THE IMPACT OF THE FEED FREIGHT SUBSIDY ON THE LOCATION OF LIVESTOCK PRODUCTION

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by

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AN ABSTRACT OF THE THESIS

The Impact of the Feed Freight Subsidy Upon the Location of Livestock Production

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Freight assistance on the movement of feed grains from the prairie provinces to Eastern Canada and British Columbia was instituted by the Federal Government in 1941 as a means to encourage increased livestock production in support of the war effort. The subsidy has been in effect since that time with subsequent modifications merely extending the area of application, changing the level of payment, or introducing additional features. Only limited empirical research had been done previous to this study to ascertain the effects of the subsidy upon livestock production patterns.

It was hypothesized that the transportation subsidy, which applied to movement of feed grains between specific regions in Canada, had increased the volume of grain moved and had decreased the movement of finished products. Consequently, a new spatial equilibrium in the livestock-feed economy not in accord with comparative advantage had developed. This resulted in an increase in the total cost incurred in satisfying the given consumer demand for animal products.

Three alternative methods of analysis were considered feasible to test the hypotheses. The first involved the development of a theoretical model and evaluating the existing situation on the basis

of what could be explained by the model. The second required the determination of the elasticities of supply and demand for feed grains so that an estimate of the gains or losses of the affected groups of individuals could be made. The third consisted of constructing a model to represent the real world situation and empirically determining the effect of the subsidy upon specified activities. The first method was rejected since an earlier study by another researcher had demonstrated the weakness of this approach. Demand and supply analysis does not lend itself to the determination of production patterns by areas or the interregional movements of the respective products. Consequently, this method was not appropriate to use in testing the hypotheses. To accomodate suggestions by other analysts, multiple regression was used to make estimates of the elasticities of supply and demand. Many of the calculated coefficients were not statistically significant. The third alternative was found to be the most appropriate. A linear programming model was developed to represent the real world situation. Four alternative sets of resource restrictions were imposed on the model. These represented the current distribution of resources, the allocation of the feed grain acreage among the respective feed crops, the redistribution of the basic herd and finally the elimination of the export requirement for feed grain. In addition, four objective rows were used to reflect alternative levels of subsidy. These allowed the effects of sixteen different resource-subsidy combinations to be compared.

The results obtained from the analysis served to affirm the hypotheses made at the outset of the study. The volume of feed grain transported between regions increased when the subsidy was applied and consequently livestock were not being produced in accord with natural competitive advantage. Part of the subsidy was absorbed to overcome the inefficiency artificially introduced and thus the total cost incurred by the consumer in satisfying his demands for animal products increased. The analysis also indicated that substantial savings would accrue if livestock production was carried on at optimum levels in the respective provinces. The acreage devoted to feed production was improperly allocated among the individual crops and in addition the distribution of the numbers of the respective classes of animals was not in accord with the achievement of minimum costs of production of the desired end products. The export of feed grain during the year on which the study was based, 1962-63, had little effect upon production costs. It was found that adjustment within the livestock industry would result in greater savings in cost than would elimination of the subsidy.

The level of the subsidy was found to become a progressively more important factor in determining the location of livestock production as the grain equivalent of the final product increased. The location of poultry production was more affected than that of hogs while the location of hog production was more affected than that of beef cattle. The location of the latter class of livestock was found

to be forage oriented. The existing level of subsidy tended to result in maximum payments being made by the Government, a reflection of the pattern of production that developed under the influence of the subsidy.

In view of the inefficient use of resources that was fostered by the subsidy, there was little to justify its continuance. Removal of the subsidy was therefore proposed as the desirable course of action. A system of interim direct payments was suggested as a means to alleviate the pain of the subsequent adjustment. The use of additional funds to find alternatives to the uneconomic livestock production encouraged by the subsidy and to improve research and extension facilities was also proposed.

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While the contributions of others to the study are recognized, all errors of fact, logic and judgment remain the responsibility of the author.

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CHAPTER I

FEED FREIGHT ASSISTANCE

The federal freight assistance policy on the movement of feed grains from the prairie provinces to Eastern Canada and British Columbia was introduced in 1941 to encourage expansion of livestock production, particularly hogs, as an aid to the war effort. The increasing demand for meat at home and abroad required action by the Federal Government if price control was to be maintained while at the same time satisfying the existing market outlets.[1]

When first introduced, the freight assistance policy consisted of payment of one third the freight charges on western grains and millfeeds moved from Ft. William and Port Arthur to points in Eastern Canada and from points in Western Canada to British Columbia. Funds for payment of the subsidy were made available by annual parliamentary appropriation. The level of payment was soon increased sufficiently to a level approximating the total cost of feed grain movement.

The Government provided two reasons for introducing the subsidy: (1) to expand the market for western feed grains and (2) to provide assistance for livestock production in the provinces of Eastern Canada and in British Columbia. The freight subsidy was,

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[1] A more complete account of matters pertaining to the subsidy may be found in M. J. Cameron and F. Shefrin, Federal Agricultural Assistance Programs, Canada 1900-1951. Ottawa: Canada Department of Agriculture, 1952, and subsequent supplements.

however, only part of the overall wartime feed and livestock program. Assistance was also provided for storing the western grain on farms in the receiving areas to encourage purchase during the navigation season. The price of feed grain to purchasing farmers was maintained in the face of slowly rising prices to producers of the feed by means of drawback payments. Subsidies were also paid for a limited period on the manufacture of alfalfa meal and the shipment of beet pulp. Associated with feed freight assistance was the wheat acreage reduction program whereby farmers in Western Canada were given specific payments on an acreage basis to shift away from producing wheat for which a serious storage problem existed. The purpose of this program was fourfold: (1) to compensate wheat producers for the loss of cash income as a result of being prevented from making the usual deliveries which had become subject to a quota system; (2) to put into operation a plan for reducing wheat production; (3) to encourage the production of forage and feed grains for an increasing livestock population and (4) to encourage the use of fallow as a medium of providing deferred productivity increases. In addition, partially to accommodate the large increase in western hog deliveries and at the same time maintain the returns of western producers, assistance was paid on the movement of live hogs to eastern plants. Payments were also made to encourage the use of fertilizer and lime in Eastern Canada and British Columbia.

