Indemnification Under Animal Disease Control Programs With Special Emphasis On Foot-and-Mouth Disease

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PERSPECTIVE

A primary objective of the federal indemnification program for livestock and poultry (section 2d. of PL 87-518, 87th Congress, effective July 2, 1962) is to promote successful control and eradication of exotic animal diseases if and when such diseases are introduced to the United States by establishing indemnity payments to producers that are adequate and fair. Evidence shows that payment of fair and adequate indemnities encourages the cooperation of producers in the control and eradication of animal diseases.

The methods by which indemnities are established, or at least the level of the indemnity payments, must be amenable to revision (if necessary) during the course of the eradication program in order to keep pace with changing price and market conditions. The latter may result both because of the presence of disease and/or because of other factors.

During the Newcastle Disease outbreak in California in 1972-73, considerable time, effort and money were devoted in determining acceptable and fair indemnities for condemned poultry flocks that were destroyed under the Newcastle eradication program. With this in mind, the Animal and Plant Health Inspection Service (APHIS) of the USDA contracted with the University of Minnesota to conduct a general study of the economics of exotic disease control programs with special emphasis on Foot-and-Mouth Disease. The development of guidelines to provide equitable indemnities for depopulated livestock was among the several objectives of the research study. These guidelines are presented in this report. It is hoped that the report elicits constructive responses from all interested parties.

INTRODUCTION AND SCOPE OF STUDY

In previous outbreaks of Foot-and-Mouth Disease (FMD) in the United States, a "stamping-out policy" has always been followed in eradicating the disease. This policy has basically consisted of the following measures:

(1) Strict quarantine of infected areas,

(2) Slaughter and disposal of animals and materials on infected premises,

(3) Cleaning and disinfection of infected premises, and

(4) Payment of indemnity for animals and products destroyed.

This stamping-out policy has been successful in the past in controlling and eradicating FMD epidemics in the U.S. and it is expected that such a policy will be adopted again (at least in the initial stages of the epidemic) should a new FMD outbreak occur in the United States.

A key element of the stamping-out policy is the payment of indemnities. It is agreed by almost everyone that payment of direct indemnities to producers for destruction of animals, animal products and materials is a critical element in the operation of an effective FMD control program. There is not, however, universal agreement on the extent to which indemnity payments should be made (coverage) or on the formula (method) for arriving at payment rates.

The central objective of this report is to review the current indemnity program for FMD and similar exotic diseases of livestock and to provide a set of guidelines for equitable and uniform systems of indemnification for use in future eradication programs.

We believe that development of a detailed set of guidelines for determining indemnity payments prior to the outbreak of FMD will ease substantially the job of determining appropriate indemnification procedures and rates under conditions of an actual outbreak. Moreover, if such guidelines can be developed, discussed and broadly disseminated prior to the existence of FMD, they are more likely to be accepted than if developed on an ad hoc basis under the pressure and chaos associated with an actual outbreak of the disease. And, the required data and analytical procedures needed to service action programs can only be provided for adequately, if the guidelines are known in advance.

CRITERIA FOR EVALUATION OF ALTERNATIVE INDEMNITY PROCEDURES

The following criteria were considered to be important in evaluating indemnification programs:

(1) Effectiveness in obtaining the full cooperation of the livestock industry in disease control and eradication programs. This criterion can only be soundly tested in an "ex post" context which is, of course, too late to deal with an actual outbreak of FMD. Thus, we need to draw on historical indemnity payment levels (and associated price relationships) which did result in obtaining adequate cooperation from the livestock industry. Previous livestock epidemics in Great Britain and the U.S. provide the most useful insights into such situations. However, current market prices for livestock and livestock products at the time of an outbreak provide the single most important reference base for establishing satisfactory indemnity payment schedules.

(2) The program needs to be administratively feasible. Excessive complexity in procedures for determining payment levels or in making payments can render the program nonfunctional. Thus, guidelines for payment levels need to be simple, specific and easily administered.

(3) Payment rates and procedures need to be implementable within required time limits. Both the effectiveness of the control program and the goodwill of the livestock industry require timely implementation of the indemnity program.

(4) The program should be economically sound in terms of appropriate cost minimization criteria. For example, indemnity payments should not be so high as to produce windfall profits for owners or to induce deliberate infection of herds. Also, taxpayers should not be subjected to control program costs in excess of those required to make the program effective.

(5) The program needs to be socially and politically acceptable. This means generally that there can be no excessive "windfall gains" to participants nor can payments be so low as to incite the opposition of producer groups and politicians.

(6) The program should be flexible enough so as to allow for future modification as the situation warrants. For example, payments should not be rigidly set once and for all but must, of necessity, be related to economic conditions at the time of implementation.

FINANCING OF INDEMNITY PAYMENTS

Because of the externalities[1] involved in the benefits and costs of FMD control programs, governments in many countries, particularly those which use a slaughter policy, have seen fit to intervene on behalf of consumers and producers alike to control such diseases. Moreover, countries which use the policy of eradication have typically paid for all control and eradication measures including indemnities to producers whose stock or products were destroyed.[2]

In the United States the basis of indemnification for animals and products destroyed in order to eradicate FMD is authorized under section 2d. of PL 87-518, 87th Congress, effective July 1962. The law states, "Appraisal of animals shall be based on the fair market value and shall be determined by the meat, egg production, dairy or breeding value of such animals." The law further states that, "animals may be appraised in groups providing that where appraisal is by the head each animal in the group is the same value per pound."

Bases for Public Financing

Indemnification payments are considered to be a necessary component of any effective control program to eradicate and/or contain FMD. Without such payments the livestock industry will find no strong incentive for cooperating adequately to make control programs work successfully.[3] Moreover, political pressure from the industry will encourage the federal government to make indemnity payments.

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[1] To illustrate the externality concept let us assume that a farmer decides to control FMD by himself in the absence of government intervention to control the disease. Such action by the farmer will confer an external benefit to his neighbors in the form of reduced hazard of getting the disease. The farmer will not, however, receive a reward for protecting his neighbors. On the other hand, a farmer's failure to control FMD on his farm will impose additional hazards (costs) on his neighbors. Thus, in the absence of government intervention there is a divergence between social and private costs.

[2] For more detail on FMD control policies of other countries, see Report of the Committee of Inquiry of Foot-and-Mouth Disease, Part 2, London, 1968.

[3] A review of literature relating to the 1924 FMD epidemic in California, the 1967-68 FMD epidemic in Great Britain, the 1972 outbreak of Newcastle Disease in California and many other epidemics of exotic diseases has verified time and time again the critical need for making indemnity payments in order to operate an effective disease control program.

As indicated earlier, the United States has, in the past, used the most stringent measures to combat FMD epidemics. These measures included direct slaughter of affected and exposed susceptible livestock. The use of such measures in the future will, as in the past, surely entail compensation for producers. And, the justification for such compensation is well established in precedent and in legislation.

Another objective rationale for justifying indemnity payments is that of protecting the entire livestock industry, related industries and consumers from severe economic consequences which could result if financial incentives were not available for the livestock sector to restock and rebuild following the destruction of basic breeding herds and inventories of livestock and livestock products. And, because the supply and demand for livestock products is relatively inelastic the major portion of benefits from FMD control will normally be passed on to consumers in the form of lower retail prices.

A preliminary study by Aulaqi has estimated on a gross basis that a nationwide epidemic of FMD in the U.S. could increase meat expenditures by U.S. consumers by an amount in excess of $3.4 billion in the first year.[4]

In summary then, it can be generally concluded that payment of indemnities by government is justifiable on the bases of equitable treatment for producers and favorable cost-benefit relationships for consumers.

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[4] Nasser A. Aulaqi, The Impact of Foot-and-Mouth Disease Epidemic on Consumer Meat and Milk Prices, A Preliminary Report by the FMD Research Group, University of Minnesota, to the Animal and Plant Health Inspection Service, U.S. Department of Agriculture, Washington D.C., 1975.

ELIGIBILITY FOR INDEMNIFICATION

In many countries where eradication measures are used to control FMD, indemnities are paid to cover only livestock and other materials destroyed by the government as part of the eradication program. The cost of cleaning and disinfecting infected and exposed premises is also borne by the government in at least two countries, the U.S. and Great Britain. The reader is referred to Appendix A for further details on indemnification procedures in other countries.

In the United States, the current legislation on indemnity for FMD does not cover any costs other than livestock and materials directly destroyed. It is well documented, however, that costs may extend beyond infected and exposed premises.[5] As a result of restrictions on movement of animals, meat and other related products, substantial costs may be sustained by producers, packers, agribusiness sectors such as the manufactured feed industry, etc. In fact, these indirect or consequential losses may extend to all segments of society but it would be very difficult, if not impossible, to clearly define and quantify all of these losses.[6]

Some argue that indemnity payments should be extended to cover consequential losses, but as indicated in the previous paragraph, these losses are almost impossible to identify, let alone quantify, for all the classes of people who may claim these losses. Moreover, the overall impact of consequential losses is not unlike those resulting from fluctuations in the volume of livestock and livestock products due to weather, high feed prices, etc. And, consequential losses of the latter type are not indemnified.

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[5] Numerous reports document the impact on "secondary" or "consequential" losses due to FMD epidemics. See C. C. Plenn, The Economic Effects of Foot-and-Mouth Disease in California, 1924, Unpublished Report; and Report of the Committee of Inquiry of Foot-and-Mouth Disease, Part 2, London, 1968.

[6] A review of the literature regarding previous FMD epidemics, particularly those in California in 1924 and in Great Britain in 1967-68, suggests the difficulty of isolating losses and providing an equitable basis for compensation. The committee·of inquiry for the FMD epidemic in Great Britain concluded under a section in their report on "Consequential Losses" that marketing disruptions, unemployment of workers, etc., caused service problems but found indemnification for these losses to be impractical. Plenn's study in California indicates the chief losses from the 1924 FMD epidemic were in the form of losses of prospective profits which could not be accurately estimated and which included, for example, losses in tourism because of the scare of FMD. Discussions which the FMD research group at Minnesota has had with representatives of the meat processing industry suggest that a package of "special tax treatment and technical assistance" would be more feasible than indemnification for foregone income.

While we believe that direct indemnity payments should be limited to those whose livestock and/or other products are destroyed as part of the eradication program, we recognize that other producers and firms may suffer real economic losses for which they may be entitled to some form of compensation. It is our suggestion that in cases where consequential losses represent severe economic hardships, those hardships should be alleviated via utilization of such policies as low cost loans, liberal tax writeoffs, special unemployment compensation authorizations, etc.[1]

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[1] A report by G. E. Frick (APHIS - RIEN Exercise, February 1975, Unpublished Report) outlined a procedure for estimating indemnities for income loss due to down time of producers. This procedure appears to us to be excessively complex and costly and, furthermore, may result in gross inequities. A simpler procedure would be to declare FMD infected areas as "disaster areas" and permit the granting of low cost loans and/or other programs to alleviate hardship. The latter procedure would, moreover, be consistent with procedures used for assisting producers who encounter natural disasters such as floods, tornados, etc.

ALTERNATIVE APPRAISAL METHODS FOR INDEMNIFICATION

There are numerous procedures for appraisal of livestock but most of the methods fall into two broad classifications:

(1) Market Value Method

(2) Productivity Method.

It should be pointed out that in reality only one unique price does exist and that is the market value. Any other valuation of resource inputs or outputs is based on some estimate of future expectations.[8] Moreover, the market value method is normally based on the competitive decisions of many buyers and sellers at a given time and in a given place whereas the productivity method must be based on the estimate of an individual appraiser, banker, producer, etc. (or, at most, a small number of such individuals). These two basic methods of appraisal will be evaluated below and the advantages and disadvantages of each method will be discussed.

Market Value Method

The market value method can be further subdivided into the following:

(1) Current Market Price - Legislation currently in effect calls for compensation for destroyed animals, animal products and materials on the basis of "fair market value." The term "fair market value" is not clearly defined but presumably it refers to the price which is determined by the interplay of the forces of demand and supply in a given market at a specified time and place.

The "current market price" can be used effectively as an indemnification basis for livestock animals or products for which there is a regular price quotation at a recognized market. Livestock normally marketed for slaughter or further fattening fit into this category. These animals are regularly traded at terminal and auction markets throughout the United States. The quoted market price is a gross value which includes marketing costs.[9] To obtain the market value at the

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[8] E. O. Heady, _Economics of Agricultural Production and Resource Use_, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1952, p. 395.

[9] Marketing costs include transportation costs, commission charges, yardage fees, transit and market insurance.

farm for a particular product the marketing costs may be sub-
tracted from the gross market value.

The current market price method is simple and thus can
be easily applied provided that a correct interpretation of
market quotations for different grades of animals and products
is made. It is essential that the grade or class of livestock
be correctly determined; otherwise the estimated farm price
will be either too low or too high as compared to the assumed
grade in the market. The current value or price method is
also assumed to be equitable and fair because the price is
determined in a competitive setting where the final price of
a product is determined by the actions of many sellers and
buyers. There are, however, certain situations where the
market price method as such cannot be used. These situations
are discussed below.

Under ordinary circumstances where only minor epidemics
occur, the above method of appraisal may be adequate for de-
termining equitable indemnity payments.10/ However, when a
major epidemic occurs the use of the current market price as
defined in the code of Federal Regulations (Part 53, Title 9)
may not be feasible because of the closure of livestock mar-
kets and, therefore, the elimination of any readily ascertain-
able market in which prices can be measured. It is realized
that such a situation may never occur in the U.S. but we
should have enough flexibility in the indemnity guidelines to
allow for these extraordinary circumstances. A proposed method
for evaluating livestock under epidemics which necessitate the
closure of markets for long periods of time is described in
Appendix B. Later sections of this report provide more de-
tails with respect to the use of the market value and a com-
plete listing of markets and market news offices where rele-
vant price data can be obtained to appraise livestock.

(2) Local Market Price - This method of appraisal is basically
the same as the method described above except it is more
narrowly defined. It is applicable to products for which
there are no current quotations at larger markets or ter-
minals. It is a local price in the sense that it reflects to
some extent the surplus and deficit conditions of livestock in
a localized area. Prices paid for livestock at local auction
sales are one form of local market prices. The sale of live-
stock, especially calves and breeding animals in local markets
is usually on a per head basis. This method of evaluation of

10/ In situations where the animal is kept primarily for its breeding
or milk value and market prices happen to be excessively depressed,
then other methods of appraisal such as capitalized earning power
may reflect the true value of the animal more accurately than the
market price concept. Such methods will be evaluated in detail
later in this report.

livestock may, of course, result in significant errors since the pricing accuracy of the method depends on the ability of buyers and sellers in the market to evaluate livestock characteristics such as weight, grade, etc., and to integrate these characteristics in arriving at a per head value. Because of the difficulty in doing this accurately, the use of local price as defined above should be used only for livestock products for which no current quotation of prices is available and where appraisers are able to consider all the economic characteristics which influence the price of a given animal or product. Later in this report we propose specific guidelines for appraising the type of livestock for which the local price concept is most appropriately used.

