals. However, since their two primary goals are to maintain or increase the number of cow records processed and to deliver product efficiently, how long all seven DRPCs will remain satisfied in the current environment is questionable. Those that are large and still growing are probably well positioned, while those that have seen significant decreases in the number of cow records handled may need to question their staying power and whether it will be feasible to continue processing records in the future.

Managers indicated there are too many DRPCs, but information on if, when, or how, the number can be narrowed was not ascertained. Given market and system conditions, the number will likely be reduced either by attrition or consolidation. Those with university affiliation may have neither the opportunity nor the incentive to pursue a structural-change direction (the two DRPCs that closed in 1995/1996 were associated with universities). Thus, reduction most likely will occur from closings.

Strategic Planning Summary and Implications

Strategic planning permits DHI system participants to systematically evaluate their future. Goals must be defined and refined; the associated local market and industry continually assessed; strategies must be developed, implemented and defended; and in light of an organization's ability to achieve its specified goals, strategic direction must be explored and determined.

The needs of the DHI system and the examination of industry trends suggest many possible goals. From an outside vantage point, 11 core and performance goals were provided for evaluating different strategic directions as part of a strategic planning process. These goals can be modified and reworded and if other goals can be defined, DHI leaders should identify and evaluate them.

The DHI managers contacted provided a sound assessment of their industry and espoused ideas on strategies and strategic direction that DHIA leaders need to independently, and in some cases, collectively, further discuss and define. In sum, strategies and strategic direction ideas indicated that DHIAs should focus on these areas:

- Education and promotion of DHI benefits.
- Aggressive solicitation of business.
- Progressive programs and services.
- Flexibility for meeting the needs of individual dairy producers.
- Efficiency.
- Further coordination between DHIAs, DRPCs, regulations, etc.
- Continued development of technological (on-farm and program related) capabilities.
- Improved marketing, training, and promotion of DHI.
- Consolidation within and/or outside the system.
- Seeking non-traditional ways to make system better.

The service provision role of DHI organizations is becoming increasingly difficult. With a shrinking base related to traditional sources of revenue (i.e., per cow dues/fees), DHI organizations are being forced into developing and providing other dairy-related services and products. They are feeling greater pressure to be both more efficient and cheaper while providing greater technical support and innovative programs. Flexibility, ingenuity, and extensive resources are fast becoming imperative ingredients for working in that direction. Additionally, on-farm electronic metering systems and dairy management programs are gaining in popularity, although primarily by producers progressive and/or large enough to afford them. These are increasing the pressure on DHI because this equipment challenges the traditional methods of DHI testing (i.e., technician surveillance and the "official" label of records).

The technological arena will continue to change and grow and become highly competitive. To effectively compete, DHIAs will need a broad and solid member-cow base, operational efficiencies, the ability to develop and implement advanced technologies, and considerable resources. The prospect that DHIAs will continue to have a strong role in providing services is based on the fact that most of the managers contacted identified numerous strengths and few weaknesses. They are optimistic about the future and feel their director leaders are progressive.

While many structural changes have occurred to DHI system participants over the years, this study defines their current strategic direction. DHIAs are working under existing conditions while continuously modifying and improving their operations in line with new developments and member demands. It is from this direction that strategic planning for the future needs to continue. DHIAs need to build on their strengths (managers identified many) and improve on their weaknesses. DHIAs will either proceed with the status quo (with modifications and improvements) or explore and determine other directions. Two strategic

directions likely to receive further exploration in strategic planning are consolidations and joint ventures within or outside the DHI system. How those directions are defined and whether they are further explored will depend on the circumstances surrounding each DHIA and its market position.

Leaders of one or more DHIAs in low-cow-population regions need to carefully analyze the current conditions of their respective market and thoroughly assess their organization's ability to achieve goals related to available strategies and directions.

In a mature market, continuing with the status quo will require competitive advantage: the ability to defend leadership strategies and the resources to develop niche strategies. Those who can do that may not need to examine other directions for some time. Conversely, those that are competitively disadvantaged-finding it increasingly difficult to defend leadership strategies and develop niches in their marketplace-will be forced to examine structural-change directions. It is important to note that those DHIAs that have been structurally changed in recent years have found their new structure well accepted by members and enhancing operational efficiency and financial performance.

