

**An Economic Analysis of  
Ryegrass Seed . . . . . Prices  
Production  
Movement**



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# **An Economic Analysis of Ryegrass Seed**

## **Prices, Production, and Movement**

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### **Introduction**

Nearly all United States commercial production of common and perennial ryegrass seed is in the Willamette Valley in Oregon. In analyzing this \$7 million a year industry, consideration is given to determining monthly movements of ryegrass seed and relating these movements to price. Attention also is given to showing variation in ryegrass seed prices from year to year and the relationship between producer and first-handler prices for both common and perennial ryegrass.

This study brought into focus important factors affecting the price of common ryegrass and shows their relative importance. This information can be useful to the industry as a take-off point to finding solutions to both pro-

duction and marketing problems. It is common knowledge in the industry that prices vary a great deal from year to year and are often low. Solutions to these problems can be approached more realistically when important characteristics of demand and supply are known.

Whether or not prices can be stabilized, and perhaps raised, by group action on the part of the growers is discussed later in this bulletin.

The primary objective of this study was to provide the ryegrass seed industry with more information concerning price behavior, demand, supply, and the limitations and possibilities of grower group action so that decision-making outcomes can be predicted more easily.

### **Prices and Movement**

#### **Monthly movement of ryegrass seed**

The movement of ryegrass seed, both common and perennial, can best be observed at the first-handler (valley-dealer)<sup>1</sup> level. At this point, seed moves

from the first handler into marketing channels. Monthly movement of common and perennial ryegrass at this level is shown in Table 1.

During the three months of July, August, and September, nearly 63% of common ryegrass seed moved from the first handler into marketing channels. Peak movement of common ryegrass was during July when nearly 25% occurred, followed by August with 20%, and September with about 18% of the total movement.

<sup>1</sup> The most common method for ryegrass seed to move into trade channels is for valley dealers to sell directly to wholesalers or through brokers who make arrangements for sales to wholesalers or retailers. Some valley dealers are also growers who clean and sell their own seed and sometimes that of other growers.

Movement of perennial ryegrass seed followed the same pattern as common ryegrass. Again, as in the case of common ryegrass, peak movement of perennial ryegrass from the first handler into marketing channels was during the month of July, when about 17% occurred. Nearly 59% of the movement of perennial ryegrass occurred during the months of June, July, August, and September.

In short, movement of both common and perennial ryegrass seed was characterized by a highly seasonal demand.

### Monthly prices of ryegrass seed

Over a period of 13 years, average prices of common ryegrass have shown little variation from month to month at the first-handler level, ranging from an average high in January of \$7.86 per hundredweight, to an average low

in June of \$7.43 per hundredweight.<sup>2</sup> This is an average difference of \$.43 per hundredweight.<sup>3</sup> These monthly prices are shown in Table 2. Of course, within a given year prices may vary much more from month to month than the average for 13 years.

Price of perennial ryegrass fluctuated more from month to month than price of common ryegrass. Average monthly prices for the 13 years ranged from a high in November of \$12.21 per hundredweight to a low in May of \$10.59 per hundredweight, represent-

<sup>2</sup> Monthly price figures for both common and perennial ryegrass represent only seasonal (month-by-month) fluctuations in prices. Fluctuations due to trend, cycle, and irregular factors have been removed.

<sup>3</sup> Seasonal price variation is nonsignificant at the 5% level.