(3) Original or Purchase Price[11]- The purchase price represents the amount that was actually paid for or invested in the animal(s) in question. It is assumed that the purchase of animals is documented by a record or receipt. The method has limited application since, for example, it cannot be used to appraise products or animals produced on the farm. It can be used, however, in some cases to settle claims for non-slaughter type animals such as breeding animals. The original price method is inadequate for use when the purchase price of the animal or product involved has little relation to its actual value at the time of appraisal.

The purchase price method is generally the most appropriate appraisal method in valuing feeds and other consumable items purchased for immediate use or for use within a relatively short period of time. Such products are normally best valued at the cost of purchase plus the cost of getting them to the farm.

Productivity Method

An alternative method of appraisal that is used quite frequently by farm appraisers and farm management economists is the "productivity" or "capitalized" method. This method basically involves the computation of the present value of future streams of income from a specified capital investment such as a piece of machinery or a breeding animal. In those cases where resources are expended for only a short period of time the process of discounting costs and incomes is not important since the difference between the discounted and nondiscounted values

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[11]/ Original price needs to be adjusted upward in the case of livestock because of additional feed and other costs incurred to carry the animal from the time of purchase to the time of appraisal.

is not significant. However, if an investment involves resources such as a breeding stock (including dairy animals) then the discounting of future income and costs becomes important.

The productivity method of valuation is designed to provide a "value in use" for resources irrespective of their current market prices. The productivity or capitalized value of a breeding animal is equal to the present value of its future net returns or profits. In order to calculate the present value of the animal, we need to know the prices, production and costs for some specified period of time considered to be "normal." Then a net profit is estimated on the basis of estimated costs and returns. This profit figure is divided by an appropriate interest rate (adjusted for risk) to establish a normal or capitalized value. In using this type of valuation, the appraiser does not accept the actual market price of the resource but rather formulates his own price based on expectation of future prices. But as Heady[12]/ indicates, in so doing the appraiser accepts the market prices for all the resource inputs which were used to produce the animal.

Thus the use of the productivity method is based on the assumption that costs and prices will behave as estimated. In reality, we know that a given investment may or may not successfully return the original cost plus appropriate interest rate because of mistaken expectations at the time the investment was made. Formulas for using the productivity method of appraisal are presented in Appendix C.

Comparison of Market Value vs. Productivity Value

Two primary methods of valuation of resources have been outlined in the preceding section - the market value and the productivity or capitalized value. In this section we evaluate these methods in terms of their applicability, equitableness and cost. Then we give our judgment on which method to use under different circumstances.

Market Value Method - The market value method can be applied to any product for which there is a regular market on which to base prices. If relevant prices are available the use of this method is both inexpensive and equitable. The method is inexpensive because personnel, travel and time requirements are minimal. It is equitable because a single value is paid for similar (like) products. It is also impersonal, easily administered and thus should contribute to the success of the eradication program.

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[12]/Heady, op. cit., p. 403.

Productivity Method - In certain situations the market price method
may be viewed as an inadequate method for indemnification. For
example, because of instabilities in supply and demand, current
market prices in the short-run may be out of line with production
costs. And, if the product happens to be a capital product (re-
source) such as breeding stock, the current market price may not
reflect its true value over its estimated productive life. So if
the major product of the animal does not involve its value for
slaughter (as for milk, breeding, wool, etc.) and if current mar-
ket prices are excessively depressed or inflated, then the pro-
ductivity or capitalized earning power method may be the appro-
priate appraisal method to use.

In practice the productivity method may be very difficult to
apply because of lack of pertinent data and the considerable cost
of using such a method even if data is available. In order to
estimate productivity values for depopulated farms a complete
accounting of costs and returns over a specified period of time
will be needed for individual farms or for representative farms.
Such analysis may involve considerable costs, personnel require-
ments and delay.

If, contrary to our recommendations, current indemnity pay-
ments are modified to include payments for lost or foregone in-
come, then there is merit in using the productivity method of
valuation as opposed to the market price method. Under the pro-
ductivity method losses of income such as those caused by delays
in restocking, for example, can be incorporated into the calcula-
tion by estimating the current value of animals plus expected re-
turns from sale of milk, offspring, etc., at given price and cost
levels. It should be noted again that the practical application
of this method can present problems which could well outweigh its
advantages. Moreover, present data and personnel resources of
APHIS appear inadequate for use of the productivity method.

Advantages and Disadvantages of Appraisal Methods Discussed

The advantages and disadvantages of the two appraisal methods dis-
cussed in the preceding section are summarized below:

Advantages of Market Method:

(1) It is simple and impersonal and therefore, can be easily ad-
    ministered.

(2) It is inexpensive in terms of time and personnel cost require-
    ments.

(3) It can be adjusted quite easily to reflect quantity, quality, seasonal and locational differences.

(4) It is equitable because producers are paid the going market price.

Disadvantages:

(1) Fluctuations in supply and demand for livestock products may create temporary windfall gains and losses. And, when prices are excessively depressed, there will be pressure from the industry not to use market prices for indemnifying producers for their destroyed products.

(2) The closure of livestock markets during disease outbreaks may create a situation where current price information cannot be obtained to appraise condemned livestock. Under such conditions formula pricing based on historical price data would have to be substituted for current market prices.

(3) The market price method cannot account for losses associated with "lost income" should this be a desired component of indemnification.

Advantages of Productivity Method:

(1) It can automatically incorporate down time or corollary income losses. The discounted present value method does, in fact, reflect both asset value and foregone income since it calculates a discounted value of the initial investment plus expected return.

(2) Its appropriateness increases for those cases in which investment in a given product (such as a breeding and/or dairy animal) requires the appraisal of future as well as present values.

Disadvantages:

(1) It is costly. The use of this method normally requires considerable time and personnel.

(2) Future prices and costs cannot be adequately determined and, therefore, the resulting appraisal values may be grossly inaccurate.

(3) It can result in gross inequities among recipients of indemnification payments because of the substantial variation between farms. For example, if it costs producer X an amount of $500 to produce a given animal and producer Y only $400 to produce the same animal, then what should the indemnity rates be for these two producers? Do we reward producer X for his

inefficiency by paying him $500 and punish producer Y for his efficiency by paying him $400? Even if a representative farm is used as a basis for indemnities some inequities will remain.

To summarize, the marketing system for the primary livestock sector is one of the most competitive marketing systems in the U.S. Prices for livestock are determined competitively on a regular basis by numerous buyers and sellers at literally thousands of auctions and terminals throughout the nation. As long as this type of marketing system exists we feel justified in recommending the open market price as the primary basis for determining indemnity payments.

It is also our judgment that the substantial variability in production costs between firms, the difficulty in estimating costs and returns with adequate accuracy and the possible disagreement over what constitutes a "fair return to resources" makes the productivity or capitalized value method of estimating indemnity payment rates much less desirable than the system based on market prices.

The next phase of this report presents in detail the use of the market value method for appraising different classes of livestock to attain desired uniformity, equity and efficiency in future FMD indemnification programs.[13]

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[13] It should be noted again that the guidelines developed in this report for FMD can be easily modified for application to other disease indemnification programs as well.

PROCEDURES AND GUIDELINES FOR APPRAISING LIVESTOCK

The first portion of this report dealt primarily with the conceptual framework for analyzing alternative procedures and methods for determining fair indemnity payments for livestock and materials destroyed under exotic disease eradication programs. It was suggested that a pricing system based on open market prices is the most desirable method to use from the standpoint of both equity and efficiency. It was also pointed out that the market appraisal method may not be feasible and/or appropriate to use under all circumstances unless certain adjustments are made to make it applicable. The purpose of this section of the report is to describe and analyze in more detail the use of market prices for determining indemnity values for the different species, classes, qualities and grades of livestock under normal circumstances. A procedure for determining indemnities in extraordinary circumstances of an epidemic is presented in Appendix B.

The federal regulations pertaining to indemnity payments for infected and exposed herds specify that animals should be appraised on the basis of their breeding value as well as on their dairy or meat value. The regulations also state that appraisal of animals should be based on their "fair market value."

The procedure for appraising livestock is also described in the Code of Federal Regulations. The CFR states that animals may be appraised in groups providing they are of the same species and type and providing that where appraisal is by the head each animal in the group is the same value per head or when appraisal is by the pound each animal in the group is the same value per pound.

In order to develop an equitable and efficient appraisal system of livestock conforming to that required by law, it is necessary to follow some systematic and uniform method of evaluation that considers quality, yield and other differences of livestock species. For commercial livestock, particularly animals intended for slaughter, such a method is the system of grading and classification developed by the United States Department of Agriculture (USDA). Procedures for appraising breeding and dairy animals including purebred animals will be discussed later in the report.

Methods of Marketing Livestock

Before we get into the subject of classifying and grading livestock for determining fair market values we need first to have a brief understanding of the major marketing agencies used to market livestock, the recent changes in livestock marketing and the effects of the latter on price reporting.

Livestock are bought and sold through several kinds of markets. However, the most important types of livestock markets which are relevant for establishing representative schedules of prices are (1) terminal or central markets, (2) country or local markets and (3) auction markets.

Terminal Markets:

Terminal markets are livestock trading centers for all types of commercial livestock. These are usually located at major rail heads. Examples are South St. Paul, Omaha, St. Louis, Kansas City, Lancaster, Denver, Oklahoma City, Sioux City and Indianapolis. A complete listing of livestock terminals in the United States is provided in Appendix D.

Livestock is consigned to commission firms for selling at terminal markets. The yard facilities at terminal markets are owned by stockyard companies. Terminal markets are open and competitive and all reputable buyers and sellers are free to use the facilities at specified fees.

Country Markets:

The development of trucking and improved highway networks made it possible for farmers to market their livestock through channels other than terminal markets. These include selling of livestock directly to dealers, order buyers, other farmers, etc. This method of livestock marketing is becoming very popular because farmers feel they have more control over selling while it takes place. And, they have not incurred shipment costs or other service or selling expenses.

Auction Markets:

These are trading centers for livestock where animals are sold to the buyer making the highest bid. There are more than 2,300 auction markets scattered all over the United States.[14]

Traditionally auction markets have been used as outlets and sources for feeder livestock and breeding animals. Livestock marketed in auction markets are sold either by weight on a price per pound basis or simply by the head. Selling by the head is used primarily for breeding stock since most auctions are now equipped with automatic weighing scales.

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[14] Thomas T. Stout, ed., Long Run Adjustments in the Livestock and Meat Industry, Ohio Agricultural Research and Development Center, Research Bulletin 1037, 1970, p. 88.

Recent Changes in Livestock Marketing

In recent years the marketing of livestock has undergone impor-
tant changes among which is the declining volume of livestock marketed
through terminal markets. The decline of terminal markets in terms of
volume of livestock marketed is shown in Table 1. Table 1 also shows
that direct marketing gained in volume at the expense of terminal mar-
kets.

Table 1. Percent of Packer Livestock Purchases Through
Different Market Outlets, 1960 and 1972

Year and Market	Cattle	Calves	Sheep	Hogs
	Percent	Percent	Percent	Percent
Terminal Markets:				
1960	45.8	25.4	35.4	30.3
1972	13.2	7.6	13.7	16.3
Direct, Country Dealers, Etc.:				
1960	38.6	42.5	54.0	61.0
1972	72.2	31.6	74.3	70.4
Auction Markets:				
1960	15.6	32.1	10.6	8.7
1972	14.6	60.7	12.2	13.3

Source: Packers and Stockyards Resume, Packers and Stockyards Adminis-
tration, U.S. Department of Agriculture, Washington, D.C.,
Respective years.

The shift of producers to a direct form of marketing is the result
of their belief that this type of selling enhances their competitive
position. Such a method of marketing makes it possible for producers
to exercise control over selling while it takes place either on their
own farm or at nearby local markets. Selling directly to order buyers,
local markets, etc., also reduces marketing costs such as yardage,

commission charges and feed. Transportation costs paid by producers can also be reduced as a result of direct marketing but these costs, of course, depend on the distances traveled to packing plants, buying stations and public markets.

Effect of Changes on Price Reporting

Because of their historical importance, their relatively small number and their excellent reporting systems, terminal markets have been given wide and thorough coverage by the Federal Market News Service in its market reporting activities. Firms and individuals engaged in buying and selling of livestock have historically relied on price reports originating from public terminal markets.

As a result of the declining volume of livestock marketed through terminal markets, questions have been raised concerning the validity of the price reporting done by the U.S. Department of Agriculture. For example, questions have been raised concerning the "true price" of livestock, i.e. whether prices reported from terminal markets adequately reflect the prices at other markets.

Actually, no one single market can individually be viewed as a price basing for other markets to follow. Rather, prices are determined by the whole group of markets functioning as one integrated system. The nature of livestock products makes it difficult to have one single market on which to base prices.

"To say that any one kind of livestock market is the competitive market and that it sets the basic price simply disregards the market facts of life. Terminals, country markets, auction markets, etc., all are phases of a complex, integrated marketing system."[15]/

The USDA in recent years has expanded substantially its price coverage, and price reports are provided for different types of markets including auction markets and direct selling. The price information gathered and released by the USDA will be described in detail in the section dealing with sources of price information.

Classification and Grading of Livestock for Price Determination

The primary function of grading and classification of livestock is to facilitate the task of marketing. Livestock is produced in a wide range of quality and weight. Classification and grading of livestock into homogeneous lots results in meaningful price quotations which have the same meaning to buyers and sellers in all markets.

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[15]/Ibid., p. 92.

From the standpoint of indemnification programs, the use of price quotations which are based on quality and other recognized livestock differences will result in fair appraisal values. If an appraiser is thoroughly acquainted with the quality standards, he can determine with reasonable accuracy the relative worth of the animals and products being appraised. The use of price quotations to appraise livestock can substantially reduce the time needed for determining indemnity values. For example, a minimum of physical inspection of animals is needed. The use of uniformly accepted standards for weight, grade and class can also cut the time and expense of arguing with producers over what constitutes a fair price for their livestock.