Structural change within the DHI system will occur, but what type of change is necessary and will develop remains to be seen. Several directions of change are likely-more streamlining in the form of fewer DHIAs, fewer DRPCs, fewer milk labs, more streamlined regulations, more direct information flows, and more outside working relationships. Most DRPCs will struggle to maintain the number of records they process. Closings are likely to happen. For DHIAs, coming changes are likely to result from their individual initiatives. Some will be forced to restructure. This will consist of consolidations between existing DHIAs or outside relationships will be initiated with AI firms, holding cooperatives, dairy cooperatives, or financial management service firms.

While it may have been somewhat difficult to imagine the DHI system with such a varying array of potential participants in the past, such possibilities are gaining acceptance. Many leaders have suggested that they can foresee joining forces with outside service-oriented firms to provide the types of specialized services dairy producers are demanding.

The surviving DHI organizations will employ strategies and position themselves in the market to be flexible enough to deliver the varying programs and services producers demand, efficient enough to be affordable, and resource-strong enough to be progressive.

This report voices some opinions, thoughts, and expectations of DHI leaders. These can provide focus and stimulation for further discussions by DHI managers, directors, and members. A continuing dialogue requires progressive steps for planning and action. Sound strategic planning by DHI organizations will help determine the correct avenue for future success. System leaders and members need to be progressive, open minded, and involved. They must collectively brainstorm and listen to each other and the marketplace. Alternative strategies and directions must be explored in light of industry conditions and with a keen eye on crucial organizational and systemwide goals. Leadership must work and plan to properly position their organizations to continue their important contribution to the U.S. dairy industry.

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Appendix Table 1—Milk cows and heifers that have calved, United States 1985, 1990, 1995