**Table 1. Average percent of annual movement, common and perennial ryegrass, first-handler (valley-dealer) level, by months, 1948 to 1959**

Month	Common ryegrass	Perennial ryegrass
	<i>Percent</i>	
January	1.3	4.1
February	1.4	2.1
March	2.7	5.4
April	3.4	7.0
May	5.5	5.8
June	8.4	15.7
July	24.7	17.2
August	20.1	14.6
September	17.9	11.4
October	8.6	6.9
November	3.5	6.0
December	2.5	3.8
	100.0	100.0

Table 2. Average prices, common and perennial ryegrass, first-handler (valley-dealer) level, by months, 1947 to 1959

Month	Common ryegrass	Perennial ryegrass
<i>Dollars per hundredweight</i>		
January	7.86	11.97
February	7.79	11.85
March	7.84	11.42
April	7.58	11.06
May	7.45	10.59
June	7.43	10.93
July	7.66	11.47
August	7.57	11.65
September	7.74	11.97
October	7.67	12.09
November	7.81	12.21
December	7.85	11.65

ing a \$1.62 per hundredweight difference in high and low monthly prices.<sup>4</sup>

A year-by-year breakdown of seasonal price of common ryegrass shows that highest and lowest prices were most likely to occur in the month of September. Between 1948 and 1959, highest price occurred during September in 4 out of 12 years, and lowest seasonal price also occurred during September in 3 out of 12 years. On the other hand, June had the lowest seasonal price the greatest number of years (4 out of 12). A breakdown in number of years with highest and lowest seasonal price by months is shown in Table 3.

In the case of perennial ryegrass, the months having the highest seasonal price were more evenly distributed throughout the year. However, in

4 out of 12 years the lowest seasonal price occurred in May.

Range between the highest and lowest seasonal price for common ryegrass at the first-handler level was the greatest for September; that is, price fluctuations from year to year were the greatest during September. Price range was the smallest during April. For perennial ryegrass, the greatest range between the highest and lowest price was in September and the least fluctuations in price from year to year occurred in February.

In short, there was no dependable best month in which to sell common ryegrass seed because the average difference between high and low months was only \$.43 per hundredweight, and because of the wide variation in price between the same months of different years. On the other hand, prices of perennial ryegrass seed were usually highest in November and lowest in May.

<sup>4</sup> Seasonal price variation is significant at the 5% level.

**Table 3. Summary of the number of years in which the price was highest and lowest, by months, common and perennial ryegrass, first-handler (valley-dealer) level, 1948 to 1959**

Month	Common ryegrass		Perennial ryegrass	
	Number of years when price was highest	Number of years when price was lowest	Number of years when price was highest	Number of years when price was lowest
January	3	1	2	0
February	0	1	1	0
March	0	0	1	0
April	0	0	1	2
May	0	1	0	4
June	0	4	0	1
July	2	1	1	2
August	0	0	1	2
September	4	3	2	1
October	1	0	2	0
November	0	0	1	0
December	2	1	0	0

### **Weighted season-average price**

Year-to-year changes in price of common and perennial ryegrass represent widely fluctuating prices at both the producer and first-handler level. These fluctuating prices have been particularly apparent in the past 10 years. Figure 1 shows price movement of both grass seeds at the producer- and first-handler level.

For the years 1947 to 1959, weighted season-average prices received by producers for both common and perennial ryegrass were highly related;<sup>5</sup> that is, prices of the two grasses consistently moved up and down together. For the 13 years, average price for common ryegrass was \$6.97 as compared to

\$10.29 for perennial ryegrass, a difference of \$3.32 per hundredweight.

Weighted season-average prices of common and perennial ryegrass seed at the first-handler level also were highly related.<sup>6</sup> For the years 1947 to 1959, average price received by the first handler for common ryegrass seed was \$7.53 as compared to \$11.48 for perennial ryegrass seed.

A comparison between price received by growers and price received by the first handler for common ryegrass shows a high correlation of price movement.<sup>7</sup> For the 13 years, average price received by producers was \$6.96, as compared to \$7.53 at the first-handler

<sup>5</sup> An r-value of .83 was computed which is significant at the 1% level.

<sup>6</sup> An r-value of .78 was computed which is significant at the 1% level.

<sup>7</sup> An r-value of .995 was computed which is significant at the 1% level.