All the wartime programs were of short duration except one,

that of freight assistance on feed grains. It is difficult to fully determine the logic behind this retention. The most fruitful area of investigation would appear to be the politics involved. What began as a means of assisting livestock production in the short run has become accepted as a continuing policy, attacks upon which are resented in certain quarters. Over time adjustments have been made in the level of the subsidy primarily to accommodate the changes in freight rates and to equalize the price of feed grains between areas.

Surprisingly little formal investigation of the effect of the subsidy has been done until recent years. This no doubt reflects the shortage of research personnel and the complexity of the task. On the other hand, various groups have presented data to support their respective points of view and these deserve examination.

The C.F.A. and the Feed Grain Subsidy

The feed grain subsidy policy as initiated in 1941 by the Federal Government met with the approval of the Canadian Federation of Agriculture. It was realized at the time that maximum use of the facilities available for the production of meat was required to aid the war effort. Since considerable productive plant remained unused in Eastern Canada while at the same time a surplus of feed grain existed in Western Canada, the policy of assisting the movement of feed grain appeared justified. Indeed, as the records of production

indicate, the policy served to assist Canadian farmers in meeting the demands placed upon them. The war emergency was over by 1945 and this was followed by a period of readjustment in European countries. In consequence, the demand for livestock products remained high. Moreover, since that time, the C.F.A. has consistently agitated for an increasing degree of interference by government in the marketing of feed grains, particularly in those areas of Canada outside the prairie provinces. An examination of the proposals put forward indicates that most of them arose from special interest groups within the Federation. In addition, there is no evidence of any research being conducted on the differential effects of these proposals on the various regions of Canada. Over time the feed subsidy policy has developed from being one receiving the tacit approval of the Federation to one actively supported. Consequently, an examination of this development appears justified.

The progression in development of the current Federation attitude toward the feed grain subsidy can be followed through an examination of the annual submissions to the federal cabinet. These submissions appear in published form as freely distributed annual pamphlets entitled Farmers Meet the Cabinet. Perusal of these pamphlets indicates that the first reference to the subsidy appeared in the 1942 submission from which the following request to the government is drawn:

> "That there should be guaranteed to farmers purchasing feed grains an adequate supply at prices consistent with the level of livestock prices, to implement which, if necessary, Government Wheat stocks could be made available, while the current freight assistance policy should be continued."[2]

Actual support for feed freight assistance by the Federation, however, apparently started somewhat earlier. This is borne out in the following short summary received from the Federation:

> "The policy can be said to have had its origin in an agitation started in the Maritimes in 1938. The need for some such policy was emphasized in a national feed grain conference called by the Canadian Federation of Agriculture in Ottawa in July 1941. Following this conference, and one a month later called by the Federal Minister of Agriculture, the Canadian government established the Freight Assistance policy to take effect October 1, 1941. It was designed at that time to provide maximum utilization of our agricultural resources both east and west, in the interest of the war effort."[3]

Further detail is apparently not available since the previous records of the organization have been relegated to the archives. The first statement appears to be significant. The idea of the subsidy originated before the war emergency and did not receive general support for some time. This indicates that some reservations must have existed relative to the merits of the idea. Adoption of the idea came as a result of an entirely changed set of circumstances to those which existed at the time it was first put forward.

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[2] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1942, p. 8.

[3] D. Kirk, personal letter dated April 26, 1965.

During the war years the Federation was more concerned with the availability of transportation to move the grain than with support for the subsidy itself. The subsidy was of such obvious value in assisting in the national production of livestock products that its continuance was not a matter for debate. In the 1943 submission the following statement appears:

> "Notwithstanding the above it should be recognized that the feed situation in Eastern Canada will need continuous careful attention and may require emergent action from time to time, particularly with respect to transportation facilities."[4]

Transportation for feed grains by that time had become a critical factor. Storage facilities for feed grain in Eastern Canada were limited requiring continuous replenishment of feed stocks if the existing demand was to be met. Attention was drawn to this situation in the 1944 submission, an exerpt of which follows:

> "Notwithstanding the fact that at times the demand for Western grains in Eastern Canada has appeared to be temporarily satisfied, it must be remembered that storage facilities of dealers and farmers are limited, and that actual reserves of such feeds in the East are comparatively small. It will require continuous attention by Government officials, to avoid the dangers of a shortage which might imperil livestock production."[5]

The feed situation in Eastern Canada had become less acute by 1945 for two reasons; the demand for livestock products was less

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[4]C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1943, p. 6.

[5]C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1944, p. 8.

urgent as a result of the increasingly favourable prosecution of the war and also that producers had been able to make the necessary adjustment. In consequence, no direct reference is made to the feed grain situation in the 1945 submission.

The following year was one devoted to assessment. In the Federation statement of policy in 1946 the following comment appears:

> "The general feeling, however, was that the time is ripe for a reconsideration of our national livestock program, with the objective of establishing a broad national policy in production having regard to the resources and adaptability of the various areas of the dominion, and co-ordinating such a policy with a broad national policy for the production and marketing of essential feeds and feed grains in relation to livestock production."[6]

The policy announced at this time was very creditable. The time was opportune for such an assessment. The war had terminated and many of the associated controls imposed to aid in its prosecution were about to be modified or removed. In view of this, the statement is very significant and represents a high point in the attitude of the Federation with regard to feed grain policy. Unfortunately, the assessment made did not arise from objective research. The time was indeed appropriate for such research as the feed grain freight assistance policy followed during the war period had brought about production adjustments within the various regions of Canada and

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[6] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1946, pp. 7-8.

modification was called for due to the changing situation. It is interesting to speculate upon what conclusions would have been reached if this research had been conducted.