	As of January 1,			10 year-change	5-year change	
	1985	1990	1995	1985-95	1990-95	Relative
	Numbers	Numbers	Numbers	Percent	Percent	weight
Alabama	49,000	40,000	36,000	-26.53	-10.00	0.38
Alaska	1,300	1,400	700	-46.15	-50.00	0.01
Arizona	83,000	91,000	116,000	39.76	27.47	1.22
Arkansas	79,000	69,000	61,000	-22.78	-11.59	0.64
California	974,000	1,115,000	1,250,000	28.34	12.11	13.11
Colorado	75,000	76,000	83,000	10.67	9.21	0.87
Connecticut	48,000	34,000	32,000	-33.33	-5.88	0.34
Delaware	10,000	9,000	10,000	0.00	11.11	0.10
Florida	164,000	182,000	170,000	3.66	6.59	1.78
Georgia	118,000	109,000	102,000	-13.56	-6.42	1.07
Hawaii	12,000	11,000	11,000	-8.33	0.00	0.12
Idaho	165,000	170,000	222,000	-33.33	-29.41	2.31
Illinois	216,000	195,000	165,000	-23.61	-15.38	1.73
Indiana	197,000	160,000	145,000	-26.40	-9.38	1.52
Iowa	345,000	308,000	265,000	-23.19	-13.96	2.78
Kansas	108,000	98,000	81,000	-25.00	-17.35	0.85
Kentucky	232,000	210,000	165,000	-28.88	-21.43	1.73
Louisiana	95,000	85,000	79,000	-16.84	-7.06	0.83
Maine	56,000	43,000	39,000	-30.36	-9.30	0.41
Maryland	121,000	106,000	91,000	-24.79	-14.15	0.95
Massachusetts	47,000	31,000	28,000	-40.43	-9.68	0.29
Michigan	390,000	344,000	333,000	-14.62	-3.20	3.49
Minnesota	890,000	715,000	600,000	-32.58	-16.08	6.29
Mississippi	84,000	63,000	57,000	-32.14	-9.52	0.60
Missouri	225,000	226,000	195,000	-13.33	-13.72	2.05
Montana	27,000	24,000	21,000	-22.22	-12.50	0.22
Nebraska	102,000	105,000	75,000	-26.47	-28.57	0.79
Nevada	18,000	20,000	23,000	27.78	15.00	0.24
New Hampshire	29,000	19,000	19,000	-34.48	0.00	0.20
New Jersey	39,000	26,000	23,000	-41.03	-11.54	0.24
New Mexico	65.000	71,000	170,000	161.54	139.44	1.78
New York	942,000	790,000	710,000	-24.63	-10.13	7.45
North Carolina	127,000	101,000	89,000	-29.92	-11.88	0.93
North Dakota	97,000	88,000	65,000	-32.99	-26.14	0.68
Ohio	380,000	354,000	293,000	-22.89	-17.23	3.07
Oklahoma	107,000	100,000	98,000	-8.41	-2.00	1.03
Oregon	96,000	98,000	100,000	4.17	2.04	1.05
Pennsylvania	735,000	694,00	639,000	-13.06	-7.93	6.70
Rhode Island	3,600	2,200	2,100	-41.67	-4.55	0.02
South Carolina	47.000	36,000	28,000	-40.43	-22.22	0.29
South Dakota	161,000	140,000	120,000	-25.47	-14.29	1.26
Tennessee	210,000	195,000	160,000	-23.81	-17.95	1.68
Texas	314,000	390,000	400,000	27.39	2.56	4.20
Utah	80,000	80,000	85,000	6.25	6.25	0.89
Vermont	186,000	167,000	157,000	-15.59	-5.99	1.65
Virginia	162,000	141,000	129,000	-20.37	-8.51	1.35
Washington	211,000	225,000	263,000	24.64	16.89	2.76
West Virginia	33,000	25,000	22,000	-33.33	-12.00	0.23
Wisconsin	1,837,000	1,760,000	1,500,000	-18.35	-14.77	15.74
Wyoming	12,000	10,000	6.000	-50.00	-40.00	0.06
TOTAL	10,804,900	10,152,600	9,531,800	-11.78	-6.11	
AVERAGE	216,098	203,052	190,636	-12.81	-4.95	

Source: National Agricultural Statistics Service, USDA.
Relative weight = percent of total.

Appendix Table 2—How cow numbers changed from 1990-1995 by State[1]

Increased	Decreased faster
Arizona	Alabama
California	Alaska
Colorado	Arkansas
Delaware	Connecticut
Idaho	Florida
Nevada	Georgia
New Mexico	Illinois
Oregon	Indiana
Texas	Iowa
Utah	Kansas
Washington	Kentucky
	Louisiana
Decreased slower	Maine
Hawaii	Maryland
Michigan	Massachusetts
New Hampshire	Minnesota
Oklahoma	Mississippi
Rhode Island	Missouri
	Montana
	Nebraska
	New Jersey
	New York
	North Carolina
	North Îdakota
	Ohio
	Pennsylvania
	South Carolina
	South Dakota
	Tennessee
	Vermont
	Virginia
	West Virginia
	Wisconsin
	Wyoming

[1] The decreased slower and decreased faster columns reflect States where cow numbers decreased slower and faster than the average decrease (4.95 percent), respectively.

Appendix Table s-Top cow number States

State	1995 COWS
(1) Wisconsin	1,500,000
(2) California	1,250,000
(3) New York	710,000
(4) Pennsylvania	639,000
(5) Minnesota	600,000
(6) Texas	400,000
(7) Michigan	333,000
(6) Ohio	293,000
(9) Iowa	265,000
(10) Washington	263,000

[1] Milk cows and heifers that have calved, 1995.
Source: NASS, USDA.