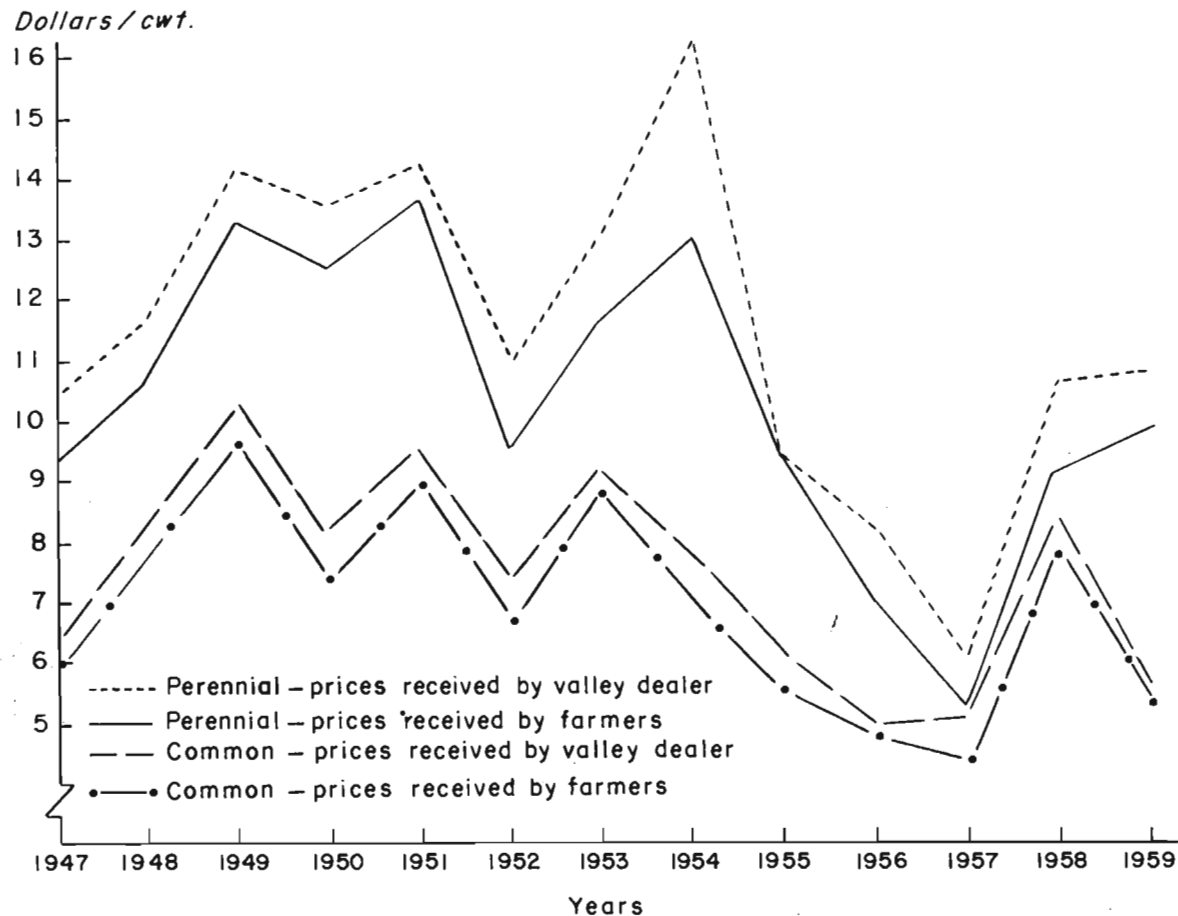


Figure 1. Weighted season-average prices of ryegrass seed received by producers and the first-handler (valley-dealer) level, 1947 to 1959.

level, an average price spread of \$0.57 per hundredweight.

Price spread between price paid to growers for perennial ryegrass and price received by the first handler showed a greater fluctuation from year to year than in the case of common ryegrass. However, the two prices were

still highly correlated.<sup>8</sup> Average price received by growers for the 13-year period for perennial ryegrass was \$10.29, as compared to \$11.48 received by the first handler, a difference of \$1.19 per hundredweight.