It is easy to criticize the Federation for their inactivity in the research area. Federation policy is the result of compromise between various farm groups from the diverse areas of production within Canada. Policy tends to be developed in accord with the interests of the strongest pressure groups. Eastern livestock farmers were very vocal at this time in support of the freight assistance policy since they had a vested interest in cheap feed. On the other hand, the policies put forward by the Western section of the Federation tended to be influenced predominantly by the wishes of the grain growers who were providing the major share of the financial support for the organization. The grain growers had at least two strong reasons to support the freight subsidy policy. The policy appeared to encourage the use of Western grain in Eastern Canada and if the continuance of this policy was fostered, the cooperation of the Eastern section of the Federation would be more easily obtained in support of the move to have the Canadian Wheat Board assume sole responsibility for the marketing of oats and barley from the prairies. Unfortunately, the interests of Eastern grain producers and Western livestock producers were ignored, primarily due to their relatively weak position. The lack of objective action on the part of the Federation in the development of a research program in the area has had consequences that have

become increasingly apparent since that time.

By 1947, even though the research program had not been undertaken, the Federation policy was to support continuance of the subsidy at a time when reservations were being voiced in government. The following statements from the 1947 submission appears significant:

> "And let us not overlook the fundamental importance of a feed grain supply in such a program. One of the reasons why this abundance has been possible has been the fact that we have had an adequate and increasing output of feed grains, together with which we have had the best organized and most stable feed grain and millfeeds program which has ever been developed for Canada.
>
> One fact we desire to bring prominently to your attention today is that in our opinion it would be a serious mistake and a retrograde step on the part of government to under-estimate the value of the feed program and to withdraw support from it thereby permitting it to deteriorate if not to disintegrate."[7]

It was obvious that the policy as enunciated was now to resist any changes in feed freight assistance since if these occurred they would be accompanied by readjustments at the farm level. There was apparently no further consideration given to an objective evaluation of freight assistance, this having been abandoned in the interests of expediency. Since that time the basic policy of the Federation relative to the subsidy has not changed. However, since it is a national body the Federation could not avoid a consideration of some

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[7] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1947, p. 3.

of the ramifications within particular areas of the country. Some thought was therefore given in 1948 to the development of an overall feed grains policy in which the Wheat Board and freight assistance would play major roles. This is borne out in the submission to the Cabinet made in that year where the following statement appears:

> "With respect to the freight assistance policy on feed grains, we are asking that this policy remain in effect until it can be embodied in a national policy on feed grains."[8]

There is evidence of a shift in emphasis in Federation policy the following year. Large exports of Canadian feed grains were being made to overseas countries and these were the cause of some concern among livestock producers particularly in those areas dependent upon Western grain. In addition, the Wheat Board had assumed sole responsibility for marketing prairie oats and barley. The freight assistance policy was itself being increasingly subject to criticism. The original policy had been brought into force by order-in-council and continued to be imposed in this manner. It was therefore subject to annual review in Parliament and this caused concern to the Federation. To avoid an open conflict of interest between prairie grain growers and livestock feeders outside the prairie region a covert suggestion was made for an impartial body to administer the subsidy and to maintain adequate feed supplies in consuming areas.

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[8] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1948, p. 7.

Accordingly, the following statements appeared in the 1949 submission:

> "Recognizing the importance of the livestock industry in our economy, we believe that the maintenance of adequate reserves of feed grains to meet the needs of our livestock industry should be an integral part of our agricultural program, and further, this being a matter of policy, is therefore the responsibility of government rather than the Canadian Wheat Board.
>
> . . . Believing that the freight assistance policy has been of advantage nationally to our Canadian livestock and grain industry, we recommend that this freight assistance be made a permanent feature of agricultural policy."[9]

The latter statement is repeated without change in intent in both the 1950 and 1951 submissions. However, it will be noted from these statements that the recommendation for the freight assistance policy to be made permanent was based on "believing" and on "the general opinion expressed by member bodies". For an organization to support a policy involving the expenditure of some twenty millions of dollars annually must have required considerable smugness in view of the request made previously for a comprehensive study of the livestock-feed industry which had not been pursued. On the other hand, there was no consideration given in the submissions to the diversity of the view held by Eastern grain producers and Western livestock producers. The comparative advantage of these two groups

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[9] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1949, p. 6.

was impaired as a result of the subsidy. While a diversity of interest existed within the respective regions, a somewhat more obvious problem arose as a result of the Wheat Board assuming the marketing of prairie oats and barley. Livestock feeders outside the area were concerned that the operations of the Board were tending to have an effect on their operations. The feeders argued that a feed reserve program for them was justified in equal measure to the marketing program developed for Western feed grains. While the demand for Western feed grain in the feed deficit areas of the country had increased, the storage facilities for and the inventories carried of these grains in consuming areas had not similarly expanded. Part of the problem arose from the fact that feed grains competed with grain for export for both transportation and storage facilities. Eastern feeders considered adequate facilities should be provided by the selling body whereas Western grain growers did not feel under any obligation to add to those already available since the local demand for feed was merely supplementary to that of the export market. This conflict of interest has remained up to the present time.

A reduction in the rates of payment of the subsidy in 1955 brought forth vociferous protests. These are reflected in the annual submission to the Cabinet for that year in which the following statements appear:

> "Since our annual convention great concern has been expressed over the action of the Government in reducing the rates of payment made by it on feed freight shipments from the prairie provinces, and our farmers are demanding that the former scale of assistance be restored.
>
> The feed freight assistance policy has been in effect now for nearly fifteen years, and as a result the economic structure of the agricultural industry has been developed in line with this policy. In other words, it has become so firmly established a part of our agricultural program that we have in recent years pressed for the policy to be placed in a permanent basis."[10]

The latter paragraph is particularly significant. Apparently, a policy should be continued just because it has caused a particular allocation of resources. In other words, what had started off partly as an assist to feeding cows had become in effect a "sacred" cow! This rather tenuous position did not, however, prevent the Federation two years later from opposing freight increases on feed grain movements. While on one hand supporting a subsidy policy in one area they were objecting to it in another. To offset the increase in freight costs an increase in the level of subsidy was requested. The policy statement in this regard follows:

> "The Canadian Federation of Agriculture strongly opposes the granting of the recent general rate increases, partly on the grounds that further increases in farm costs from this source represent a definite inequity. In the specific

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[10] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press 1955, p. 10.