Appendix Table 4—Number of cow records handled by each DRPC by State, 1994

State	Agri-Tech Analytii	Mid-States DRPC	Michigan DHIA	Minnesota DRPC	Cornell Dairy Rec.	DRPC @ Raleigh	Penn DHIA	DHI Provo	AgSource Co-op	Totals
Alabama						20,401				20,401
Alaska								211		211
Arizona	2,265					18,955		29,084		50,304
Arkansas		14,387								14,387
California	492,373							279,681		772,054
Colorado	619				206			30.178		31,003
Connecticut					18,992					18,992
Delaware					5.699					5,699
Florida						84,726				84,726
Georgia						65.743				65,743
Hawaii										0
Idaho	7,705								45,149	52,854
Illinois		74,300							34	74,334
Indiana						59,124				59,124
Iowa		124,047								124,047
Kansas	166	41,355								41,521
Kentucky						37,422				37,422
Louisiana						29,595				29,595
Maine					19,468					19,458
Maryland						138		48,595		48,733
Massachusetts					12,525	205				12,730
Michigan			156,157					185		156,342
Minnesota				331,239				290		331,529
Mississippi						21,801				21,801
Missouri		1,875				61,428				63,303
Montana								8,662		8,662
Nebraska		34,599								34,599
Nevada	1,458							7,879		9,337
New Hampshire					11,677	820				12,497
New Jersey					11,983					11,983
New Mexico	8,479					1,945		23,904		34,328
New York					366,573					366,573
North Carolina						60,368				60,368
North Dakota		13,017								13,017
Ohio								127,041		127,041
Oklahoma		22,787								22,787
Oregon	45.194							12,005		57,199
Pennsylvania						58,723		276,250	166	335,139
Puerto Rico						38,782				38,782
Rhode Island					790					790
South Carolina						22,263				22,263
South Dakota		37,526								37,526
Tennessee						52,706				52,706
Texas						138,769		2,692		141,461
Utah								43,146		43,146
Vermont						59,817				59,817
Virginia						80,654				80,654
Washington	3,183							95,920		99,103
West Virginia					9,814			920		10,734
Wisconsin								375	716,924	717,299
Wyoming									1,763	1,763
Total	561,442	363,893	156,157	331,239	457,717	914.385	276,250	757,880	716,924	4,535,887

Source: NCDHIP Handbook.

Appendix Table 5—Change in numbers of cow records handled by each DRPC by State, 1989 to 1994

State	Agri-Tech Analytics	Mid-States DRPC	Michigan DHIA	Minnesota DRPC	Cornell Dairy Rec.	DRPC @ Raleigh	Penn DHIA	DHI Provo	AgSource Coop	Totals
Alabama						(106)				(106)
Alaska								(276)		(276)
Arizona	188					18,955		(18,251)		890
Arkansas		1,095								1.095
California	142,180							(10.910)		131,270
Colorado	619				208			1,348		2.173
Connecticut					(2,436)					(2.436)
Delaware					187					187
Florida						15,301				15,301
Georgia						10,103				10,103
Hawaii								(9,108)		(9,108)
Idaho	5,247							3,322		8,569
Illinois		(8,721)						34		(8,687)
Indiana						(4,357)				(4,357)
Iowa		(10,059)								(10,059)
Kansas	166	(6,675)								(6,509)
Kentucky						(4,717)				(4,717)
Louisiana						351				351
Maine					(2,640)					(2,640)
Maryland						138		(4,729)		(4,591)
Massachusetts					(2,833)	205				(2,628)
Michigan			1,561					185		1,746
Minnesota				(7,888)				290		(7,598)
Mississippi						1,069				1,069
Missouri		(59,040)				61,428				2,388
Montana								(596)		(596)
Nebraska		(2,990)								(2,990)
Nevada	(553)							(410)		(963)
New Hampshire					(1,197)	820				(377)
New Jersey					(2,818)					(2,818)
New Mexico	7,662					1,945		954		10,561
New York					(23,235)					(23,235)
North Carolina						(9,183)				(9,183)
North Dakota		511								511
Ohio								(12,823)		(12,823)
Oklahoma		14								14
Oregon	(11,722)							10,188		(1,534)
Pennsylvania						58,723	(74,296)	166		(15,407)
Puerto Rico						(3,719)				(3,719)
Rhode Island					(22)					(22)
South Carolina						(4,324)				(4,324)
South Dakota		(1,118)								(1,118)
Tennessee						(6,991)				(6,991)
Texas						18,375		(2,194)		16,181
Utah								4,688		4,688
Vermont						(5,551)				(5,551)
Virginia						(7,354)				(7,354)
Washington	3,183							(1,787)		1,396
West Virginia					(1,057)			920		(137)
Wisconsin								375	(91,389)	(91,014)
Wyoming								970		970
Total	146,968	(86,983)	1,561	(7,888)	(35,845)	141 ,111	(74,296)	(37,644)	(91,389)	(44,405)

Source: NCDHIP Handbook.