APPRAISING FEEDER AND SLAUGHTER LIVESTOCK[16]

The grading system established by the USDA is not compulsory but it is the most popular and widely used livestock grading system in the U.S. The Federal-State Market News Service utilizes the federal grade nomenclature in its market and price reports.

Grading of livestock began by establishing carcass grades and then was followed by live animal grades. The slaughter grades were intended to be directly correlated to the grades established for carcasses. Similarly, feeder cattle, lamb and swine grades were developed to conform to slaughter grades.

Since in the case of an exotic disease outbreak livestock have to be graded alive, an appraiser needs to be able to grade animals on the basis of their potential grade on a carcass basis and also must be able to estimate accurately the weight of animals individually or in groups as there will, in most cases, be no scales available to weigh the animals. Without an expert appraiser, significant errors may occur both in estimating the weight and yield and in estimating grade quality.

Therefore in appraising livestock for indemnity purposes an appraiser must be able to perform the following tasks:

(1) Sort the animals into homogeneous units

(2) Estimate weight

(3) Estimate potential yield and quality grade on a carcass basis and

(4) Apply appropriate price quotations to the animals appraised.

The first step in the application of grades to livestock for FMD indemnification purposes is to list the susceptible livestock species. These are:

(1) Cattle

(2) Hogs

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[16] The material in this section is based primarily on USDA publications on grading livestock which are cited at the end of this report.

(3) Sheep

(4) Goats.[17]

Each individual species can be subdivided according to use such as slaughter, breeder, etc. Within the use categories a further subdivision into classes can be made on the basis of the age, sex and condition of the animals.

The use and class categories of cattle, sheep and hogs are as follows:

(1) Slaughter cattle - steers, heifers, cows, bulls and bullocks

(2) Feeder cattle - same as slaughter cattle

(3) Slaughter swine - barrows, gilts, sows, boars and stags

(4) Feeder pigs - same as slaughter swine

(5) Slaughter lambs, yearlings and sheep - ram, ewe and wether

(6) Feeder lambs, yearlings and sheep - ewe and wether.

As indicated previously, grades for slaughter cattle are designed to be correlated to the carcass grades. In order to accomplish this, the slaughter grade standards are based on quality and yield factors. Detailed discussion of these factors is beyond the scope of this report but it should be noted that a minimum understanding of the grading system is required by anyone involved in the appraisal of livestock and it may be acquired by referring to USDA publications on the subject.

Grades for Slaughter Cattle:

The quality grade standards for cattle are applied to steers, heifers and cows as one group and to bullocks as another group. Eight quality designations apply for steers ,and heifers. These are: (1) Prime, (2) Choice, (3) Good, (4) Standard, (5) Commercial, (6) Utility, (7) Cutter and (8) Canner.

With the exception of prime grade the same quality standards apply to cows. The quality designations for bullocks are: (1) Prime, (2) Choice, (3) Good, (4) Standard and (5) Utility.

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[17]/Goats represent a very small percentage of the livestock population of the United States and price information on goats is only available in Texas. Because of the rather unique locational and marketing characteristics associated with production of goats we have excluded them from our discussion of indemnification guidelines.

There are five yield grades, which are applicable to all classes of slaughter cattle and are designated by numbers 1 through 5, with yield grade number 1 representing the highest grade and yield grade number 5 representing the lowest grade. Slaughter bulls are eligible for yield grading only and, therefore, have no quality grades.

Grades for Feeder Cattle:

The difference between feeder and slaughter cattle is in the intended use. Feeder cattle are intended for further feeding before they are ready for slaughter. The classes of feeder cattle are identical to those of slaughter cattle and so are the grades.

Grades for Swine:

The official standards for grading slaughter barrows, gilts and feeder pigs provide for sorting first according to use - slaughter and feeder - then as to class, which is determined by the apparent relative excellence of the animal for its intended use.

The following grades are applicable for barrows and gilts: (1) U.S. No. 1, (2) U.S. No. 2, (3) U.S. No. 3, (4) U.S. No. 4, and (5) U.S. Utility.

The grades for slaughter hogs are directly related to the grades established for pork carcasses. Similarly, the grades for feeder pigs also are directly correlated with the grades for slaughter hogs. For example, a U.S. No. 1 feeder pig is expected to grade U.S. No. 1 slaughter hog, which in turn, should produce a U.S. No. 1 carcass.

Sows, stags and mature boars are seldom used as feeder animals, and these feeder animal standards do not apply to these classes of swine.

Grades for Lambs, Yearlings and Sheep:

Quality grades are specified as follows: (1) Prime, (2) Choice, (3) Good, (4) Utility and (5) Cull.

Mutton carcasses are not qualified for Prime grade. There are five yield grades as for cattle ranging from 1 to 5 with yield grade No. 1 indicating the highest yield. As with other species, grades of carcasses and live animals are directly related to each other. Therefore, quality grade names and yield grade designations for live animals are the same as those for carcass grades.

A summary of official grading for all classes of FMD-suscep-
tible domestic livestock with the exception of goats is given in
Table 2.

Table 2. Official USDA Grades for Livestock

Species and Grade	Quality Grade	Yield Grade
Slaughter Steers and Heifers	Prime, Choice, Good, Standard, Commercial, Utility, Cutter, Canner	1, 2, 3, 4, 5
Cows	Choice, Good, Standard, Commercial, Utility, Cutter, Canner	1, 2, 3, 4, 5
Bullocks	Prime, Choice, Good, Standard, Utility	1, 2, 3, 4, 5
Bulls	Not eligible for quality grade	1, 2, 3, 4, 5
Feeder Cattle	Same as slaughter steers and heifers	
Calves and Vealers	Prime, Choice, Good, Standard, Utility, Cull	No yield grades established
Slaughter Barrows and Gilts	U.S. No. 1, No. 2, No. 3, No. 4 and Utility	
Feeder Pigs	U.S. No. 1, No. 2, No. 3, No. 4, U.S. Utility, U.S. Cull	
Sows	U.S. 1-3, U.S. 2-3	
Boars	No grades established	
Slaughter Lambs, Yearlings and Sheep	Prime, Choice, Good, Utility, Cull	1, 2, 3, 4, 5

Source: Compiled from several USDA publications on livestock grading.

Sources of Price Information

Current data is provided by the Federal-State Market News Service on most livestock products. The data is gathered directly at public and auction markets and from buyers and sellers in production areas. The data collected by livestock reporters is immediately released to the news media and can be obtained through telephone answering devices, nationwide teletype network, and printed reports.

The collected data cover sales of feeder and slaughter cattle, hogs and sheep at public terminals. Auction and direct selling and buying activities are also covered by reporters. These data sources provide price ranges for livestock by class, grade and weight.

Extent of Price Coverage

The data coverage includes most of the livestock producing areas of the United States. State personnel under the technical supervision of federal reporters prepared and released livestock information reports from 165 auctions in 15 states as of 1972.[18]/

The information collected by livestock reporters is obtained through telephone and personal interviews. Reporters usually select representative samples of sales on which to base their reports covering each grade and weight group.

With the increasing trend towards more decentralized marketing of livestock it is expected that the number of the reporting stations will increase further in the future.

Price-Basing Markets for Appraisal

As mentioned previously, the shift of volume from central public markets resulted in a questioning of the adequacy of these markets as price basing points for livestock. It was also indicated, however, that because these markets have excellent price reporting systems, many individuals and firms in the livestock industry still rely heavily on them.

Livestock appraisers can obtain local market prices for livestock immediately by calling the local Federal-State Market News office. If no office is located in a particular area, prices from the nearest

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[18]/USDA, Major Statistical Series of the U.S. Department of Agriculture, How They are Constructed and Used, Volume 10. Market News, Agricultural Handbook No. 365, 1972.

market can be obtained and adjusted to local conditions. However, most livestock areas of the country are either covered by the Federal-State Market News Service or by the appropriate State Department of Agriculture. A complete listing of Federal-State Market News offices in the country is given in Appendix D. This listing can be used effectively by appraisers in the field since it covers practically all livestock producing and marketing areas of the country. A listing of livestock terminal markets by location is also given in the same appendix.

APPRAISING DAIRY AND BREEDING ANIMALS

It has been pointed out that livestock kept for <u>non-breeding and non-dairy purposes</u> (Feeder and Slaughter livestock) are traded and priced according to relatively uniform grade, quality and weight specifications. Determination of fair market prices for this type of livestock is not only possible but can be made with relatively little time and expense provided experienced livestock appraisers are employed to perform the appraisal work. On any day, prices for varying grades, qualities and weights can be established for almost any area in the United States with locational differences in prices which reflect deficit-surplus conditions and transportation costs.

In contrast, the marketing of dairy and breeding animals differs in many ways from that of commercial feeder and slaughter livestock. For example, breeding and dairy animals are usually sold on a per head basis rather than on a unit of weight basis. Also, <u>there are no regularly established markets such as terminal markets with regular price quotations for breeding and dairy stock comparable to those for feeder and slaughter livestock.</u>

Because of the lack of any regular price reporting system for breeding livestock, it is necessary to develop <u>some basic informational data</u> and subsequently some broad guidelines for use by appraisers in determining appropriate and fair values for these classes of livestock. The material in this section is presented in sequence for: (1) Dairy cattle (both registered and grade), (2) Registered and grade beef breeding cattle, (3) Swine and (4) Sheep.

<u>Dairy Cattle</u>

Classification:

 Most of the dairy cattle in the United States are classified as "Grade." An animal classified as grade is defined as a non-purebred animal that possesses the major characteristics of a breed. In many cases, a grade animal is a descendent of purebred animals that have not been registered. A purebred animal is defined as an animal which can be traced back to the foundation animals of its particular breed.[19] According to Foley <u>et al</u>[20] grade dairy animals represent more than 85 percent of the dairy

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[19] G. H. Schmidt and L. D. Van Vleck, <u>Principles of Dairy Science</u>, W. H. Freeman and Company, San Francisco, 1973, p. 37.

[20] R. C. Foley, <u>et al</u>, <u>Dairy Cattle: Principles, Practices, Problems, Profits</u>, Lee and Febiger, Philadelphia, 1973, p. 502.

cattle of the United States. Bailey[21] reports that grade dairy cattle represent 95 percent of the dairy cattle in the United States. The apparent discrepancies in these figures are due to the fact that no actual census has been taken. No precise measure of distribution of dairy cattle by breed is available but it is estimated that Holsteins represent more than 80 percent of the total dairy herd of the United States.[22]

Marketing of Dairy Cattle

Dairy cattle are marketed by several methods. One important method of selling is the private treaty. Dairymen with surplus cattle maintain a standing agreement with other dairy farmers to supply them with their needs. Other dairymen sell and buy dairy cattle through other methods such as auction, dealers and local markets.

Private sale is probably the most important outlet for registered dairy cattle. Consignment, dispersal and public auction sales are also used for marketing dairy cattle, particularly purebred animals. Public auction sales are usually organized by the breed associations. About 15 to 20 percent of the sales of purebred dairy cattle are consummated every year by this method.

Deficiencies in Price Reporting

The prices paid for dairy cattle are not given systematic, widespread publicity and are not reported by the public market information agencies such as the USDA Federal-State Market News Service.

The USDA reports an average price of milk cows for each state on a monthly basis. Such a price is not very helpful in appraising dairy cattle for the following reasons:

(1) It is not current. It often takes several months before the price data are released.

(2) It is a simple average price for milk cows bought within a specified month. Since a specific age or grade of animals is not identified, the price cannot be accepted widely by producers as a method of determining values for their cattle.

One important reason for lack of specific price quotations for dairy cattle is the difficulty of establishing objective grading standards on which to base price quotations. Visual appraisal is the only method used in many cases to establish prices.

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[21] N. D. Bailey, et al, Dairy Type: Its Importance in Breeding and Management, USDA Technical Bulletin No. 1240, 1961, p. 18.

[22] J. E. Rouse, World Cattle III, Cattle of North America, University of Oklahoma Press, Norman, 1973, p. 429.

In the absence of specific price information for dairy cattle we need to develop a system of pricing that incorporates all of the important factors that determine the value of individual animals or herds. Since purebred dairy cattle are priced differently from grade dairy cattle the two will be discussed separately.

Establishing a Base Price for Grade Dairy Cattle

A system of pricing grade dairy herds for indemnity purposes could be developed using the following procedures:

(1) Establish a base price for grade dairy cattle on a national, regional or state basis.

(2) Adjust the base price according to production, sex, age, health status and any other relevant factors when appraising individual herds.

The use of an average or base price to evaluate dairy cattle for indemnification is only a first step in determining equitable appraisal values. The use of this base price alone will result in overestimating the value of some herds and underestimating the value of others. Thus, if an equitable system of compensation is to be developed, we need to go beyond the use of an average price and develop appraisal prices that are more relevant to a given herd. The following are some of the methods that may be used in deriving a base price for grade dairy cattle:

(1) Rule of Thumb Method - A rule of thumb used by many dairy farmers states that the purchase price of grade dairy cows for milk can be at least 50 percent more than the current average value of cutter and canner cows of the same weight.[23] Such a method of determining a base price is very simple but tends to disregard the other factors which influence the price for dairy cows. To assess the relative accuracy of this method, the average price relationships between dairy and beef cows have been estimated for the past fifteen years and are presented in Table 3.

In most years the premium in average price of grade dairy cows over that of canner-cutter grade cows was less than 50 percent. It should be noted that these prices are only averages. And, it is recognized that exceptionally good milk cows can bring substantially higher prices which in many instances may be double or even triple the price paid for canner-cutter grade cows.

[23] Foley, et al, op. cit., p. 497.

Table 3. U.S. Average Prices for Grade Milk Cows and
Canner-Cutter Cows, 1960-1974

| Year | Average Price Per Head | | Percent Increase in Milk Cow Prices Over Canner-Cutter Cow Prices |
	Milk Cows	Canner-Cutter[a]/	
1960	201	155	30
1961	204	162	26
1962	202	156	29
1963	196	150	31
1964	187	134	40
1965	193	150	29
1966	221	186	19
1967	232	185	25
1968	246	188	31
1969	273	211	29
1970	302	211	43
1971	325	224	45
1972	351	262	34
1973	447	342	31
1974	449	271	66
Average	269	199	35

[a]/Value of 1100 pound cow based on price of canner-cutter cows.

Source: Agricultural Statistics, USDA, Washington, D.C., Annual issues.