<sup>8</sup> An r-value of .96 was computed which is significant at the 1% level.

## Supply and Demand Analysis<sup>9</sup>

### Factors affecting price of common ryegrass

The two most important factors influencing price received by growers for common ryegrass are carryover from previous years and current year's production. About 83% of the variation in price paid to growers for common ryegrass seed is explained by these two factors. Of these two factors, impact of carryover of common ryegrass from previous years on price is greater than current year's production.

Another factor which influences price received by growers for common ryegrass is regular Agricultural Conservation Program (A.C.P.) payments to farmers in the south Atlantic and the south-central sections of the United

States.<sup>10</sup> Common ryegrass is used in these areas to establish a green manure crop or as a temporary winter cover crop. By considering A.C.P. payments along with carryover and current year's production, 85% of variation in price received by growers for common ryegrass seed is explained by these three factors.

Individual influence of production, carryover, and A.C.P. payments is as follows:

1) **Production.** A change of 10,000,000 pounds in the production of common ryegrass, considered by itself, was on the average accompanied by a change in the opposite direction of about \$.27 per hundredweight in price received by producers for common ryegrass.

<sup>9</sup> It should be noted that the supply and demand analyses that follow relate to different markets and are, therefore, not directly comparable. Furthermore, analysis of data through time (over a period of years) violates some of the underlying assumptions. However, all of the relationships shown in this report are logical and computed values are at least satisfactory estimates.

<sup>10</sup> The south Atlantic section of the United States includes Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. The south-central section includes Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas.



2) **Carryover.** A change of 10,000,-000 pounds of total carryover (by farmers, dealers, and government) of common ryegrass, considered by itself, was on the average accompanied by a change in the opposite direction of about \$.84 per hundredweight in price received by producers for common ryegrass.

3) **A.C.P. payments.** A change of \$10 million in regular Agricultural Conservation Program payments to farmers in the south Atlantic and the south-central sections of the United States, considered by itself, was on the average accompanied by a change in the same direction of about \$.19 per hundredweight in price received by producers for common ryegrass.

Based on these three factors, an estimating equation can be used to estimate price that growers will receive in the coming year for common ryegrass.<sup>11</sup> Actual and estimated season-average prices are shown in Figure 2.

<sup>11</sup> The estimating equation takes the following form:

$$\hat{Y} = 9.08399 - .271234 X_1 - .844459 X_2 + .187837 X_3$$

where  $\hat{Y}$  = the estimated season average price received by growers for common ryegrass seed

$X_1$  = total production of common ryegrass, United States

$X_2$  = total carryover of common ryegrass, United States

$X_3$  = regular A.C.P. payments to farmers in the south Atlantic and south-central sections of the United States.