Appendix Table 6—**Number of herds handled by DRPC, 1989 and 1994**

DRPC	1989	Percent	1994	Percent	Percent Change
Agri Tech Analytics	996	1.75	973	1.98	-2.31
Mid-States DRPC	7,248	12.76	5,528	11.22	-23.73
Michigan DRPC	1,954	3.44	1,794	3.64	-8.19
Minnesota DRPC	6,569	11.57	6,021	12.23	-8.34
Cornell Dairy Records	6,496	11.44	5,433	11.03	-16.36
DRPC @ Raleigh	6,634	11.68	7,562	15.35	13.99
Pennsylvania DHIA	6,145	10.82	4,584	9.31	-25.40
DHI Computing Service	5,307	9.34	4,690	9.52	-11.63
AgSource Coop. Serv	15,451	27.20	12,695	25.78	-17.84
Total	56,800		49,250		-13.29

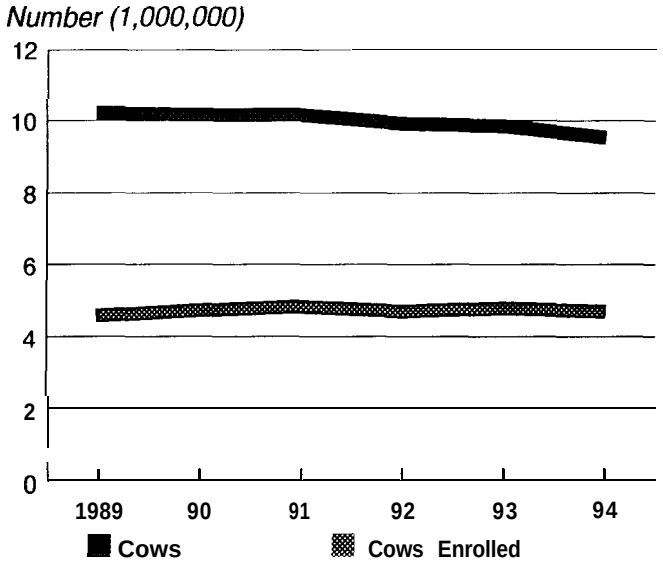
Source: NCDHIP Handbook.