(2) <u>Formula Method</u> - The "rule of thumb" appraisal method used in determining the price of dairy cows implicitly recognizes the relationship between the milk production and slaughter values. These relationships can, however, be measured more precisely. In an effort to gain precision a regression equation was estimated to determine the factors which influenced the price of dairy cows for the period 1950 to 1974. The estimated equation is as follows:[24]

$$P_{dc} = -120.94548 + 7.0335 \; P_b + 38.67327 \; P_m$$
$$(.82144) \qquad (4.9948)$$

$$R^2 = .989$$

Where

P_{dc} = Price of grade dairy cows per head in dollars

P_b = Price of all beef cattle per hundred weight in dollars

P_m = Price of milk per hundred weight in dollars.

The numbers in parentheses are the standard errors for the regression coefficients. The regression equation clearly shows that for the period 1950 to 1974 the price of dairy cows has been highly correlated with the price of beef and the price of milk. An original equation also contained the price of cull cows as an independent variable. This variable was dropped from the equation, however, because it did not add significantly to the predictive power of the equation. The equation above shows that <u>almost 99 percent</u> of the variation in milk cow prices is explained by variations in the prices of milk and beef. The regression coefficient for the price of beef indicates that for each dollar change in the price of beef cattle per hundred weight a change of about $7.00 will occur in the price of dairy cows (other things being equal). Similarly, a one dollar change in the price of a hundred weight of milk will generate a change of about $38.70 in the price of dairy cows.

Because of the high correlation between the price of dairy cows and the price of beef and milk, it is possible to get a good estimate of the current price of dairy cows by using the above equation.

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[24] Price data was obtained from <u>Agricultural Statistics</u>, USDA, Washington, D.C., Annual issues. Since the reported price for dairy cows included both registered and grade cows, price for grade cows was estimated by assuming a 10:1 ratio of grade cows to registered cows in the national dairy herd. Price data for registered cows was obtained from relevant breed associations (see Table 9).

The prices of dairy cows predicted by the equation and the actual prices are presented in Table 4 for the period 1950 - 1974. The results show the deviations between actual and predicted prices of milk cows to be relatively low in most years, particularly during the later period of the analysis. If the current prices of milk and beef are known (cetereis paribus) a reasonably accurate estimate of dairy cow values can be made.

The prices discussed so far refer to yearly average prices for the U.S. as a whole. It is known, however, that prices paid for dairy cattle vary seasonally and from one part of the U.S. to another. Adjustments for seasonal and regional differences in prices should, therefore be built into any appraisal formula for indemnity purposes. The application of the formula method for a particular area of the country is illustrated in Appendix F. Seasonal variation in prices of dairy cows is also presented in Appendix F.

(3) Method Based on Local Sale Price - The marketing of dairy cattle in very small quantities and in literally thousands of markets (auction, dealerships, local markets, etc.) is probably the major reason for the lack of dairy cattle price quotations by the USDA Market News Service. In establishing a base price for dairy cattle, prices paid for dairy cattle in all of these various markets appear relevant. Yet the complete reporting of these markets or even a reasonably reliable sampling procedure may be prohibitively costly in time and finances. And the capability for reporting this set of prices is not currently operational.

Table 4. Predicted and Actual Prices of Grade Dairy Cows,
United States, 1950-1974

Year	Observed Value*	Predicted	Deviation
	$	$	$
1950	172	183	+11
1951	221	247	+26
1952	221	231	+10
1953	155	159	+4
1954	131	144	+13
1955	127	144	+17
1956	135	144	+9
1957	147	163	+16
1958	189	193	+4
1959	210	199	-11
1960	201	185	-16
1961	204	184	-20
1962	202	188	-14
1963	196	194	-2
1964	187	166	-21
1965	193	183	-10
1966	221	221	0
1967	232	230	-2
1968	246	247	0
1969	273	275	+2
1970	302	291	-11
1971	325	310	-15
1972	351	350	-1
1973	447	456	+9
1974	449	451	+2

*See footnote 24.

Comparison of Methods

Three methods of establishing a base price for grade dairy cattle
have been discussed. It was indicated that the first method, that of
"rule of thumb," has the advantage of simplicity.

The formula method is a better method of price basing since it includes separate consideration of the two major factors which determine the prices paid for dairy cows - price of beef cattle and the price of milk. The high correlation between the price of dairy cows and the price of milk and beef cattle indicates that this formula can be used to estimate a reasonably current and accurate price for dairy cows. Once a formula is established, the only information needed for estimating the current price of milk cows is the current price of beef cattle and milk. The formula may have to be modified periodically depending upon the recent historical price relationships of beef cattle, milk and dairy cows. This method does, however, have the advantage of simplicity and ease of administration. Moreover, data and cost requirements will be minimal. If the formula method is to be utilized effectively, efforts will need to be undertaken by USDA to systematically provide regional and seasonal refinements for the formula method.

The third method discussed is the use of local sale prices. This method is probably the one with greatest accuracy potential since it draws directly on local dairy market conditions. But, such data are not currently reported even on a sample basis.

Adjusting Base Prices

In determining the value of dairy cows on an individual animal or herd basis we need to consider the specific factors which directly affect their market value. The factors discussed before are important to consider when a base price for a given area is needed. However, a fair price for individual animals can be determined only if due consideration is given to such factors as age, production, type, breed, etc.

The following set of factors should be considered in evaluating grade dairy cattle for indemnity payments.

Production:

The most important factor in determining the value of both grade and registered dairy cattle during the productive age span of the animals is milk production capability of cows. Cows or herds which yield above average milk and fat should be priced higher than those herds with below or average yields. For example, if it is determined that a given herd (other factors being equal) has a production average which is 50 percent more than the average for the total of herds in a given area then the cows in this herd should be valued proportionately more than cows of other herds.

Production records for many dairy herds are kept by the Dairy Herd Improvement Associations in their respective states. There are also many other private organizations which keep data on production of dairy cattle.

Health:

Another important factor that has a major influence on prices paid for dairy cows is their health status. Animals that are infected with mastitis, tuberculosis, brucellosis and other diseases are sold for substantially lower prices than animals free from such diseases. There is no data available by which the effect of health on prices can be adequately and separately measured but it is known that a significant portion of the culling of dairy cows is due to health problems. It is, therefore, obvious that cows having severe health problems should be priced at less than their milk producing value.

More than one fourth of dairy cows leave the herd each year because of low production, health problems, reproductive problems, etc. Since culling percentages vary from one herd to another because of management capabilities and other factors, an appraiser will have to use his judgment and relevant data in order to determine the number of dairy cows in a particular herd which should be appraised at cull values.

Breed:

The type of breed will also influence the price of dairy cattle. For example, average milk production from Holstein cows is higher than that for other breeds. Holsteins are also larger in size than some of the other dairy breeds. Thus, as a result of their milk and meat value, Holsteins are usually valued at premium prices over other breeds.

Age:

Age is an important factor to consider when evaluating grade dairy cattle. In general, the value of an animal increases until it reaches its prime (age four to six years) after which its value starts to decline. Outstanding animals are exceptions to this rule because of the potential value of their offspring.

There are other factors which affect the value of individual dairy animals such as calving intervals and temperament. However, under a disease eradication program, time becomes a critical factor and, therefore, it would be impractical for appraisers to evaluate those factors when determining indemnity values.

A simple method for evaluating dairy cattle both grade and registered is developed later. And, the method is compared to real price conditions.

Registered Dairy Cattle

The preceding section developed broad guidelines and procedures for appraising grade dairy cattle for the purpose of indemnification. This section develops similar guidelines and procedures for registered dairy cattle.

The value of registered dairy cattle extends beyond their milk producing value because the demand for such cattle is based not only on their milk producing value but also on their value as foundation breeding animals. Prices of registered dairy cattle vary greatly from one herd to another because of the wide variation in individual merit and in the popularity of different blood-lines. There are also wide fluctuations in prices over time. All these factors make evaluation based on average prices grossly inaccurate. What is needed, therefore, is a system of appraisal which deals with herds on an individual basis but at the same time relates appraisal values to some uniform grade standards for all registered dairy cattle. Accurate appraisal of registered dairy cattle requires appraisers who are adequately familiar with all the factors which determine the price of animals.

Regardless of which appraisers are used, the following factors should be thoroughly considered when indemnities are computed for registered dairy herds as these factors account for almost all of the variation in prices.

Production:

As in the case of grade dairy cattle, production is the most important single factor in determining the value of registered dairy cows. Income from the sale of milk represents the major portion of income of dairy producers even for registered herds. Estimates show that milk sales from registered herds account for more than 75 percent of total income.[25]

While data is not directly available to quantify the relationship between production of milk and prices of registered dairy cattle independent of all other factors it is possible, nonetheless, to estimate the capitalized value of production for a particular breed of registered dairy cattle for which some historical data is available.

Table 5 presents the prices paid for registered Holstein cows by age, sex and production records for the last 10 years. The table shows clearly that cows enrolled in Dairy Herd Improvement Registry (DHIR) are priced substantially higher than cows with

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[25] Rouse, op. cit., p. 530.

Table 5. Prices of Registered Holsteins by Age, Sex and Production Records
1966-1975

Description	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	Average
						Dollars					
Females* with Official DHIR Records	654	706	892	760	808	916	1092	1267	1481	1457	1003
Females with DHI Records	486	534	559	603	732	759	901	1135	1142	1231	808
Females without Records from DHIR Official Record Dams	562	592	653	670	701	772	897	1129	1291	1271	854
DHI Official Record Dams	445	496	525	546	605	640	743	967	990	1023	698
Untested Dams	420	446	469	470	507	533	625	768	775	677	569
Heifers Under 2 Years Not in Milk:											
From Official Record Dams (DHIR)	392	478	539	475	484	555	820	925	1075	1267	755
From Official Record Dams (DHI)	272	316	338	327	424	406	544	712	737	738	481
From Untested Dams	260	300	329	277	299	334	366	490	501	431	359
Bulls All Ages:											
From Official Record Dams (DHIR)	1022	1354	1269	1144	969	1539	1350	1490	1436	1565	1394
From Official Record Dams (DHI)	332	585	405	376	433	506	1319	1027	692	1492	716
From Untested Dams	230	224	244	271	252	308	294	477	424	328	305

*Females refer to those above 2 years old.
Source: Holstein-Friesian World, March 25, 1976, p. 23.

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Dairy Herd Improvement (DHI) records or those without records.[26]
For example, the 10 year average price for cows with official DHIR
records is $1003 compared to $808 for cows with DHI records and
only $569 for untested dams. The variation in prices is also sig-
nificant for bulls. Bulls from official DHIR record dams sold for
an average price of $1394 whereas bulls from untested dams sold
for only $305. The latter price is probably equivalent to beef
value. The data presented in Table 5 above does not give specific-
ally the quantity of milk production per cow associated with each
price. It is generally true, however, that cows with DHIR records
yield the most milk and fat. For instance, in 1973, 113,319 Hol-
stein cows with DHIR records averaged 15,932 pounds of (305d-2X -
M.E.) milk. The general DHI average for 1973 covered more than
2.2 million cows including 90 percent Holsteins with an average
of 13,287 pounds of milk.[27] The corresponding average for cows
with no records was only 10,125 pounds. Table 6 below presents
these relationships in modified form.

Table 6. Price and Production Ratios for
Registered Dairy Cows

	Production Ratios	Price Ratios	
	1973	1973	1960-75
Cows with DHIR records	1.00	1.00	1.00
Cows with DHI records	.80	.90	.81
Cows with no records	.64	.60	.57

Type:

Type is a controversial subject in dairy cattle breeding
because of the difficulty of determining its contribution to the
value of dairy animals.

Type is defined as the standard that combines all the physi-
cal characteristics dairymen consider desirable in a dairy cow.
In show rings, type is measured by the ranking of individual

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[26] DHIR records are DHI records which also meet breed association
standards. Herds qualified for DHIR are considered to be the elite
of registered dairy herds.
[27] Holstein-Friesian World, April 15, 1975, p. 12.

animals in their respective age classes as determined by a par-
ticular judge at a particular show. Such grading is very subjec-
tive and varies substantially from one show to another depending
on the quality of animals entered for competition. Very often
judges appraise animals with a view to their "ribbon winning"
ability rather than to their economic value.

The five major dairy breed associations have developed a
system of herd classification which is quite precise and useful
and is widely accepted as a basis for grading purebred dairy
cattle. Five basic type grades for female dairy cows that have
freshened are presented in Table 7.

Table 7. Classification of Purebred Dairy Breeds

Type Classification	Score of Points
Excellent (E)	90 and above
Very Good (VG)	85 - 89
Good Plus (GP)	80 - 84
Good (G)	75 - 79
Fair (F)	70 - 74

Source: Foley, et al, op. cit., p. 501.

The Purebred Dairy Cattle Association developed a dairy cow
unified scorecard for all breeds, which encompasses all the
characteristics that are considered desirable in a dairy cow.
These include points for general appearance, character, body
capacity and mammary system. The breed associations have
approved lists of judges who are able to classify animals
according to the rules established by the associations. The
system of classification is voluntary but many purebred dairy
owners classify their cattle because of the potential price pre-
miums involved in having classified dairy cattle.

A study conducted by the Holstein-Friesian World in 1958
attempted to determine the impact of type classification on the
sale of registered Holsteins sold at auctions. The results of
the study are presented in Tables 8a and 8b. Table 8a shows
average prices paid for Holsteins by grade classification. The
results show that there is a close correlation between grade and
price. Cows which graded excellent were sold at higher prices
than cows of lesser grades. For example, the average price for
cows classified as excellent was $1,335 whereas the price for

Table 8a. Analysis of Type Classification and Price
of Holsteins Sold at Auction, 1957

Description	EX	VG	GP	G	F	Unclassified
			Grade			
					Dollars	
Classified Females Over 2 Years	1335	680	478	382	330	
Females Over 2 Years From Classified Dams	697	503	455	382	353	360
Heifers Under 2 Years Not in Milk From Classified Dams	1057	401	326	267	254	227
Classified Bulls All Ages	10693	649	350			

Summary: 4571 head classified sold at an average price of $467.
7195 head unclassified sold at an average price of $326.

Table 8b. Effect of Type Classification on Prices in the
Absence of Production Records, 1957

Description	EX	VG	GP	G	F	Average	Average Price for All Untested Dams and Heifers
			Grade				
					Dollars		
Classified but Untested Cows	--	475	412	344	300	380	326
Unclassified Cows From Classified But Untested Dams	--	772	351	292	336	407	326
Females Under 2 Years From Classified But Untested Dams	--	215	298	175	--	239	193

Source: Adapted from Holstein-Friesian World, March 9, 1958, pp. 19-20.

cows classified as very good was only $680. In general, the
results in Table 8a show that animals that had been officially
classified or were from classified dams sold for $467 or 43 per-
cent more than unclassified animals which averaged only $326.