> case of feed grains we have the additional factor that these higher freight costs serve only to undermine this very sound national policy. We therefore strongly urge that the level of freight assistance be increased to cover the recent freight increases."[11]

There was little change in the submissions made relative to the subsidy in the subsequent two years. Support continued to be given to the idea that the subsidy be incorporated into permanent legislation.

A shift in the position of the Federation occurred in 1961. In addition to the usual request for permanency, a recommendation was made that the subsidy also apply to movements of Ontario corn and wheat. This suggestion arose from the agitation by Ontario grain growers for assistance that would enable their products to compete with American corn. The annual presentation to the Cabinet contains this request:

> "We recommend to the Government a policy of making water and freight rates on eastern shipments of Ontario corn and wheat (although the latter does not presently move to Canada from the U.S.) competitive with rates for U.S. grains from terminal positions in the U.S. to Eastern Canadian Markets."[12]

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[11] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1957, p. 9.

[12] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1961, p. 8.

A subsidy on the movement of corn was subsequently applied but this met with a mixed reception from the Federation since its administration did not accomplish the desired effect.

A major statement of policy was made by the Federation in 1962. This appeared as Appendix C in the annual submission to the Cabinet. Since this statement is concise it is included as part of this discussion:

> "Feed freight assistance in Canada is a national policy. It is the strongly held view of the Canadian Federation of Agriculture that feed freight assistance is a sound and desirable policy that is effective in serving the national interest. The purposes of feed assistance are: to encourage the equitable and balanced development of livestock production in Canada; to stabilize grain and livestock prices and markets; to ensure the utilization of Canadian grain in the Canadian livestock industry, and to guarantee an adequate continuity of supply of protein foodstuffs to the Canadian consumer. Feed freight assistance is an agricultural and not a transportation policy.
>
> The feed freight assistance policy is part of the total picture of national agricultural policy in Canada. It should be assessed in relationship to its place in the total grain and livestock marketing, production and policy picture.
>
> The approach to feed freight assistance policy in Canada should be one of looking toward its maintenance and improvement. In particular there is need for the removal of inequities that exist in the comparative cost of transportation for feed grain still borne by some farmer consumers, for example, by the British Columbia feeders, and feeders in certain areas of other provinces.

The Canadian Federation of Agriculture therefore recommends:

1. That the policy of assisting the movement of feed grain to Eastern Canadian and British Columbia markets be continued.
2. That feed freight assistance policy be embodied in special legislation, replacing the present policy of implementation through Order-in-Council and annual inclusion of expenditures in the Appropriations Bill.
3. That in general the application of freight assistance on feed grain, millfeeds, and screenings be continued on the present basis. Some adjustments in the application of the policy are, however, required to provide a greater degree of equity to consumers of feed grains than is at present achieved. To this end the present policy should be modified to provide that in no case shall the balance of cost of transportation to the consumer, after payment of the assistance, be greater than $3.00 per ton. The transportation cost referred to is the cost of the movement to recognized local destinations.
4. That in principle rates of freight assistance paid should not be greater than the cost of movement to recognized local destinations.
5. The policy of assisted feed freight should be extended to Ontario wheat and corn moving to provinces east of Ontario. (This assistance should be paid at a rate calculated as follows: The rate of freight assistance on western grain shipped from the Lakehead to the destination of the Ontario grain movement, less, the freight assistance on western grain from the Lakehead to the point of loading of the Ontario grain movement. The minimum assistance should be $5.00 per ton.)
6. That payment of feed freight assistance need not be confined to movements by water and/or rail."[13]

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[13] C.F.A., Farmers Meet the Cabinet. Ottawa: Mutual Press, 1963, pp. 18-19.

The first paragraph of this policy statement is particularly interesting. The recognized purposes of freight assistance have changed. No reference is made to any alternative policy which could accomplish the same end, or even as may be suggested the effect of a change in policy by removing the subsidy. Rather the statement indicates that the Federation was in full support of the policy without having analyzed its differential effects on production patterns between regions within Canada. The following sentence supporting such an analysis,

> "It should be assessed in relationship to its place in the total grain and livestock marketing, production and trade policy picture."[14]

apparently did not influence subsequent recommendations. The statement indicates the need for objective study. However, there is no indication that such a study was in fact seriously considered. Such a study no doubt would presumably not have supported the suggestion that subsidies be paid on the movement of grain out of as well as into Ontario.

The Federation continued to be concerned with the problem of the limited storage capacity available for feed grains in Eastern areas. However, here a shift in point of view was indicated. The Royal Commission on Transportation in their report[15] had suggested

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[14] Ibid, p. 18.

[15] Royal Commission on Transportation, Report Vol. II. Ottawa: Queen's Printer, pp. 246-247.

that recommendations four and six be adopted and that five be rejected since the principle that a new subsidy be instituted in order to offset an old one could not be accepted. The Commission, however, did request the Federal Government to make a detailed assessment of the feed freight assistance policy in order to determine whether or not in its present form it was still benefitting Canadian agriculture to the greatest possible extent or whether assistance could be more effectively applied through providing additional storage capacity in the feeding areas or some other form of aid. The Federation took violent exception to this request thus attempting to compensate for their weak position. An alternative proposal for storage assistance on feed grain stored in Eastern elevators during winter months was made. This suggestion was later adopted by the Government but when this assistance policy was in operation it failed to accomplish its purpose so has since been withdrawn. A favourable freight rate on feed grain movement during the winter months has been substituted. In addition, a system of provisional pricing has been adopted by the Wheat Board to remove some of the risk involved in holding feed grain over the winter months in Eastern elevators.

As a result of the increasing complexity in the administration of the subsidy which now involved storage as well as transportation, the Federation suggested in 1964 that an Eastern and British Columbia Feed Grain Agency be established.

The agency would have the responsibility to administer the subsidy and related programs and also to study and advise on all aspects of feed grain policy. The agency was not to:

> . . . "interfere with the exercise by the Canadian Wheat Board of its responsibility to market Western grain in an orderly fashion in the interests of producers of Western grain."[16]

The Federation has continued to press for the establishment of such an agency. Legislation for such an agency was formulated in 1966. However, the functions of such an agency, in the view of its proponents, have been broadened to include that of being a central purchasing agency for feed grains which could result in the price of feed grain being established on a political rather than economic basis since in effect a Government bilateral monopoly would exist.