*Dollars / cwt. (farm level)*

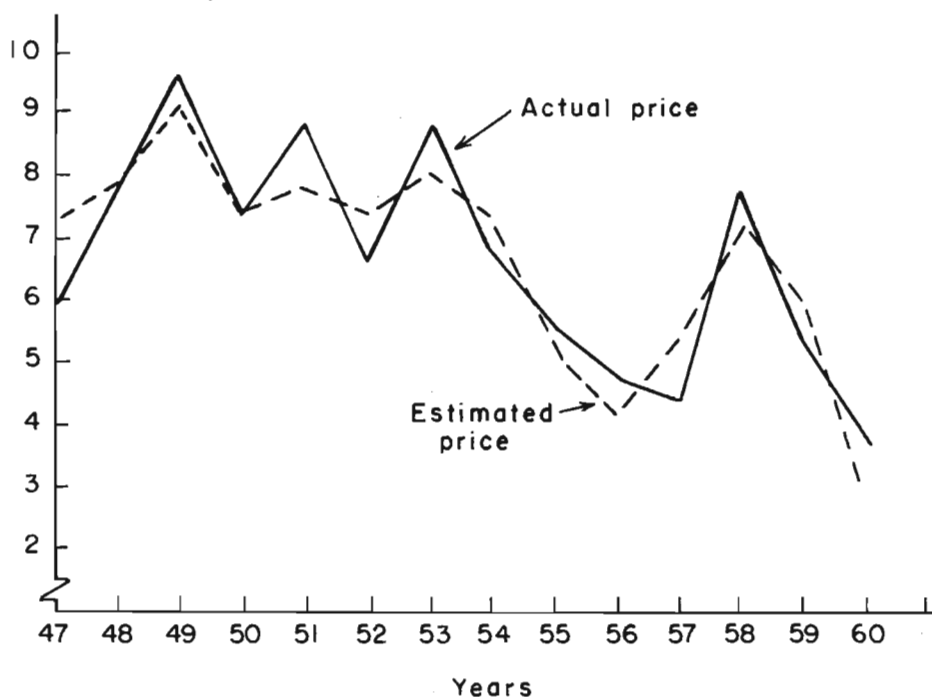


FIGURE 2. Actual and estimated season-average price per hundred-weight received by growers for common ryegrass seed, 1947 to 1960.

### Supply analysis

Production of common ryegrass in the current year is a response to prices received by growers the previous year for common ryegrass. From 1940 to 1960, production and prices (with a one-year time lag in price) were positively related; that is, they moved up and down together, in 17 out of the 21 years. This supply response to a one-year lag in price is shown in Figure 3.

A shift to the right of the supply curve for common ryegrass is suggested in Figure 3. This means that since 1955, growers have been willing to supply a larger quantity of common ryegrass seed at the same price as compared to previous years. Also, the flatness of the supply curve (1955 to 1960)

indicates that producers are highly responsive to a change in the price of common ryegrass seed the previous year. In other words, a given change in price brings about a relatively larger change in percent of production of common ryegrass the following year.

Use of fertilizer is the most plausible explanation for shift in the supply curve and the highly responsive nature of common ryegrass seed production. For example, average yield per acre from 1939 to 1949 was 409 pounds (see Table 4). From 1950 to 1954, average yield per acre was 734 pounds and average yield per acre for the years 1955 to 1960 was 970 pounds.