It should be pointed out that the results in Table 8a do not
separate the effect of type grade on prices since most classified
animals are animals with production records. Price averages in
the complete absence of production records are presented in Table
8b. Though the number of cows involved is very small, the results
can be viewed as a rough estimate of the market value of type. As
indicated, cows which were classified but without records averaged
$380 or 16 percent more than untested dams.

There is no doubt that most registered dairy owners consider
type an important factor in the sale of registered dairy cattle.
It is also true, however, that dairy owners associate improved
type classification with improved milk production.[28] And, pro-
duction is probably the dominant factor in establishing prices
for registered cattle.

Pedigree and Progeny:

Complete and accurate information on the performance of both
male and female ancestors is an important consideration in valuing
dairy animals of all ages. Such information is particularly help-
ful in determining the value of young females under two years of
age for which production records are lacking. In this case eval-
uations of the sires and the production records of their female
ancestors offer the best evidence of milk producing potential for
these heifers.[29] Table 5 shows, for example, that Holstein
heifers under two years of age from official DHIR records were
sold for an average 1966-75 price of $755 whereas heifers from
untested dams were sold for an average price of $359.

Most of the sires used for breeding in the U.S. are selected
by pedigree or by a combination of pedigree and type. Extremely
high prices are paid, however, only for proven sires. The USDA
has developed a method of comparison of different bulls based on
the so-called "predictive difference" and sire summaries are
published for both A.I. and natural service sires. Appraisers
of registered dairy cattle are expected to be acquainted with
these summaries in order to be able to evaluate the monetary
value of these predictive differences in the pricing of sires.

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[28] Bailey, et al, op. cit., p. 19.
[29] Foley, et al, op. cit., p. 500.

Health:

It was indicated previously that health is an important consideration in determining prices for dairy cattle. Animals which are infected with diseases other than the disease for which indemnities are paid should be sorted out and priced at less than their dairy value. How much less will depend on age, on the feasibility of rectifying health problems, etc. It is obvious that an owner of cows infected with tuberculosis, for example, cannot sell them at their dairy value. Thus, it is suggested that appraisers should sort out animals which will be normally culled and value them at their slaughter value.

Breed:

The five major dairy breed associations registered 383,501 animals in 1974/75, of which 76 percent were Holsteins. Prices paid for dairy animals depend, in part, on the breed involved. The figures listed in Table 9 provide a comparison of prices paid at public auction for registered dairy cattle of three major breeds over the last 15 years. During this period Holsteins averaged $138.5 more than Guernseys and $141.5 more than Jerseys.

Table 9. Average Prices of Registered Dairy Cattle of the Three Major Breeds Sold at Public Auction in the United States, 1960-1974

Year	Holstein	Guernsey	Jersey
1960	429	414	362
1961	429	360	356
1962	401	346	332
1963	403	358	361
1964	417	361	376
1965	398	381	295
1966	495	441	377
1967	527	518	401
1968	579	420	394
1969	506	423	457
1970	656	444	559
1971	698	537	534
1972	832	562	553
1973	1015	615	654
1974	1088	605	727

Source: Holstein-Friesian World, March 25, 1975, p. 29; Guernsey Breeders Journal, February 1975, p. 108; and Jersey Journal, February 20, 1975, p. 19.

Table 10 provides economic explanations for the variation in prices of different breeds. For example, Holsteins average more milk than the two other breeds. They also weigh more than the other breeds and their meat quality is graded better. And their calves grow much better than Guernseys and Jerseys.

Table 10. Economic Characteristics of the Three Major Dairy Breeds in the United States

Characteristic	Holstein	Guernsey	Jersey
Average size of cow (lbs)	1500	1100	1000
Average size of bull (lbs)	2200	1700	1500
Birth weight of calf (lbs)	95	75	60
Value of beef and veal	Excellent	Fair	Fair
Milk fat (%)	3.5	5.0	5.5
DHI production average (lbs)	13844	10137	9372

Sources: Milk production averages are derived from Dairy Herd Improvement Letter, Vol. 51, No. 3, October 1975, p. 6. The remaining data is adapted from Schmidt and Van Vleck, op. cit., p. 39.

Basis for Pricing Dairy Cattle Within Herds

When all the important factors determining the value of dairy cattle have been taken into consideration, a basis for indemnifying registered and grade animals on a particular farm is to start with one animal and base the value of the rest on it according to Table 11.

For the majority of cows above six years of age the price may be adjusted downward by 20 percent yearly until the salvage value for beef is reached. Outstanding cows will not. ordinarily depreciate as much as 20 percent a year because of the value of their offspring.

To determine the accuracy of the method of appraisal outlined above it would be desirable to compare it to actual price conditions. Such a comparison cannot be made broadly, however, for grade cattle because price data are not reported by age categories.

Table 11. A Suggested Method for Evaluating
Dairy Cattle by Age Groups[a]

Age Group	Value as a Percentage
Cows, 3 to 6 years old	100
Cows, 2 to 3 years old	75
Heifers, bred	60
Heifers, 12 to 18 months	40
Heifers, under 6 months	25 - 40
Heifers, at birth	20 - 25

[a] It is difficult to generalize for bulls since prices are not
necessarily correlated with age beyond certain levels. For example,
3 to 5 year old bulls may sell for the price of a yearling.

Source: P. M. Reaves and H. O. Henderson, Dairy Cattle Feeding and
Management, 5th ed., John Wiley and Sons, Inc., New York, 1963.

With respect to registered dairy cattle, some breed journals
occasionally report price data by age categories. Table 12, for ex-
ample, gives average prices paid for Holsteins by age groups for the
period 1965-74. While the age categories are not directly comparable,
the data in Table 12 does provide credence for the method of appraisal
suggested in Table 11.

In summary, we have attempted to show that fair and accurate prices
for both registered and grade dairy cattle can only be determined if
adequate consideration is given to all the factors determining their
value. These include age, sex, production and type-classification
records, breed and other factors.

Table 12. Registered Holstein Average Prices by Age Groups Sold at Auction, 1965 - 1974

Age Group	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	Average
						Dollars					
Cows 2 years and over	463	533	579	649	648	723	778	905	1142	1200	762
Bred Yearlings	376	434	476	522	540	585	617	751	949	1008	626
	(81)[a/]	(81)	(82)	(80)	(83)	(81)	(79)	(83)	(83)	(84)	(82)
Open Yearlings	282	310	389	427	371	429	462	640	824	848	498
	(61)	(58)	(67)	(66)	(57)	(59)	(59)	(71)	(72)	(71)	(65)
Heifer Calves	232	264	310	346	334	403	435	502	731	798	435
	(50)	(50)	(54)	(53)	(52)	(50)	(50)	(56)	(64)	(67)	(57)
Calves of both sexes under 3 months	104	135	154	164	169	183	196	230	284	285	190
	(23)	(25)	(27)	(25)	(26)	(25)	(25)	(25)	(25)	(24)	(25)

[a/]Figures in parentheses indicate the index of prices as a % of prices of cows 2 years and over.

Source: Compiled from Holstein-Friesian World, March 25, Respective years.

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DATA SOURCES FOR APPRAISING DAIRY CATTLE

Grade Cattle

At the present time meaningful price information on grade dairy cattle does not exist. The only price data which is available is compiled from individual states and is reported in the annual summary of Agricultural Prices published by the Statistical Reporting Service of the U.S. Department of Agriculture. A monthly questionnaire is sent out to producers by individual states in which they are asked to report the average price paid for dairy replacements.

Despite this historical data problem we feel that it is possible to determine accurate and equitable prices for grade dairy cattle if the right type of data is collected and used in evaluation.

To determine the total value of a given herd of grade animals we need the following information:

(1) Data to estimate a base price for an area,

(2) Data to adjust the base price for a given herd.

The base price can be obtained in two ways. One is to develop a pricing formula which computes the price of dairy cows based on the current price of milk and beef cattle. The accuracy of this method will depend on the degree of correlation between the price of dairy cows and the price of milk and beef cattle. It will also depend on the extent to which estimates account for critical locational and seasonal price effects.

The second method for determining a base price for grade cattle is to survey local markets in which dairy cattle are marketed and attempt to obtain a representative price. This method is costly in terms of money and time. However, it has the potential for being the best method from the standpoint of relevancy and accuracy.

Once a base price for a particular area or state is derived it should then be adjusted to reflect factors regarding individual herds such as production, age, sex, etc. A method for classification into seven age categories was presented in Table 11. To appraise a particular herd the appraiser will need to determine the difference in average production of milk and fat between the herd average and the area or state average and then adjust the price of milk cows in the herd accordingly. Production records are available for many herds and can be obtained from DHI associations. Dairy herds for which official records are not available may be appraised on the basis of owner production records when these can be verified by official appraisers. Those animals which will be normally culled within a short period of

time because of health or other problems should not be appraised for their milk production value but rather at or near their value for beef.

Registered Dairy Cattle

It is beyond the scope of this study to evaluate the efficiency of the pricing and marketing system of registered dairy cattle but some generalizations can be made relative to prices for registered animals.

To the best of our knowledge the only available sources of information on prices of registered dairy cattle are the journals of the breed associations. The major breed journals publish annual price summaries on registered cattle sold at public auctions by sex and by age groups. Appraisers should consult these journals when computing indemnities for registered dairy cattle. The journals also publish regularly the results of individual herd sales from different parts of the country. These are very detailed reports that include the price by age categories and also data such as type-classification grade, production records, pedigree, etc.

The journals also publish the top prices paid for animals with outstanding records. For example the Holstein Journal lists all animals sold for a minimum price of $7,000.[30] These types of data will be a valuable yardstick to use by appraisers when evaluating animals at the farm. In cases where an animal was recently bought, the appraisal price will be the purchase price plus adjustment for feed and other costs.

Finally, Appendix E gives useful reference material on registered dairy breeds which includes listing of associations, number of registrations by breed and average price paid for both grade and registered dairy cattle.

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[30] In 1974, 7.64 percent or about 1100 head of Holsteins were sold at public auctions for more than $2,000. If we assume that Holsteins sold at auctions represent 20 percent and prices at public auction are the same as those of private treaty then the total number sold at more than $2,000 is 5500 head.

BEEF BREEDING ANIMALS

Classification

About 3 percent of all beef cattle in the United States are pure-bred and 97 percent are grade.[31/] The major beef cattle breeds include Angus, Hereford, Polled Hereford, Charolais, Shorthorn, Santa Gertrudis, Brahman and Brangus. Number of registrations and volume of sales for 1974/75 are presented in Table 13 for the eight major breed associations.

Table 13. Registrations and Transfers for Registered
Beef Cattle, 1974/75

Breed Association	Registrations	Transfers
	---------Head------------	
American Angus Association	350,558	231,028
American Hereford Association	272,416	111,211
American Polled Hereford Association	207,882	113,718
American International Charolais Association	96,525	75,668
American Brahman Breeders Association	25,295	21,955
American Shorthorn Association	24,204	16,219
Santa Gertrudis Breeders International Association	28,060	13,751
International Brangus Association	12,686	9,957

Source: National Society of Livestock Record Associations, **Annual Report and Directory, 1974-1975**.

Marketing Methods

The marketing of grade and registered breeding cattle is not very different for beef than for dairy. As for dairy, selling methods for both registered and grade beef cattle include private treaty, auction, consignment sales, dispersal and other methods. Some of the problems

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[31/]A. L. Neuman and R. R. Snapp, **Beef Cattle**, John Wiley and Sons, Inc., New York, 1960, p. 393.

which are common in the marketing of beef breeding animals can be summarized as follows:

(1) There are no price-quoted markets.

(2) Prices are determined on a head basis and there is no real basis for establishing whether prices are reasonable or not because prices are based to a large extent on visual appraisal and pedigree of animals.

In recent years more objective standards such as performance and progeny records have been developed; however, they are not yet widely used methods of evaluation.

Grade Beef Cattle

Although there are more than 43 million beef cows in the United States at the present, price data for them is very sparse. Grade beef cows are traded regularly through different marketing channels but prices are not published even on an annual basis. Since price data are not reported, it is necessary to establish base prices on the basis of direct contact with auction managers, commission men, dealers and others who are acquainted with the local marketing of breeding animals.

A survey of dealers, auctions and commission men in a given area can be made for deriving average prices for beef breeding animals. The limitations of this method in terms of cost and time have been discussed earlier with respect to dairy cattle. Another method of determining the value of grade beef cows is one based on the price of feeder cattle. A 25 to 50 percent premium per cwt over feeder cattle price can be used as a rough guide for establishing a base price for beef cows in breeding herds.[32]

Once a base price is established appraisers can adjust this base price for the individual factors affecting a particular animal or herd. Factors which need to be considered in appraising grade breeding animals include age, sex, breed and health. In order to obtain accurate appraisal of animals, herds should be classified according to uniform and acceptable standards of age and quality categories.

Registered Cattle

Most of the registered beef cattle are sold and bought through private treaty. Only about 10 to 15 percent of purebred cattle of the major breeds are traded at auction markets. However, since only auction prices are published they are often used as a price guide in private treaty selling. Although registered cattle are marketed separately

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[32] Ibid., p. 170.

from commercial cattle, their prices are influenced by most of the same factors which influence commercial cattle prices. When prices of commercial cattle are high, the demand for purebred cattle increases, which, in turn, results in high prices for registered cattle. Other factors which influence the value of registered beef cattle include general economic conditions, the reputation of the breeder and the conformation, quality, breed, performance, pedigree and age of animals.

Procedures for Determining Indemnities

Purebred cattle prices vary greatly from one herd to another. Prices also differ greatly from one animal to another in a given herd. These variations make it very difficult to make specific guidelines for indemnity payments, and particularly in the case of outstanding animals whose prices deviate greatly from the average.

The first requirement for determining equitable indemnity values for registered beef cattle is to employ qualified appraisers who are thoroughly acquainted with the registered beef business. These appraisers should consider the following factors in the evaluation of herds for indemnification.

(1) Age and sex: It is important that all the animals in the herd are classified first according to sex and age categories. The age categories should conform to those used by the breed associations. Normally, prices increase from birth to maturity and then begin to decline. Animals which are beyond breeding age should be valued at their meat value.

(2) Type conformation: This is an important consideration in the merchandising of registered cattle even though research studies show little or no relation between type and performance. Prices published by breed journals do show that breeders pay higher prices for animals with higher type scores.