Examination of the development of Federation opinion toward the feed freight subsidy reveals that the necessity for research has been recognized. On the other hand, research which might reveal the true nature of the regional effects of the subsidy has not been actively supported. Rather, support has been given to the subsidy in response to the demands of pressure groups within the organization. This has resulted in the stand taken being inconsistent. The stand taken reflects the relative strengths of the many individual pressure

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[16]C.F.A. Farmers Meet the Cabinet. Ottawa: Mutual Press, 1964, p. 7.

groups of which the Federation is composed. The interests of Western grain producers to this time have been protected and the point of view of livestock feeders outside the prairies has been brought to the fore. On the other hand, the interests of both Western livestock feeders and Eastern grain growers have been largely ignored.

The stand taken by the Federation is most unfortunate for agriculture as a whole. Historically, farmers have been opposed to special privilege. Many successful attempts have been made to overcome the effect of privileges extended by Government to other groups. By supporting the subsidy without first having conducted objective research into all its ramifications, the Federation has allowed itself to be placed in the untenable position where the present policy may result in direct conflict between its constituent membership groups.

Attitude of Other Parties Toward the Subsidy

The other parties affected by the subsidy, which include the elevator companies, the millers, the transportation services and Government have been less vocal than the Federation. With the exception of Government, these groups have assumed a passive role. The effects upon the elevator companies and the millers are difficult to assess, but since most of these operate in both Eastern and Western Canada, the effect on their operations in aggregate would appear to be small. The railways are affected to the extent that

gross tonnage tends to increase as a result of the substitution of movements of grain and feeder animals for finished animals, meat and poultry products. In as much as there has been no active stand taken on the subsidy by the transportation media, it can only be assumed that they are not adversely affected. On the other hand, the Federal Government has a direct interest since the subsidy involves an annual expenditure of some twenty millions of dollars. Provincial Governments also have an interest in the subsidy in view of its effect upon some of their local policies regarding livestock production. Economists, interested as they are with the efficient allocation of resources, are concerned with the distortion in comparative advantage brought about by the subsidy. It is not surprising therefore that the research done relative to the subsidy has been initiated by various Governments and the economics profession rather than by other groups.

Studies and discussions in varying degrees of depth have been conducted by several organizations. These organizations include among others, the Committee on Manitoba's Economic Future, the Royal Commission on Transportation, the Canadian Agricultural Economics Society, the Winnipeg Chamber of Commerce, the Agricultural Economics Research Council and the Standing Committee on Agriculture and Colonization of the House of Commons. All these studies served to emphasize the differential effects of the application of the subsidy on the various regions in Canada.

(a) The Manitoba Study

Dr. A. W. Wood in his analysis of the effect of the feed freight assistance policy prepared a table showing the effect of the assistance on the relative cost of shipping meat, feeder cattle, and grain from Winnipeg to Eastern Canada.[17] This table indicated that the subsidy reversed the advantage Western Canadian livestock producers had in shipping cattle in terms of meat rather than grain equivalents from Winnipeg to Toronto. In the case of hogs, while pork products could normally be shipped in the form of grain equivalents rather than meat, this situation was exacerbated by the subsidy. With regard to shipments between Winnipeg and Truro it was still more economical to ship cattle in the form of meat products rather than grain when the subsidy was imposed but to a much less marked degree. On the other hand, application of the subsidy reversed the normal situation where pork products could be shipped at substantially less cost than the equivalent in the form of grain. Dr. Wood also drew attention to other possible effects of the subsidy which included the expansion of demand for western grains and the depressing tendencies upon the production of Eastern grain. His general conclusion was:

> "There is, however, no question that the direction of the effect is to improve the

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[17] Gilson et. al., Development of the Livestock Industry in Canada by 1975 and Implications for the Meat Packing Industry in Manitoba, Winnipeg: Department of Agricultural Economics, University of Manitoba, 1962, p. 9.20.

> comparative advantage of the eastern provinces in livestock production or to lower their comparative disadvantage. Production and processing would be stimulated in Manitoba by removal of the subsidy."[18]

(b) The Royal Commission on Transportation.

The Royal Commission on Transportation conducted a study on the effects of the subsidy on the National Transportation Policy. The study served to bring into focus the features which operated against the efficient use of transportation resources.[19] The commission found that truck shipments were discriminated against. One of the effects of the subsidy was to encourage the hauling of raw materials rather than more finished products to which attention was also drawn by Dr. Wood. It was the first study in which attention was given to the distortions introduced between the relationships of feed inputs. However, this aspect was not pursued. The Commission contended that the absolute effects of the subsidy upon receiving feeders were diminishing over time as the complexity of feed mixes increased. The conclusion was reached that the Maritimes required a different policy if red meat production in that area was to be increased. The subsidy was held to discriminate in favour of livestock and poultry producers in Eastern Canada and the

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[18] Ibid., p. 9.20.

[19] Royal Commission on Transportation, Report, Vol. II, 1961, pp. 233-258.

feed grain producers in Western Canada and, on the other hand, to discriminate against the livestock and poultry producers of Western Canada and the feed grain growers in Eastern Canada. In its report the Commission made the following pertinent comments:

> ". . . the reasons for continuing the policy since that time (World War II) have not been clearly defined and the limits of its application have subsequently been uncertain. Without such clearly defined application its administration has become increasingly difficult and, in many cases, based on temporary expedients."[20]

The Commission obviously considered its investigation purely cursory since it made the following statement:

> ". . . it is apparent from our investigations that this (feed grain subsidy) should be the subject of much more, and continuing, study to remedy and prevent its adverse effects on transportation efficiency and to relate the burgeoning effects of this policy to its objectives."[21]

Four recommendations were made by the Commission, the first three directed toward making the application of the subsidy more efficient and equitable while the fourth, to which the C.F.A. took exception, was that:

> "The Federal Government should make a detailed reassessment of the feed freight assistance policy in order to determine whether or not in its present form it is still benefitting Canadian agriculture to the greatest possible extent, or whether assistance could be more effectively applied to, for example, additional storage capacity in feeding areas

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[20] Ibid., p. 246.