### Demand analysis

Domestic disappearance of common

*Dollars/cwt. (farm level)*

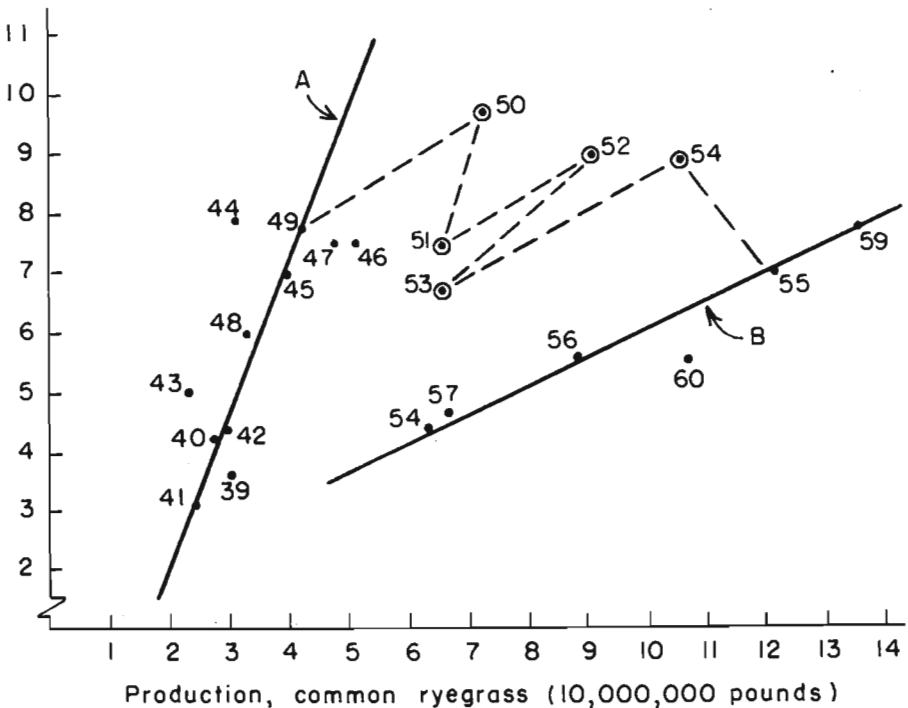


FIGURE 3. Changing nature of supply curve for common ryegrass seed between 1940 and 1960.

Table 4. Season-average price per hundredweight at the producer level, yield per acre, production, and carryover—*common ryegrass*, 1938 to 1960

Year	Price	Yield/acre	Production	Carryover
	<i>Dollars/cwt.</i>	<i>Pounds</i>	<i>Million pounds</i>	<i>Million pounds</i>
1938	3.60	.... <sup>1</sup>	.... <sup>1</sup>	.... <sup>1</sup>
1939	4.20	500	30.50	.... <sup>1</sup>
1940	3.10	360	27.50	6.09
1941	4.30	300	24.00	8.46
1942	5.00	320	30.00	8.77
1943	7.90	340	23.00	9.47
1944	7.00	370	31.00	9.35
1945	7.50	450	39.50	11.44
1946	7.50	510	51.00	8.23
1947	5.95	500	47.50	24.41
1948	7.80	400	32.70	26.35
1949	9.70	450	42.20	6.09
1950	7.50	630	72.45	7.51
1951	9.00	660	66.00	13.09
1952	6.70	800	90.40	14.20
1953	8.90	660	66.00	13.23
1954	7.00	920	105.80	8.62
1955	5.60	980	121.52	21.25
1956	4.75	1,000	89.00	43.71
1957	4.40	930	66.96	41.40
1958	7.80	880	63.36	21.31
1959	5.50	1,100	136.40	13.46
1960	3.70	930	107.00	57.52

<sup>1</sup> Data not available.

ryegrass is inversely related to price; that is, as price goes up, quantity demanded (domestic disappearance) goes down and as price goes down, quantity demanded goes up.<sup>12</sup> This inverse relationship can be observed in Figure 4. From 1949 to 1959, price and quantity demanded moved in the opposite direction in 9 out of the 11 years.

Demand for common ryegrass at the first-handler (valley-dealer) level indicates that a given percentage change in

price of common ryegrass at the first-handler level will result in a relatively smaller percentage change in the quantity demanded. In other words, quantity of common ryegrass demanded is relatively insensitive to price changes.

In summary, the demand situation is such that the quantity demanded of common ryegrass seed is relatively insensitive to changes in price of common ryegrass, and the supply situation is such that quantity supplied of common ryegrass seed is rather sensitive to changes in the price of common ryegrass seed the previous year.

<sup>12</sup> An *r*-value of  $-.81$  is significant at the 1% level.