(3) Performance records: Cows and bulls with performance records usually command higher prices than bulls and cows without records. Only a very small percentage of purebred beef cattle have yet entered into systematic performance testing programs. The fantastically high prices occasionally reported in breed journals are for cattle with excellent performance and type score records.

(4) Breed: Prices vary substantially from one breed to another depending on the current popularity of a particular blood line or breed. Some of the new exotic breeds command higher prices than some of the established breeds.

(5) Health: It is expected that animals with severe health prob-
    lems prior to the outbreak of the disease for which indemni-
    ties are paid should be sorted out and valued at prices less
    than their potential breeding value. For example, herd ani-
    mals which would have been normally culled should be valued
    at cull prices.

(6) Pedigree: Pedigree information is also very important in
    determining the value of registered animals. Before the ad-
    vent of performance and progeny testing, pedigree information
    and visual appraisal were the only methods of evaluating
    breeding cattle. Pedigree information is a particularly im-
    portant consideration in the case of young animals which be-
    cause of their age lack progeny and performance information.

It is recognized that there are many variables in determining
the value of registered beef cattle but our attempt was to point out
only the major factors influencing prices.

Sources of Price Information

It was mentioned before that there is no public price information
available for breeding animals including registered beef cattle. The
only sources of information on prices of registered animals are the
breed association reports and journals. Some of the major beef breed
associations publish regularly the prices of registered animals by sex
and age categories.[33/] Evaluation of these sources of information
provides appraisers with an adequate basis for estimating values of
animals at the farm. In order to obtain equitable values, appraisers
need to be able to interpret the prices paid at auction to the specific
cattle being appraised.

The price information given in Table 14 provides background infor-
mation relative to average prices of registered and grade beef cattle
during the period from 1960 to 1974. The data permits a comparison
between prices of different breeds and also between registered and
grade cattle prices.

The data in the table indicates, in general, that prices of
registered beef cattle followed closely the general trend of grade
cattle prices. The weighted average price bf registered Angus and
Hereford cattle averages approximately 2.8 times the average value per
head of 700 pound grade feeder steers over the 15 year period.

Because the prices of some outstanding animals can be extremely
high (for example $100,000 or more) sale averages can be misleading

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[33/] See for example Aberdeen Angus Journal, American Hereford Journal
    and Polled Hereford World.

and less meaningful to use as a basis for indemnifying outstanding herds. However, it should be pointed out that these herds represent a very small percentage of the registered beef herds. For the majority of registered cattle the average price can be expected to range from 2.5 to 3.5 times the average price of commercial feeder steers if the historical relationships between registered cattle and grade cattle prices prevail in the future.

Table 14. Average Prices of Registered Beef Cattle of Two Major Breeds Sold at Auction and All Grade Feeder Steers at Kansas City, 1960 - 1974

Year	Registered Cattle		Weighted Price	Grade Feeder Steers Per Head (700 lbs.)
	Hereford	Angus		
1960	458	412	439	161
1961	498	445	476	161
1962	506	519	511	172
1963	508	539	522	161
1964	451	509	479	139
1965	441	436	438	158
1966	508	476	491	178
1967	522	523	522	173
1968	484	464	472	181
1969	530	490	506	205
1970	621	503	544	211
1971	664	529	583	224
1972	857	604	705	272
1973	1050	816	919	344
1974	960	869	907	245

Sources: Hereford prices are derived from American Hereford Journal, Annual February issues; Angus prices are obtained from American Angus Association, St. Joseph, Missouri, personal correspondence; and grade feeder steer prices are derived from livestock and meat statistics, Statistical Bulletin No. 522 and Supplements, USDA, Washington, D.C.

APPRAISAL OF BREEDING SWINE AND SHEEP

The marketing of breeding swine and sheep is not very dissimilar
from the marketing of other breeding livestock. Swine and sheep are
marketed through auction sales, private treaty sales, consignment sales
and several other methods. These methods have already been discussed
in detail.

In appraising both purebred and grade swine and sheep we need to
consider all the relevant factors influencing prices. Evaluation of
pedigree, type, performance and other factors is very important in or-
der to arrive at equitable appraisal values for condemned herds. The
importance of these factors in evaluation has been discussed before and
will not be treated further. Instead, this section will be devoted to
outlining some of the data needs in pricing breeding swine and sheep,
particularly registered animals.

Swine

The number of purebred swine registered in 1974/75 was slightly
over 352,000 head. This number is small when compared to the 61 mil-
lion hogs and pigs on U.S. farms in December 1973.

As is true in the case of dairy and beef breeding animals, current
price information is not available for breeding swine. Moreover, many
of the swine breed associations do not publish average prices for their
breeds on a regular basis. Occasionally a breed journal will publish
sale prices for individual sales. This type of data is, however, in-
adequate to serve as a base for pricing registered swine because it may
not be representative of the animals of that breed.

One swine breed association which publishes regular prices is the
Hampshire Swine Registry. In 1974 this breed association registered
more than 24 percent of the total swine registrations in the U.S. for
that year. Table 15 gives background price information by sex and
breeding status for the Hampshire Swine Registry for the period from
1963 to 1975.

The data in Table 15 indicates that there is a substantial varia-
tion in prices between boars and gilts with boars commanding the higher
price. For example, the average price of boars for the 13 year period
was more than 1.8 times the average price of open gilts. There is also
a significant difference between the price of open gilts versus bred
gilts. Over the 13 year period the average price of bred gilts was
1.27 times the average price of open gilts.

It can be generally concluded that classification of animals
according to sex, age and other categories is a necessary requirement
for obtaining fair indemnity values. Any indemnity procedure which is
based only on average per head values may result in gross errors and
inequities.

Price information on grade breeding swine is not available on a wide basis. Some of the registered swine breed associations occasionally publish price comparisons between grade and registered swine. Appraisers need to augment this data by surveying dealers and commission men who deal actively in swine marketing.

To supplement the sources of information on prices of registered swine, appraisers should consult with the breed associations. Fieldmen employed by breed associations can generally be expected to give accurate appraisals of the worth of animals registered in their respective breed associations.

Table 15. Average Prices for Registered Hampshires Sold
at Auction by Sex and Breeding Status, 1963-1975

Year	Average Price per Head		
	Boars	Open Gilts	Bred Gilts
1963	164	94	133
1964	152	87	134
1965	197	113	135
1966	235	136	207
1967	230	125	169
1968	233	136	162
1969	265	144	166
1970	273	159	223
1971	231	129	151
1972	277	143	187
1973	387	216	253
1974	410	213	258
1975	472	260	295
Average	271	150	190

Source: Hampshire Swine Registry, Peoria, Illinois, Personal correspondence, January 1976.

Sheep

The number of sheep and lambs in the United States declined in the last three decades reaching 13.3 million head in 1976.[34/] The number of purebred sheep that are registered as purebred represent less

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[34/]Livestock and Meat Situation, ERS, USDA, February 1976, p. 28.

than one percent of the total sheep and lambs in the United States. The number of registrations and the volume of sales for selected years are presented in Table 16 for the major breed associations.

Selling purebred sheep is a highly specialized business. They are usually sold at private treaty directly to other purebred breeders or owners of commercial flocks. Accurate pricing of breeding sheep can be difficult because of the lack of published price data on which to base prices. Official agencies such as the Federal-State Market News Service do not publish price quotations for breeding ewes and rams. The only available published price data is found in the breed journals. However, such data is only reported for major sales. Moreover, it is not reported on a regular basis. Table 17 illustrates the type of price data reported by the breed journals.

The prices reported in Table 17 are by no means typical for the purebred sheep industry. In fact, less than 100 head surpassed $1,000 in 1974. The table does show clearly that prices of purebred sheep vary substantially by breed and sex. In general, prices paid for rams are significantly higher than ewe prices. This is because of the high demand for rams by both the purebred and commercial segments of the sheep industry.

Despite the fact that price data is not widely available for pure-bred sheep, it is possible to establish a basis for pricing animals provided that appraisers are acquainted with the marketing system. A survey of dealers, commission men, breed organizations and others involved in the trading of breeding animals in a given area can provide a base price on which to base indemnities. A simpler procedure which may be applied to run-of-the-mill breeding animals is that of appraising them on the basis of their meat value plus a specified premium. The amount of the premium above meat value should be based on factors related to the individual animals being appraised such as age, pedigree, performance and other relevant factors.

Table 16. Registrations and Transfers for Registered Sheep, Selected Years

Breed Association	1974 Registrations	Previous 5 Year Average	1974 Transfers	Previous 5 Year Average
National Suffolk Sheep Association	29,045	26,828	19,931	17,560
American Hampshire Sheep Association	17,492	20,611	12,400	13,994
American Suffolk Sheep Society	14,478	13,000	4,932	3,500
Continental Dorset Club	9,274	9,070	5,602	5,579
American Rambouillet Sheep Breeders Association	6,097	6,857	1,996	2,470
American Corriedale Association	6,009	7,551	3,459	4,036
Columbia Sheep Breeders Association	5,035	6,446	2,314	3,686
American Shropshire Registry Association	4,060	4,448	2,265	2,194
American Southdown Breeders Association	3,358	4,338	NA	NA
American Cheviot Sheep Society	2,408	2,813	1,625	1,622
Montadale Sheep Breeders Association	2,315	2,338	1,044	1,130
Finnsheep Breeders Association	1,630	1,513	733	360
American Oxford Down Record Association	1,277	1,101	697	567

Source: "1974 Purebred Sheep Review," Sheep Breeder and Sheepman, March 1975, pp. 66-67.

Table 17. Top Selling Prices for Purebred Rams and Ewes, 1974

Breed	Rams	Ewes
	dollars	dollars
Cheviot	185	215
Columbia	1,800	425
Corriedale	850	350
Polled Dorset	1,425	825
Hampshire	3,700	1,475
Montadales	875	500
Oxford	360	275
Rambouillet	2,000	675
Shropshire	1,200	700
Southdown	1,300	550
Suffolks	12,000	3,400

Source: "1974 Purebred Sheep Review," Sheep Breeder and Sheep-
man, March 1975, pp. 70-76.

SUMMARY AND CONCLUSIONS

Legislation currently in effect calls for compensation for destroyed animals, animal products and materials on the basis of "fair market value." Two basic alternatives of appraisal, with possible modification, exist for determining indemnity rates for livestock:

(1) Market Value

(2) Productivity Value.

The market value method is equivalent to the current open market prices of the animal or product at the time of slaughter. It can be used for livestock animals or products for which there is a regular price quotation at a recognized market. This method is simple and thus can be easily applied provided that appraisers make intelligent interpretation of market quotations for different grades and classes of animals and products. It is also assumed to be equitable and fair because the price is determined in a competitive setting where the final price of an animal is determined by the actions of numerous buyers and sellers.

The productivity method is intended to provide a "value in use" for resources irrespective of their current market prices. It is defined as the present discounted value of future net returns or profits.

The productivity method may be very difficult to apply because of lack of pertinent data and the considerable cost of using such a method even if data is available. In order to estimate productivity values for depopulated farms a complete accounting of costs and returns over a specified period of time is needed for each farm or at least for representative farms.

From the standpoint of both equity and efficiency in application it appears that the open market method is the most desirable appraisal method to use. There are two main reasons for reaching such conclusions:

(1) The marketing system for the primary livestock sector is very competitive. Prices for livestock are determined competitively and fairly on a regular basis at literally hundreds of auctions and terminals throughout the country.

(2) The substantial variation in production costs from one farm to another, the difficulty in estimating costs and returns with adequate accuracy and the possible disagreement over what constitutes a "fair return to resources" makes the productivity method of appraising slaughtered livestock and other products much less desirable than a system based on market prices.

The procedures for estimating market value should be based on use of price data from public sources for competitive markets where this is possible. In order to develop equitable and efficient appraisal systems of livestock, it is necessary to follow some systematic and uniform method of evaluation that considers quality, yield and other differences of livestock species. For commercial livestock such a method is the system of grading and classification developed by the United States Department of Agriculture. This and other procedures for appraising breeding and dairy animals including purebred animals are presented in detail.

Concluding Recommendations

We conclude that the use of the open market value for livestock and products at the time of slaughter is the only practical approach to indemnification. If the situation develops in which all major markets are closed and there ceases to be any reliable yardstick on which to base indemnity values we propose that historic prices be used and that they be adjusted to reflect changing seasonal, cyclical and other price movements.

The value estimating system on which indemnity payments are based will require that professional appraisers be used to assess the value of livestock involved since it will be impractical to move livestock to market for appraisal.

The necessity for expert appraisers is particularly important in the case of registered dairy and breeding animals. Consequently, the USDA should establish a list of appraisers chosen with consultation with the respective breed associations. During emergency disease eradication programs appraisers can be chosen from these lists to appraise registered animals. In order to maintain a degree of uniformity in the valuation of livestock it is suggested that the appraisal officers attached to the Regional Emergency Animal Disease Eradication Organizations (READEO) be given the responsibility of monitoring indemnity payments in their regions.

Full compensation through indemnity payments should be limited to payments for animals, animal products or materials directly destroyed in the operation of a disease eradication program. While it is recognized that consequential losses may prove to be substantial it is suggested that direct payment of indemnities should not be made for such losses. Rather it is recommended that in those cases where consequential losses represent severe economic hardships, those hardships should be alleviated via utilization of such policies as low cost loans, liberal tax writeoffs, unemployment compensation, etc.

Data Needs

Relevant and accurate data is a necessary requirement for a successful and fair indemnification program. Reasonably accurate and adequate data is provided by the Federal-State Market News Service (FSMNS) on feeder and slaughter livestock. This type of data can be obtained directly by appraisers. Prices for varying grades, qualities and weights can be established at almost any time for almost any area in the United States.

In contrast to feeder and slaughter livestock, price data on breeding and dairy animals is very scanty. There are no regularly established markets such as terminal markets with regular price quotations for breeding and dairy stock.

Because of the lack of adequate and current price data for breeding and dairy animals we propose that APHIS establish, in cooperation with SRS, FSMNS and other agencies in the USDA, a data reporting system on livestock prices at the local, state, regional and national levels. The proposed system should be used only to collect data not currently available. For example, market reporters employed by FSMNS may expand their activities to include price reporting on breeding animals and dairy cattle. Since any expansion in data coverage will involve considerable costs we suggest that such expansion be planned in advance but that it only be implemented during disease outbreaks. In conjunction with this expansion in data acquisition it is recommended that appropriate USDA agencies be assigned the task of establishing a set of formulas which provide estimates of historical relationships between subsets of animals within different classes of breeding stock (e.g., Table 11) and of other useful prediction equations (e.g., dairy cow prices, beef prices and milk prices, Table 4) with appropriate adjustment factors for season and location. An example, for illustrative purposes only is shown in Appendix F.