[21] Ibid., p. 244.

or some other form of aid."[22]

Due to the realities of the political climate no positive action has been taken on this recommendation to date.

(c) The Canadian Agricultural Economics Society

The ninth annual workshop of the Canadian Agricultural Economics Society, which was held in 1964, was devoted to consideration of interregional competition in Canada. Work Group III discussed the implications of interregional competition in Canadian agriculture for government programs aimed at direct support of farm incomes. This group used the perfect competition model as a norm to use as a guide in its discussion. The group considered that

> ". . . costs to society must be minimized for a given level of total income benefits received by the agricultural sector."[23]

Furthermore, when an evaluation was made of support programs making use of import subsidies, feed freight assistance was used as the prime example. Some general conclusions were reached regarding the effects of this subsidy.

> "The effects of the Feed Freight Assistance program has been to improve the position of the eastern livestock feeders vis-a-vis their western counterparts, and to improve the position of the western

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[22] Ibid., p. 247.

[23] Canadian Agricultural Economics Society, Interregional Competition in Canadian Agriculture. Ottawa: Ninth Annual Workshop, 1964, p. 65.

grain producers relative to those in the East. It is possible that some benefit also accrues to the transportation services through increased tonnage shipped. There has also been a tendency to maintain and/or increase livestock and poultry production adjacent to main centres of consumption as a result of the decreased input cost. Hence, adjustments by the meat-packing industry have been made.

It is unlikely that the Feed Freight Assistance program has had much effect in raising total farm income in either region. The decline in income of eastern grain producers has been offset to some degree by the increase in income of eastern livestock feeders. In the Prairies, the reverse situation occurred. The major effects of the program have been, therefore, to redistribute farm income within each region rather than to have increased it, and to have distorted the allocation of resources within and between regions. To this extent, society bears an additional cost with no apparent offsetting economic gains to the farm sector."[24]

(d) The Parliamentary Committee

The Standing Committee on Agriculture and Colonization was given authority by Parliament in 1964 to

> ". . . examine and inquire forthwith into all matters arising out of and relating to the difference between the prices received for feed grain by the producers in the prairie provinces of Canada and the price paid by livestock feeders in Eastern Canada and British Columbia."[25]

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[24] Ibid., p. 66.

[25] Standing Committee on Agriculture and Colonization, Minutes of Proceedings and Evidence No. 8. Ottawa: Queen's Printer, 1964, p. 235.

Various points of view were expressed during the hearings before the Committee, this divergence of opinion reflecting to some degree the impact of the subsidy upon the respective organizations concerned. The Montreal Corn Exchange Association suggested that more adequate stocks of feed grains be made available by the Canadian Wheat Board at the Lakehead and that the import duty on American corn be removed. The group were agreeable to storage costs being subsidized by the Government during the winter months and also supported the subsidy. The Metro Toronto Board of Trade combined with the Ontario Elevator Association and the Ontario Retail Feed Dealers Association supported the subsidy and the storage assistance policy and wished that additional terminal storage space be made available for Ontario corn and expressed their disapproval of any move to establish an eastern feed grains agency. The British Columbia Federation of Agriculture supported retention of the subsidy while advocating that the maximum transportation cost to British Columbia feeders be established at $4.40 per ton. The National Farmers Union felt two principles should guide the freight assistance program, (1) it must make feed available to eastern feeders on an "economical" basis and (2) it must recognize the welfare of the prairie producer of feed grains and livestock, but the inconsistency of these two principles was not recognized. The organization of an eastern feed grain purchasing agency was proposed whose powers would extend (1) to negotiation for supplies and prices with the Canadian Wheat Board, (2) to administer the assistance

program and storage program, and (3) to make a study for the purpose of determining the proper location of additional storage facilities. The Union supported, by inference, the subsidy. Presentations by the Independent Commercial Corn Growers Association of Ontario and the Ontario Seed Corn Grower's Marketing Board requested similar subsidy treatment for Ontario corn as for prairie feed grains moving beyond Ontario with provision of space for the storage of such corn to eastern terminals, the former body also supporting the retention of the duty on imports from the United States. Individual feed mill operators complained that inconsistencies existed in the application of freight rates on intra-provincial movements of grain.

Notwithstanding the divergence of views expressed before the Committee, certain features were evident:

1. those supporting the subsidy were more vocal than those opposed.

2. imperfect competition existed in the retail feed industry.

3. the net transportation costs on feed were not uniform between farmers.

4. the structure of freight rates as applied to grain deserved scrutiny.

5. insufficient storage space was available in terminal elevators for Ontario corn to maintain adequate stocks for merchandizing purposes though the groups raising the complaint apparently were not prepared to assume responsibility for its provision.

6. those supporting extension rather than retraction of government control in the feed industry were in the majority.

7. the quota system imposed by the Canadian Wheat Board resulted in Western grain producers being subject to a multiprice system which worked to the advantage of local livestock feeders.

8. that an impartial study of the effects of the subsidy was required.

(e) The National Farm and Business Forum

The Seventh National Farm and Business Forum held in March 1966 under the auspices of the Winnipeg Chamber of Commerce addressed itself to the "Feed Grain Dilemna". The widely divergent viewpoints expressed by the respective speakers emphasized the necessity for an objective study of the issue. The distortions arising in production patterns as a result of the subsidy were stressed by several speakers although others considered such distortions were of minimal importance.

(f) The Agricultural Economics Research Council

The Agricultural Economics Research Council of Canada published a report on a study they conducted on the feed freight assistance policy in September 1966.[26] Kerr provided a comprehensive account of the development of the subsidy program over time along with some valuable data on production and distribution changes which had occurred for particular farm commodities. He endeavoured to use tax and transfer payment along with trade and location theory to

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[26] T. C. Kerr, An Economic Analysis of the Feed Freight Assistance Policy. Ottawa: Agricultural Economics Research Council of Canada, Pub. No. 7, 1966.

explain the changes which he observed. Such a procedure while minimizing the requirement for complex empirical analyses necessitates making the implicit assumption that where the anticipated and observed result correspond the basic argument is correct. His theory on the determination of price cannot be accepted without further proof. This aspect will be more fully discussed at a subsequent stage of this analysis.