Appendix Table 7—**Gross farm income from dairy products, cash receipts'**

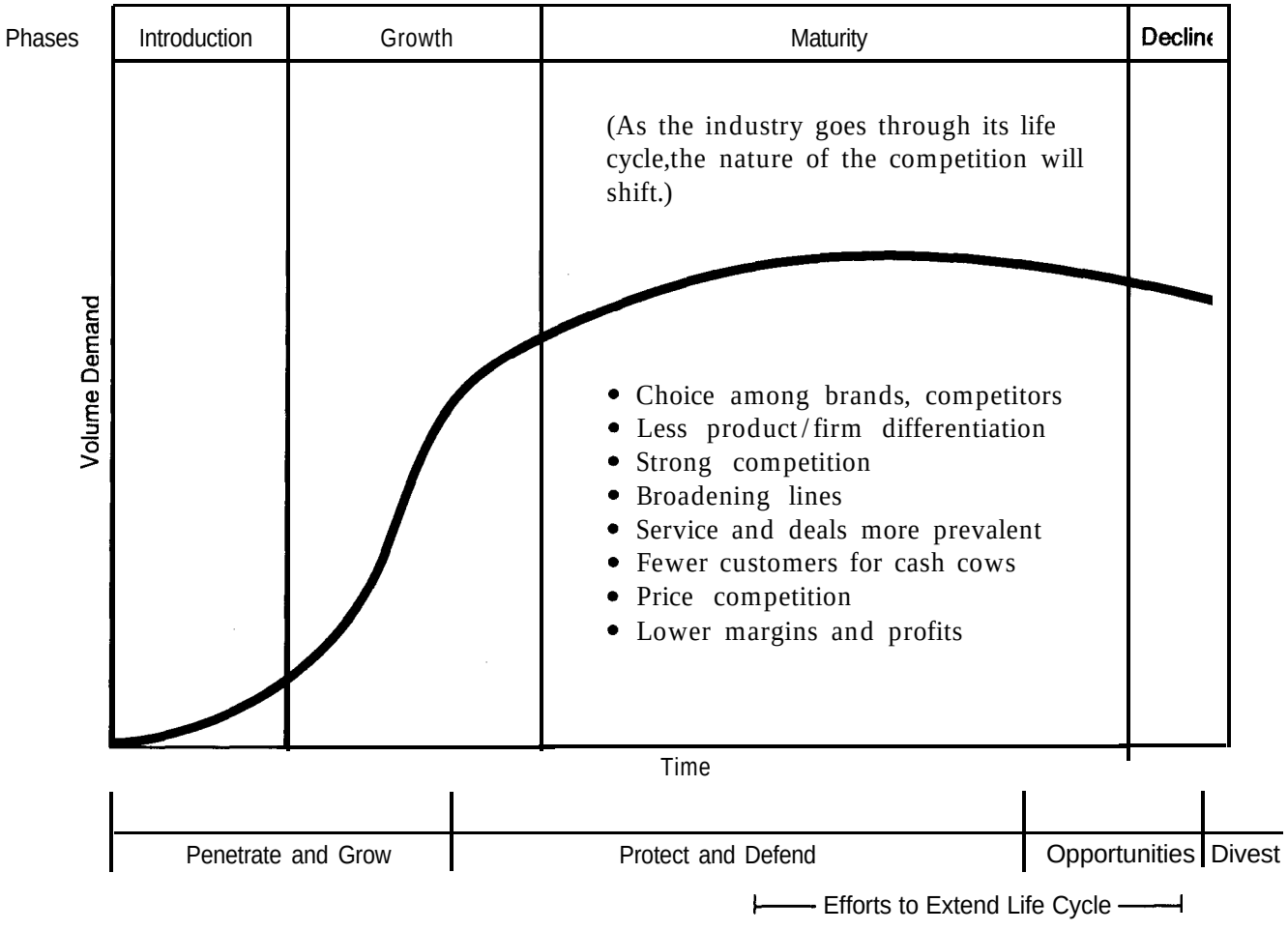
	Actual (nominal) $ Billion	Real (adjusted CPI)[2] $ Billion
1984	18.0	18.0
1985	18.1	17.2
1986	17.8	16.3
1987	17.8	15.7
1988	17.7	15.0
1989	19.5	15.6
1990	20.3	15.3
1991	18.2	13.3
1992	19.9	14.4

[1] Cash receipts from marketings of milk and cream plus value of milk used for home consumption and producer-churned butter.
[2] Figures are adjusted by the CPI (Consumers' Price Index), 1984=100.
Source: NASS, USDA.

Appendix Figure I- U.S. Dairy Cow Enrollment in NCDHIP Plans



Appendix Figure 2— Industry Life **Cycle** for Cooperatives



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Rural Business/Cooperative Service (RBS) provides research, management, and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. It works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

The cooperative segment of RBS (1) helps farmers and other rural residents develop cooperatives to obtain supplies and services at lower cost and to get better prices for products they sell; (2) advises rural residents on developing existing resources through cooperative action to enhance rural living; (3) helps cooperatives improve services and operating efficiency; (4) informs members, directors, employees, and the public on how cooperatives work and benefit their members and their communities; and (5) encourages international cooperative programs. RBS also publishes research and educational materials and issues *Farmer Cooperatives* magazine.