APPENDIX A. A Summary of Compensation Provisions
in Selected Countries[a]

1. <u>Federal Republic of Germany</u>: Compensation is authorized under an
   epizootics-act which provides for compensation on the basis of the
   full market value.

   <u>Compensation payments</u> are financed by an epizootic fund which re-
   ceives an annual contribution from all the owners (per head of ani-
   mals) and also receives a state subsidy.

   <u>Coverage</u>: Compensation covers only slaughtered animals. Loss of
   income is not compensated. Furthermore, compensation does not
   cover cattle imported into federal territory within a fixed period
   of time before the incidence of the disease, unless it has been
   proven that the animals contracted the disease after import. The
   right to compensation may be lost if the owner fails to notify the
   authorities about the appearance of the disease in his premises
   within 24 hours or knowingly bought an animal or animals affected
   by the epizootic.

2. <u>France</u>: Livestock owners whose animals are destroyed may obtain
   compensation payments. The amount is fixed by ministerial order or
   by decree according to the disease. Animals affected by FMD are
   compensated at 100 percent of market value if vaccinated and 75
   percent of market value if not vaccinated. No compensation is
   made for consequential losses.

   A producer who finds the estimated compensation payment to be
   low may contest it before the Perfect. In reality, complaints are
   very rare because compensation is made by experts proposed by pro-
   ducers themselves.

3. <u>Greece</u>: The minister of agriculture appoints a commission to assess
   the market value of the animals which is fully compensated by the
   government. The decision of assessment of the value of the slaugh-
   tered animals is irrevocable.

4. <u>Netherlands</u>: Compensation is paid in full for animals suspected of
   having the disease and only 75 percent 'of market value is paid for
   infected animals. Loss of profits is not compensated.

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[a] The information in this Appendix is based on <u>Prevention of Cattle
Diseases</u>, International Association of Legal Sciences, Brussels, 1964.

5. Poland: Compensation for slaughtered animals is 100 percent of the estimated market value, and 75 percent for dead animals. The value is based on the value of the healthy animals, according to current prices in the local market. There is no scale which fixes it in advance. The estimated value takes account of the particular characteristics of the animal, such as milk productivity, pedigree, etc.

6. Sweden: Compensation is made according to the market value the animal would represent if the disease had not occurred. Claims owing to loss of earnings may be compensated within certain limits. The maximum payment is equivalent to the amount paid under the Swedish provisions for health insurance to individuals as compensation for lost earnings in cases of sickness.

7. Britain: Compensation is for full market value. No compensation is paid for any consequential loss caused by eradication procedures such as the loss of profits to producers whose animals are slaughtered. There is accordingly no compensation for any loss ensuing from restrictions on movement of animals. Slaughtered animals are valued individually and not as a herd.

APPENDIX B. Evaluation of Livestock When Livestock
Markets Are Closed

Under ordinary situations where only minor epidemics of FMD or
other exotic diseases occur the methods of appraisal discussed in the
body of this report are adequate for determining fair indemnity values.
However, when a major epidemic occurs which extends to major livestock
production areas of the country and remains for a long period of time
(more than two months), the use of the current market price as a basis
for indemnification may not be feasible simply because of closure of
livestock markets which eliminates any readily ascertainable yardstick
against which prices could be measured.

It is possible that the situation described above may never occur
in the United States but at the same time we need to be able to deal
with such a situation if it ever arises by having built-in flexibility
in the indemnification guidelines.

The following procedure is suggested for use in determining in-
demnities when widespread and prolonged outbreaks of disease occur:

(1) A base price should be established for each class and age
group of livestock covered by indemnity legislation. The
base price may be the market price prevailing prior to the
closure of livestock markets.

(2) Producers of breeding and dairy animals whose stock is
destroyed should be paid indemnities on the basis of the
established base price with the understanding that adjustments
will be made later to reflect the changing price conditions
during the outbreak period.

(3) When the disease emergency is over and normal trading in
livestock is resumed, APHIS should appoint a panel of live-
stock marketing specialists whose major responsibility is
to oversee the supplementary payment program.[a] The panel
may determine supplementary payments on the basis of the
changes in prices for different classes of livestock. In
general the amount of the supplementary payment should be
the difference between the base price and the replacement
cost for similar (like) animals.

It is suggested that supplementary payments be limited
to owners of breeding and dairy animals and specifically to
only those who restock their farms within a reasonable period

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[a]The panel may include purebred and commercial producers, dealers,
livestock marketing economists, livestock appraisers, etc.

such as one year or less. The justification for supplementary
payment to owners of breeding and dairy stock is that such
payments will help bring the basic inventory of animals to
normal levels and, therefore, minimize the future economic
impact on producers and consumers alike.

The procedure suggested above is intended only as an illustration
and further detail may be needed to make it applicable. However, we
recommend that APHIS give serious consideration to such a proposal.

APPENDIX C. Valuation of Livestock Using Productivity
or Capitalized Value

Under the productivity method costs and prices of the future
(based on an historical period) are first estimated. These estimates
are expectations and are, therefore, subject to error and uncertainty.

The method basically involves a budgeting procedure where a com-
plete analysis of costs, prices and outputs is made. Costs, including
interest rate on investments, are subtracted from expected gross returns
to give a net profit.

The discounted present value of a given resource can be computed
as shown in formula (1):

(1) $V = \dfrac{R - C}{r}$

Where R represents gross income, r is the interest rate and C is
the cost incurred. C represents both fixed and variable costs. The
above formula assumes equal costs and returns every year and it also
assumes a perpetual income. Since we know that the life span of some
investments including livestock is finite, a better formula to use is
shown below:

(2) $V = \left[\dfrac{R1}{1+r} + \dfrac{R2}{(1+r)^2} + \ldots + \dfrac{Rn}{(1+r)^n}\right] - \left[C1 + \dfrac{C2}{1+r} + \ldots + \dfrac{Cn}{(1+r)^{n-1}}\right]$

Where R again represents gross income, r interest rate, n is the expected
life of the investment and C is the cost per year.

Formula number (2) above is thus more appropriate to use when an
investment is made in a terminal product such as breeding animals and
when the costs and returns are not the same every year.

If a salvage value for the investment is to be considered then
formula (3) below should be used.

(3) $V = \left[\dfrac{Ri}{1 + r} + \dfrac{R2}{(1 + r)^2} + \ldots + \dfrac{Rn}{(1 + r)^n} + \dfrac{S}{(1 + r)^n}\right] -$

$\left[C1 + \dfrac{C2}{1 + r} + \ldots + \dfrac{Cn}{(1 + r)^{n-1}}\right]$

R, r, n and C have been defined before and S is the salvage value.

To use the productivity method outlined above for valuation purposes we need to collect the following data:

(1) Data on the economic and physical makeup of each farm. This would include a complete accounting of the farm's input-output relationships such as labor, feed, replacement strategies, production, etc.,

(2) Data on fixed investments and

(3) Data on cash flows, sales and expenditures.

The above data should be collected to cover both disease and pre-disease conditions on each farm or at least for a sample of farms.

Once data is collected the analysis should proceed to compare expected net income under the disease situation with that of no disease. The difference will give an estimate of losses as a result of the eradication program.

APPENDIX D[a]

The following information should provide appraisers with adequate sources of information on prices of livestock for most parts of the country. It is hoped that appraisers use the sources listed here before determining appraisal values. If all appraisers use a uniform method of appraisal that takes into consideration quality, weight and locational difference, problems concerning fairness in indemnification will be minimized. The following information is provided in this Appendix.

(1) A listing of livestock public markets and a map showing their location.

(2) A listing of Federal-State Market News offices and their telephone numbers.

(3) A tabulation of cities from which market news reports are issued which also includes a directory of automatic telephone answering devices.

(4) A map showing the location of market news offices and the teletype network circuits.

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[a] Information in this Appendix is adapted from AMS-551, Agricultural Marketing Service, U.S. Department of Agriculture, March 1975.

Livestock Terminal Markets

  1. Amarillo, Texas
  2. Baltimore, Maryland
  3. Billings, Montana
  4. Cincinnati, Ohio
  5. Clovis, New Mexico
  6. Dodge City, Kansas
  7. Evansville, Indiana
  8. Fort Smith, Arkansas
  9. Fort Worth, Texas
 10. Greeley, Colorado
 11. Indianapolis, Indiana
 12. Joliet, Illinois
 13. Joplin, Missouri
 14. Kansas City, Missouri
*15. La Junta, Colorado
 16. Lancaster, Pennsylvania
*17. Lexington, Kentucky
 18. Louisville, Kentucky
 19. Memphis, Tennessee
*20. Mexico, Missouri
 21. Montgomery, Alabama
 22. National Stock Yards, Illinois
*23. Norfolk, Nebraska
 24. Oklahoma City, Oklahoma
 25. Omaha, Nebraska
 26. Peoria, Illinois
 27. Portland, Oregon
 28. St. Joseph, Missouri
 29. San Angelo, Texas
 30. San Antonio, Texas
 31. Sealy, Texas
 32. Sioux City, Iowa
 33. Sioux Falls, South Dakota
 34. South St. Paul, Minnesota
 35. Spokane, Washington
 36. Springfield, Missouri
 37. Torrington, Wyoming
 38. Tulsa, Oklahoma
 39. West Fargo, North Dakota
 40. Wichita, Kansas

Source: Livestock Market News, Livestock Division, Agricultural Market-
         ing Service, U.S. Department of Agriculture, Washington, D.C.,
         1975.

*Not exact location for these cities.

Fig. 1. Livestock Terminal Markets

Table D-1. General Livestock Information Available by Area and State

State	Area or Station	Telephone
Alabama	Montgomery	(205) 281 7060
Arizona	Phoenix	(602) 275 7972
Arkansas	Ft. Smith	(918) 875 3892
"	Little Rock	(501) 664 8790
California	Bell	(213) 268 8020
"	El Centro	(714) 352 8160
"	Stockton	(209) 466 3025
"	Visalia	(209) 733 3750
Colorado	Brush	(303) 842 2249
"	Greeley	(303) 353 5170
"	Sterling	(303) 522 4772
Florida	Kissimmee	(305) 846 6328
Georgia	Macon	(912) 743 1903 or (912) 746 1559
"	Thomasville	(912) 226 9511
Idaho	Burley	(208) 678 2424
"	Pocatello	(208) 232 7500
Illinois	Chicago	(312) 922 1253
"	Joliet	(815) 423 5026
"	National Stock Yards	(618) 874 1900
"	Peoria	(309) 676 8811
"	Springfield	(217) 525 4019
Indiana	Evansville	(812) 464 5206
"	Indianapolis	(800) 382 1567

(Code 800 calls are toll-free in Indiana only.
Out-of-state calls not accepted.)

State	Area or Station	Telephone
Iowa	Ames	(515) 294 6899 or (515) 294 4347
"	Des Moines	(515) 282 6870
"	Durant	(319) 785 6032
"	Sioux City	(712) 252 2100
Kansas	Dodge City	(316) 225 1311
"	Wichita	(316) 267 7992
Kentucky	Frankfort	(502) 564 4958
"	Louisville	(502) 584 6617 (and grain)
Michigan	Lansing	(517) 373 6330
Minnesota	South St. Paul	(612) 451 3692
Missouri	Kansas City	(816) 421 7694
"	Mexico (Not available 8:30 to 9:15 a.m. and 11:30 a.m. to 12:00 noon.)	(314) 581 6250
"	South St. Joseph	(816) 238 1203
Nebraska	Aurora	(402) 694 3183
"	Beatrice	(402) 223 5231
"	Columbus	(402) 564 2778
"	David City	(402) 367 4221
"	Exeter	(402) 266 5461
"	Fremont	(402) 721 4100
"	Grand Island	(308) 384 5101
"	Holdrege	(308) 995 4497
"	Kearney	(308) 237 5908
"	Omaha	(402) 731 4481 or (402) 731 5355

State	Area or Station	Telephone
Nebraska	Tekamah	(402) 374 1667
"	York	(402) 362 6623
New Mexico	Clovis	(505) 763 3030
North Dakota	West Fargo	(701) 237 3426
Ohio	Bucyrus	(419) 562 5489
"	Chillicothe	(614) 772 1431
"	Columbus	(614) 466 6484
"	London	(614) 852 2311
"	Washington Court House	(614) 335 5100
Oklahoma	Oklahoma City	(405) 236 5491
"	Purcell	(405) 527 3995
"	Tulsa	(918) 245 7134
Oregon	Portland	(503) 289 7220
Pennsylvania	New Holland	(717) 354 7288
South Carolina	Columbia	(803) 779 7980
South Dakota	Rapid City	(605) 342 1833
"	Sioux Falls	(605) 336 7765
Tennessee	Jackson	(901) 423 2080
"	Knoxville	(615) 525 3211
"	Memphis	(901) 774 6460
"	Nashville	(615) 256 0596
Texas	Amarillo	(806) 372 3494
"	San Antonio	(512) 223 4100
"	Sealy	(713) 885 2050
"	Spur	(806) 271 4505 (and grain and cotton)
Washington	Sunnyside	(509) 837 2412

State	Area or Station	Telephone
West Virginia	Charleston (Not available 11:00 a.m. to 2:00 p.m.)	(304) 348 8883
Wyoming	Cheyenne	(307) 777 7628

Table D-2. Federal-State Market News Service Commodity Offices and Teletype Network Connections

City and State	Livestock, Meat, Wool	Grain, Hay Feed	Dairy	Eastern Livestock	Midwestern Livestock	Western Livestock	Southern General	Central General	Western General
Albany, New York	x			x					
Amarillo, Texas	x				x				
Ames, Iowa (1)*					R				
Asheville, N.C.							x		
Atlanta, Georgia							x		
Austin, Texas	x	x			R		x		
Baltimore, Maryland	x			x					
Baton Rouge, Louisiana		x					x		
Billings, Montana	x					x			
Birmingham, Alabama		x					x		
Centralia, Illinois	x			R					
Charleston, West Virginia	x							R	
Chicago, Illinois	x	x		x				x	
Cincinnati, Ohio	x								
Clovis, New Mexico	x				x				
College Park, Maryland		x							
Columbia, South Carolina	x	x					R		
Columbus, Ohio	x			x				x	
Corvallis, Oregon (2)*						R			R
Crowley, Louisiana		x						x	
Denver, Colorado	x	x							x
Des Moines, Iowa	x	x			x			x	
Dodge City, Kansas	x				x				
El Centro, California	x	x							