All these studies, some of which involved examining in depth particular aspects, failed to make an overall objective appraisal of the total effect of the subsidy. On the other hand, any study can at best merely bring the various facets of the subsidy more clearly into focus.

The Subsidy and the National Policy

The subsidy may be placed in proper perspective by making an examination of its relationship to the so-called National Policy. This is particularly appropriate in this centennial year. The National Policy used raw materials, transportation systems and tariffs as the means for developing the nation. The opening of the Canadian west reflected this policy - the west was to provide a market for the manufactured articles produced in the central provinces, railways being the means to take these articles to the prairies and to return with raw materials, with tariffs being designed to protect this market from foreign competition. Western

development was fostered by encouraging immigration through grants of land, subsequent settlement providing traffic for the railways. By this means the investment in railways could be justified on economic as well as political grounds. Initially, wheat was the principal staple involved, later to be joined by the products of the mines and forests.

The freight subsidy may therefore be considered merely an extension of the National Policy, emphasizing eastern production of livestock products with the prairies providing the raw materials, feed grains. The subsidy becomes a tariff in reverse tending to perpetuate the situation where prairie farmers are "growers of grain yet shippers of feeders". The willingness with which the situation is tolerated and even promoted can therefore be more readily understood in terms of the historical conditioning of national opinion.

Groups Directly Affected by the Subsidy

Indirectly, the subsidy affects many segments of society. The direct effects, however, are limited primarily to five groups, namely, livestock feeders, grain producers, milling companies, the railways, and the terminal operators. A cursory examination combined with observation and reference to the attitude taken by the respective groups reveals the general pattern of the differential impact upon the respective groups which varies according to location.

Livestock producers in receipt of the subsidy have the total cost of their feed reduced. The relative importance of grain in

production depends upon the species fed and the particular ration used. The benefits from the subsidy will therefore not be distributed uniformly among all recipients but will vary according to the extent to which feeds are purchased. Producers not in receipt of the subsidy, the costs of whose feed inputs are not reduced, have their competitive position vis-a-vis other producers adversely affected. Such a situation results in livestock producers in Eastern Canada and British Columbia favouring retention of the subsidy while those on the prairies are opposed.

The effect upon grain producers on an area basis is the direct opposite to that experienced by producers of livestock. On the other hand, the impact is much less evident. Producers of grain in those areas in which feed grain production is normally insufficient to supply local requirements have the prices of their products limited by the laid down costs of comparable feeds. Since the aim in applying the subsidy is to equalize prices of feed grains in all receiving areas, the adverse effect upon local grain producers will increase as the distance from the source of supply outside the area is increased. Maritime producers are therefore more affected than those in Ontario who normally experience competition from imports of American corn. Grain producers in the supplying area, the prairies, being exporters to world markets will scarcely notice any effect from the subsidy providing that free markets exist. However, at the time the subsidy was originally established the movement of feed

grain into export channels was impeded due to the war. Later, control over the marketing of oats and barley produced in the prairie provinces was assumed by the Canadian Wheat Board, with delivery controls being exercised along with prices established by executive decision. As a result of these conditions, the competition existing in the marketing of these grains has tended to be obscured.

The primary effect upon the railroads will be in the mix of the products handled. To the extent that the subsidy brings about a shift in the location of production of the various livestock products, the railways experience an increase in the movement of feed grains and a decline in the movement of meat, eggs, and finished animals. On the other hand, the movement of unfinished animals possibly increases. The change in mix necessitates adjustment in the numbers of units of the different types of equipment used to facilitate movement. The net effect financially upon the railways will depend upon the relative profitability of acting as carriers for the different types of products. Historically, the rates were established on an inverse bulk to value basis. Under such rates the railways would experience a decline in revenue under the subsidy. Payment of the subsidy, on the other hand, may enable them to charge a higher price for their services. Since no complaints have been made by the railways, the overall effect of the subsidy upon their net returns may be assumed to be nominal.

Flour and feed mills are affected by the subsidy to the degree

to which its application on a fixed basis per ton, encourages movement of the feeds in transportation cost minimizing forms. Payment of the subsidy on a tonnage basis regardless of processing impairs the relative competitive position of flour mills on the prairies to the extent that transportation costs are now reduced on the movement of wheat to a comparatively greater degree than those for flour and the associated millfeeds, in as much as the subsidy is paid on millfeeds whether as a constituent of grain or in finished form. Feed mills on the prairies are placed in a disadvantageous position likewise for feed shipments to destinations in Canada outside the area since the freight rates are relatively higher on packaged commodities than for grain - a situation which the subsidy tends to accentuate. The overall effect on the operations of most milling companies is small since the majority operate mills at both eastern and western sites.

Terminal elevators are subject to a change in the proportion of the various grains stored. To the extent that feeding activities in Eastern Canada and British Columbia are increased and such activities consume prairie grains, greater volumes of feed grains will be handled. The terminals were developed for and present use is directed toward handling grains for export, particularly wheat. Consequently, western farmers are less than sympathetic toward the complaints of a lack of storage space for feed grain at times when handling facilities are being taxed by grain for export. The actions of the Canadian Wheat Board in their allocation of space reflect

this view. Under such control the effect on terminal operations becomes a function of the net returns from handling the respective grains. In as much as the quantity of the particular grains handled is influenced by others than the terminal operators, the overall profitability of the total handle is taken into consideration in establishing the handling charges.