*Dollars/cwt. (wholesale)*

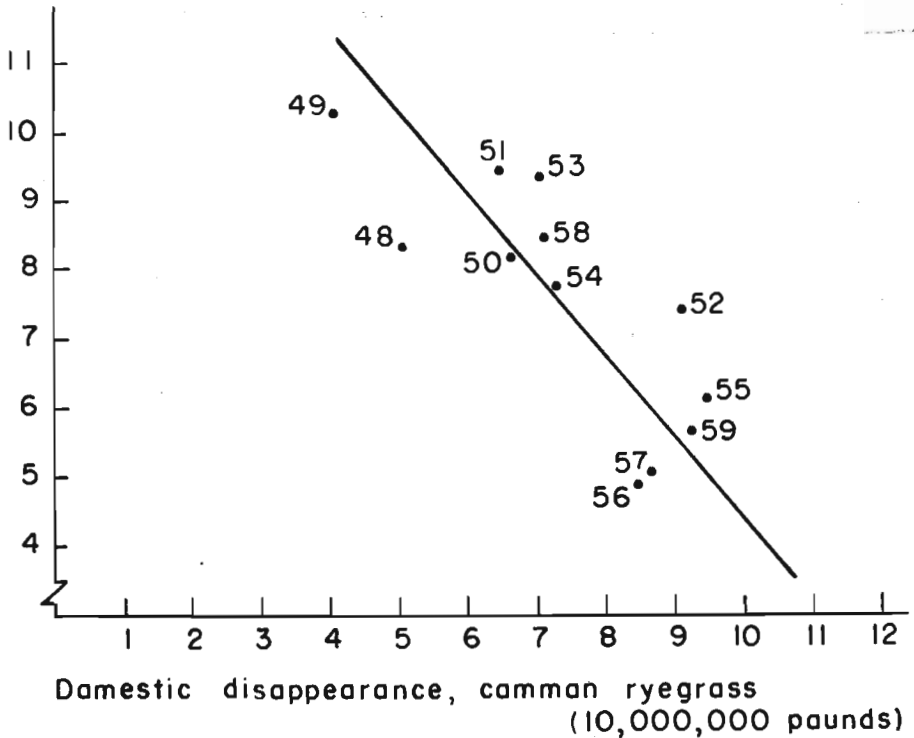


FIGURE 4. Demand curve for common ryegrass seed, 1949 to 1959.

## Bargaining Position of Ryegrass Seed Producers

Group action has been considered by ryegrass seed producers as a means of improving their price and income position. Economic forces are working "for" and "against" producers in their attempt to increase their bargaining power through group action. These limitations and opportunities must be recognized and evaluated if any kind of group action is to be successful in achieving the objectives of growers.

### Limitations

1) Perhaps the most serious limitation of group action as a means of raising price of ryegrass seed is the highly responsive nature of producers to an increase in price. Unless means are taken to control production response when price rises, any organized attempt to improve price and income position of growers will likely result in failure. This problem is compounded

by the fact that yield per acre has increased nearly  $2\frac{1}{2}$  times during the past 20 years. Growers are anxious to produce, since increased yields per acre, resulting from increased use of fertilizer and improved cultural practices, are assumed to decrease unit cost of production. A quantity or quality control program offers the best opportunity to limit amount of ryegrass seed produced.

2) Relative responsiveness of supply to a change in expected price<sup>13</sup> compared to a lack of responsiveness in the case of demand<sup>14</sup> creates a serious problem in terms of fluctuations in price and quantity of common ryegrass produced. Increasing fluctuation can logically be expected, resulting in an unstable price (extreme fluctuations up and down) with emphasis on low prices on the down side of the cycle.

3) Another important limitation revolves around obtaining cooperation of a majority of growers with a majority of production over a period of time. If satisfactory prices are to result, available supply must be kept at reasonable levels. There is no other way unless an expanded demand is in prospect. Some increase in use during the past five years has occurred, but this alone will not solve the low price problem.

### Opportunities

Factors affecting bargaining power of ryegrass seed producers which can be influenced by producer group action to some degree are as follows:

1) Expanding total market demand for ryegrass by increasing number of uses and increasing both domestic and

foreign demand through promotion and effective merchandising practices should receive continuing attention. There are prospects for selling more seed, but expectations must be reasonable. Most markets do not expand overnight or in any dramatic way.

2) Production and/or marketing controls by the industry are possible, particularly when the industry is in a concentrated area and in the hands of only about 1,500 growers. Effective group action is easier to achieve when members of the group live close together and the number of growers is relatively small.