City and State	Livestock, Meat, Wool	Grain, Hay Feed	Dairy	Eastern Livestock	Midwestern Livestock	Western Livestock	Southern General	Central General	Western General
Evansville, Indiana	x			x					
Fort Smith, Arkansas	x				R				
Fort Worth, Texas	x				x				
Frankfort, Kentucky		x							
Fresno, California		x							
Greeley, Colorado	x					x			
Hartford, Connecticut								R	
Honolulu, Hawaii	x	x							
Idaho Falls, Idaho									x
Independence, Missouri		x						x	
Indianapolis, Indiana	x			x					
Jackson, Mississippi		x					x		
Jefferson City, Missouri	x	x			x				
Joliet, Illinois	x			R					
Kansas City, Missouri	x				x			x	
Lancaster, Pennsylvania	x			x					
Lansing, Michigan	x			x					
Lexington, Kentucky	x								
Little Rock, Arkansas	x				x		x		
Los Angeles, California	x	x				x			
Louisville, Kentucky	x	x		x					
Madison, Wisconsin			x					x	
Martinsburg, West Virginia	x								
Memphis, Tennessee	x			R			x		
Merrill, Oregon									x
Mexico, Missouri	x								
Minneapolis, Minnesota		x						x	
Montgomery, Alabama	x			x					
Moses Lake, Washington	x					x			
National Stock Yards, Illinois	x			x					
Nashville, Tennessee	x			x					
Newark, New Jersey	x			R				x	
North Portland, Oregon	x					x			

City and State	Livestock, Meat, Wool	Grain, Hay Feed	Dairy	Eastern Livestock	Midwestern Livestock	Western Livestock	Southern General	Central General	Western General
North Salt Lake, Utah	x					x			
Oklahoma City, Oklahoma	x				x				
Omaha, Nebraska	x				x				
Onley, Virginia		x							
Peoria, Illinois	x			x					
Philadelphia, Pennsylvania	x		x	R				x	
Phoenix, Arizona	x					x			
Pittsburgh, Pennsylvania								x	
Portland, Oregon		x							x
Raleigh, North Carolina		x					x		
Redding, California	x					x			
Richmond, Virginia		x					x		
Sacramento, California	x	x				x			x
St. Paul, Minnesota			x						
San Angelo, Texas	x				x				
San Antonio, Texas	x				x				
San Francisco, California	x	x	x			x			x
Sealy, Texas	x				x				
Sioux City, Iowa	x				x				
Sioux Falls, South Dakota	x				x				
South St. Joseph, Missouri	x				x				
South St. Paul, Minnesota	x		x		x			x	
Spartanburg, South Carolina	x								
Springfield, Illinois	x	x		x					
Springfield, Missouri	x				x				
Stockton, California	x	x							
Tallahassee, Florida (3)*	x						x		
Tampa, Florida							x		
Thomasville, Georgia	x			x					
Torrington, Wyoming	x					x			
Trenton, New Jersey								R	
Tulsa, Oklahoma	x				R				

City and State	Livestock, Meat, Wool	Grain, Hay Feed	Dairy	Eastern Livestock	Midwestern Livestock	Western Livestock	Southern General	Central General	Western General
Visalia, California	x					x			
Washington, D.C.	x	x	x	x	x	x	x	x	x
West Fargo, North Dakota	x				x				
West Plains, Missouri	x								
Wichita, Kansas	x				x				
Yakima, Washington	x					R			x

R - Receiving only teletype stations

(1)* Iowa State University - Receives livestock, grain, poultry and eggs, and dairy reports.

(2)* Oregon State University - Receives livestock, fruits and vegetables, grain and poultry reports.

(3)* Florida Bureau of Market News - Receives livestock, fruits and vegetables, poultry and eggs, and grain reports.

Source: U.S. Department of Agriculture, Agricultural Marketing Service, AMS-551, March 1975.

MARKET NEWS TELETYPE SYSTEM
of the Agricultural Marketing Service, U.S. Department of Agriculture
January 1975

Figure 2.
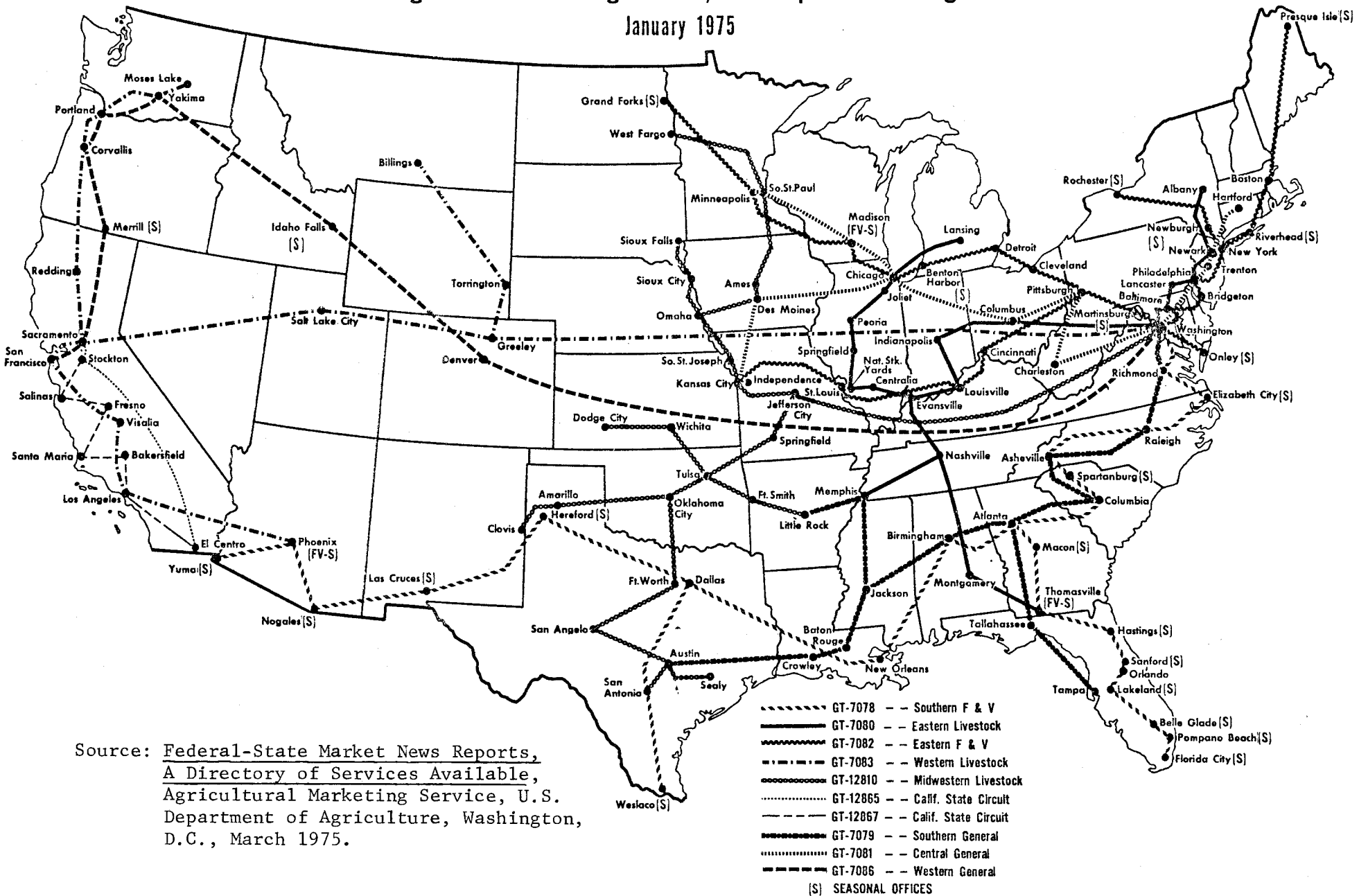
Source: <u>Federal-State Market News Reports,</u>
<u>A Directory of Services Available</u>,
Agricultural Marketing Service, U.S.
Department of Agriculture, Washington,
D.C., March 1975.

Legend:

Line	Route
GT-7078	Southern F & V
GT-7080	Eastern Livestock
GT-7082	Eastern F & V
GT-7083	Western Livestock
GT-12810	Midwestern Livestock
GT-12865	Calif. State Circuit
GT-12867	Calif. State Circuit
GT-7079	Southern General
GT-7081	Central General
GT-7086	Western General

(S) SEASONAL OFFICES

APPENDIX E

The purpose of this Appendix is to provide appraisers with reference material on appraising registered dairy cattle. Additional information can be obtained from the respective breed associations.

Table E-1. Breed Summary

Breed	1974 Registrations	Total Cows Registered	Percent Cows in U.S. Grade and Registered	Number DHI Cows Grade & Registered 1972 DHI Average	Proven Sires Available	National Headquarters
Ayrshire	Females, 10,372 Males, 704	85,000	1 - 2%	22,336 cows 11,610 lbs.	21	Brandon, Vermont
Brown Swiss	Females, 12,857 Males, 2,298	80,000	1 - 2%	27,111 cows 12,743 lbs.	32	Beloit, Wisconsin
Jersey	Females, 337,759 Males, 2,053	270,573	10 - 15%	103,053 cows 9,497 lbs.	90	Columbus, Ohio
Guernsey	Females, 27,418 Males, 1,502	265,000	5 - 9%	93,392 cows 10,285 lbs.	77	Peterborough, New Hampshire
Holstein	Females, 2,683,331 Males, 23,458	2,000,000	80 - 85%	1,721,129 cows 14,712 lbs.	771	Brattleboro, Vermont
Milking Shorthorn	Females, 3,503 Males, 1,131	50,000	1 - 2%	3,133 cows 10,450 lbs.	5	Springfield, Missouri

Source: Adapted from Dairy Project Workbook, Cooperative Extension Programs, University of Minnesota Extension Service, 4-H, B-10, 1975.

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Table E-2. Average Price for Registered and
Grade Dairy Cattle, 1965-1974

Year	Registered* Average Price	Grade Average Price	Ratio of Grade to Registered
1965	379	193	.51
1966	472	221	.47
1967	508	232	.46
1968	527	246	.47
1969	543	273	.50
1970	606	302	.50
1971	658	325	.49
1972	770	351	.46
1973	939	447	.48
1974	992	449	.45

*Only the three major dairy breeds are included. These are Holsteins,
 Guernsey and Jersey breeds.

Source: Registered dairy cattle prices are compiled from respective
         breed journals. Grade average price is derived from Agricul-
         tural Statistics, USDA, Washington, D.C., Various issues.

APPENDIX F. Spatial and Seasonal Differences In
Prices of Dairy Cattle

The formula method of pricing dairy cattle has dealt with average annual prices on a national basis. However, it is known that prices of dairy cows vary substantially from one region of the U.S. to another. Prices of dairy cows may also vary seasonally.

Table F-1 below shows the monthly and annual average price per head received by farmers, by regions for the period 1960 - 1972. While the U.S. annual average price for the period was $268 per head, the annual average price for the nine major regions ranged from a low of $196 in the East South Central region to a high of $316 in the Middle Atlantic region.[a/] Table F-2 presents the same data as index numbers (1960 - 1972 = 100). For some locations, state rather than regional data may be required in order to identify appropriate locational price differentials.

The monthly variation in prices of dairy cows as shown in Tables F-1 and F-2 is not very significant compared to the regional differences. For example, the index of prices for the U.S. ranged from a low of 97 in January to a high of 101 in September, October and November. However, in order to obtain equitable indemnity values for dairy cows it is suggested that seasonal differences in prices should be considered.

To illustrate the use of the formula method on a state basis the following equation was estimated for Minnesota.[b/]

$$P_{dc} = -80.29244 + 8.516245P_b + 35.1326P_m$$
$$\phantom{P_{dc} = -80.29244 + } (1.50228) (8.15093)$$

$$R^2 = .941$$

Where

P_{dc} = Price of grade dairy cows per head in dollars

P_b = Price of all beef cattle per hundred weight in dollars

P_m = Price of milk per hundred weight in dollars.

[a/]Price includes both grade and registered dairy cows.
[b/]Price of all beef cattle in Minnesota was obtained from Agricultural Statistics, USDA, Washington, D.C., Annual issues. Prices of dairy cows and milk were obtained from Minnesota Agricultural Statistics, Crop and Livestock Reporting Service, Minnesota Department of Agriculture, St. Paul, Minnesota, Annual issues.

Because of the high correlation between the price of dairy cows and the prices of beef and milk, it is possible to get a good estimate of the current price of dairy cows by using the above equation. This, of course, assumes that the future pattern of price relationships remains the same as historical ones.

Table F-1. Seasonal and Regional Variation in Average Prices
of Milk Cows, 1960 - 1972

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
New England	289	284	290	290	293	294	295	296	299	330	300	301	295
Middle Atlantic	310	312	310	313	313	312	316	318	320	320	321	323	316
East North Central	254	275	285	282	286	285	285	286	288	288	287	286	283
West North Central	250	254	257	260	260	261	262	262	264	265	264	263	260
South Atlantic	206	209	211	211	213	213	214	214	214	214	215	215	213
East South Central	189	192	193	194	196	196	197	197	198	197	198	199	196
West South Central	221	225	227	227	227	229	230	230	232	232	232	234	229
Mountain	250	251	254	256	257	258	258	258	260	260	261	262	257
Pacific	289	290	292	291	292	293	297	297	302	302	304	307	297
U.S.	259	260	263	265	266	267	268	268	272	271	270	267	268

Source: Based on data from "Annual Summary," Agricultural Prices, SRS, USDA,
Washington, D.C., Respective issues.

Table F-2. Index of Seasonal and Regional Variation in
Average Prices of Milk Cows, 1960 - 1972 = 100

Region	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
New England	98	96	98	98	99	100	100	100	101	112	102	102
Middle Atlantic	98	99	98	99	99	99	100	101	101	101	101	102
East North Central	90	97	100	100	100	101	101	101	102	102	101	101
West North Central	96	98	99	100	100	100	101	101	102	102	102	101
South Atlantic	97	98	99	99	100	100	100	100	100	100	101	101
East South Central	96	98	98	99	100	100	101	101	101	101	101	102
West South Central	97	98	99	99	99	100	100	100	101	101	101	102
Mountain	97	98	99	100	100	100	100	100	101	101	102	102
Pacific	97	98	98	98	98	99	100	100	101	102	102	103
U.S.	97	97	98	99	99	100	100	100	101	101	101	100

Source: Based on data from "Annual Summary," Agricultural Prices, SRS, USDA
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