3) Some system of orderly marketing would result in more stable prices. This alone may be enough to justify a form of group action.

4) Capable management employed by the industry to direct its group-action program should result in a generally better informed membership which in turn would mean more understanding and hence more realistic expectations.

Producers must weigh the consequences of a particular course of action in relation to their overall goals and objectives. Pricing policy, in particular, must be given serious consideration. Long-run considerations cannot be sacrificed for short-run gains if group bargaining efforts are to be of continuing value to ryegrass seed producers. Long-run success is based on year-to-year successes, but a relatively high price in a given year may mean trouble in a subsequent year. When strategy of bargaining is considered, any organized group of ryegrass producers may need to give up some short-run gains in some years in order to achieve their long-run objectives.

<sup>13</sup> Computed average elasticity of supply of 1.29.

<sup>14</sup> Computed average elasticity of demand of -.79.

## Summary

Movement of both common and perennial ryegrass seed is highly seasonal. Peak movement of common ryegrass at the first-handler (valley-dealer) level is during July, when 25% occurs, followed by August with 20%, and September with 18%. Peak movement of perennial ryegrass is also during July when about 17% occurs.

Over a period of 13 years, average prices of common ryegrass at the first-handler level have shown little variation from month to month, ranging from an average high in January of \$7.86 to an average low in June of \$7.43, a difference of \$0.43 per hundredweight. During the same period, average monthly prices of perennial ryegrass ranged from an average high in November of \$12.21 to an average low in May of \$10.59, a difference of \$1.62 per hundredweight. An analysis of month-to-month variation in price of perennial ryegrass showed important differences while there was no dependable price variation in the case of common ryegrass. This means that usually it has been best to sell perennial seed in November. However, there is no dependable best month in which to sell common ryegrass, making it impossible to recommend when seed should be sold to obtain the highest price most of the time.

Weighted season-average prices received by producers for common and perennial ryegrass seed were highly related; that is, they moved up and down together. Likewise, weighted season-average prices received by the first handler for the two seeds were highly related.

A comparison between price received by growers and price received by the first handler shows a high correla-

tion of price movement. Between 1947 and 1959, average price received by producers for common ryegrass was \$6.96, as compared to \$7.53 at the first-handler level, an average price spread of \$0.57 per hundredweight. Average price received by growers for perennial ryegrass for the 13-year period was \$10.29, as compared to \$11.48 received by the first handler, a difference of \$1.19 per hundredweight.

The two most important factors influencing price received by growers for ryegrass are carryover from previous years and current year's production. About 83% of variation in price of common ryegrass seed (grower level) is explained by these two factors.

Production of common ryegrass (supply) in the current year is a response to price received by growers the previous years. From 1940 to 1960, production and price (with a one-year time lag) were positively related; that is, they moved up and down together in 17 out of the 21 years. From 1955 to 1960, production of common ryegrass was particularly responsive to a change in price the previous year.

Use of fertilizer has played an important role in the shift of the supply curve to the right and the highly responsive nature of common ryegrass seed production. Average yield from 1939 to 1949 was 409 pounds per acre; 1950 to 1954, 734 pounds per acre; and 1955 to 1960, 970 pounds per acre.

Extreme price fluctuations (up and down) can be expected because a small change in price usually is accompanied by a large production response; but this large increase in supply is difficult to sell even at drastically lower prices. Growers characteristically have poor bargaining power when surpluses exist.

Through group action, ryegrass seed producers can increase their bargaining power to some extent by:

(1) expanding total market demand,  
(2) controlling production response through quantity and quality controls, and (3) sound management of an association of ryegrass seed growers.

There is no panacea for relatively stable and satisfactory ryegrass seed

prices. Without some kind of supply management program there is little hope for a price year after year that growers would consider satisfactory.

An effective supply management program is coercive in nature. Growers may prefer unstable prices to strict production or marketing controls. This decision rests with the industry.