Method of Application of the Subsidy

Freight assistance is given on movements of western wheat, oats, barley, rye, corn (to British Columbia only), wheat bran, wheat shorts, wheat middlings and Nos. 1 and 2 Feed screenings to destinations in Eastern Canada and British Columbia distributed for use "exclusively as feed in Canada for Canadian livestock or poultry."[27] Provision is made for the subsidy to apply to millfeeds regardless of location, i.e. the same rate prevails where such millfeeds are shipped as components of wheat or as milled products. The level of subsidy varies according to existing transportation rates, the objective being to make feed available in consuming areas outside the prairies at approximately the Ft. William price. Levels of payment have consequently varied over time on movements to particular locations. The subsidy is paid primarily to feed mills, such mills

[27]See Appendix II (b) for the text of the latest regulations. Wheat Board regulations with respect to provisional pricing appear in Appendix I (b).

signing an affidavit that the price charged at the retail level is reduced by the amount of the subsidy. In deference to complaints by recipient feeders that the subsidy failed to equalize the cost of feed at the Ft. William price over time, a system of feed grain storage was instituted in 1963 associated with a system of provisional pricing of feed grains by the Canadian Wheat Board. Storage payments have been subsequently discontinued, a year around water competitive rate being established by the railways on movements into the feeding areas of Eastern Canada.

Payments Made Under the Subsidy

The amount of subsidy received by an individual province depends upon the volume of grain purchased and the level of freight assistance, the latter being predicated by the prevailing transportation rate. Consequently, the largest payments on a tonnage basis accrue to those areas at the greatest distance from either Ft. William or the source of supply. Total payment received, however, is not synonymous with the level of assistance. This is shown by Table 1. Greater detail is recorded in Appendix II.

Quebec has received the largest share of the subsidy paid over the 1941-63 period, forty-two percent. Ontario received thirty per cent, British Columbia ten per cent, Nova Scotia nine per cent with New Brunswick and Prince Edward Island trailing at six per cent and two per cent, respectively. Payments made by the federal

Government to these provinces totalled over $370 million, or approximately $17 million per year. Payments to the Maritimes were approximately $65 million in total or about eighteen per cent of the total outlay for the subsidy by the Government.

TABLE 1

FEED FREIGHT SUBSIDY RECEIVED BY PROVINCE, 1941-63

	Subsidy	Proportion of Total Subsidy	Average Annual Subsidy
	(dollars)	(per cent)	(dollars)
P.E.I.	8,068,238.68	2.17	366,738.14
N.S.	35,149,883.01	9.46	1,597,721.95
N.B.	22,258,711.40	5.99	1,011,759.59
Que.	157,402,213.92	42.38	7,154,646.09
Ont.	111,417,931.71	30.00	5,064,451.45
B. C.	37,107,098.48	10.00	1,656,686.27
Canada	371,404,077.20	100.00	16,882,003.50

Source: Author's calculations based upon data provided by the Department of Forestry.

Feeds Moved Under the Subsidy

The relative importance of particular feeds in the subsidy movements varies according to province and over time. Within a particular year, purchases of specific western grains depend upon such factors as the level of local grain output, livestock numbers,

the type of feeding activity pursued and the price differentials between grains. With regard to the latter, prices established for feeds under normal circumstances should be approximately equivalent on the basis of nutrient content.

Movements of rye, screenings and corn have been relatively insignificant. The low volumes of rye and screenings reflect the inferior position of these feeds. The small volume of corn moving under subsidy originates in Manitoba. Over the 1941-63 period, on a tonnage basis, more oats moved under subsidy than any other feed. The other feeds in order of movement were barley, millfeeds and wheat.

Significant differences occurred in the proportions of the individual feeds that were assisted into the respective provinces, Table 2. Over one-third of the feed moving to the Maritimes was made up of millfeed shipments. Millfeeds also constituted twenty-six per cent of the movement into Quebec and eighteen per cent of the movement into Ontario. These millfeeds are used primarily as constituents of prepared feeds and their identity will consequently be lost at the retail level. Wheat was dominant among the feeds moved to British Columbia, making up over thirty-seven per cent of the shipments over the period. Wheat also constituted from seventeen to twenty-four per cent of the feeds moving to other provinces. On the other hand, barley was most important in movements to Quebec and oats in movements to Ontario. Since the subsidy is paid at a fixed

rate per ton, a situation may be expected to develop where shipments of those feeds having a comparatively low nutrient content are encouraged while the reverse will be true for those with a comparatively high nutrient content.

TABLE 2

RELATIVE IMPORTANCE OF PARTICULAR FEEDS RECEIVED UNDER FREIGHT SUBSIDY BY PROVINCE, 1962-63 and 1941-63

	(per cent)						
	Wheat	Oats	Barley	Rye	Corn	Screenings	Millfeeds
P.E.I.							
1962-63	15.70	10.52	28.35	--	--	5.44	39.96
1941-63	24.00	15.17	28.99	.03	--	2.20	29.61
N.S.							
1962-63	21.54	22.60	18.92	--	--	7.19	29.72
1941-63	21.03	24.59	21.48	.05	--	2.61	30.23
N.B.							
1962-63	13.96	19.71	18.35	.05	--	8.28	39.61
1941-63	16.95	22.53	21.13	.07	--	2.88	36.44
Que.							
1962-63	14.43	25.17	30.38	.13	--	3.56	26.30
1941-63	17.72	24.87	27.80	.14	--	2.76	26.72
Ont.							
1962-63	17.04	26.31	30.96	.07	--	4.46	21.12
1941-63	22.00	31.34	25.17	.19	--	3.33	17.96
B.C.							
1962-63	27.91	22.45	29.91	--	.57	1.78	17.34
1941-63	37.49	22.87	14.32	.01	1.87	1.82	21.62
Canada							
1962-63	17.00	24.79	29.27	.09	.06	4.14	24.65
1941-63	21.46	27.06	24.93	.14	.17	2.89	23.35

Objectives of the Study

The current argument between the various groups directly affected by the subsidy arises primarily from the pervading lack of knowledge of the subject. Each group attempts to emphasize only those ideas which will support its point of view. This suggests that a comprehensive and unbiased study is necessary in order to reduce the area of disagreement.

The primary objectives of this study are, therefore, to determine the effects of the application of the subsidy upon the total costs of production, the location of production and the movement of respective products between regions. The limitations placed upon the study by these objectives are recognized. Secondary effects of the subsidy may be largely overlooked. A study at the regional level does not consider intra-regional effects which may be significant. In addition, consideration of the administrative aspects of the subsidy is avoided. However, since the current argument involves regions, attainment of the objectives through a broad empirical analysis will do much to confine the area of disagreement.

Alternative Methods of Analysis

Several different methods may be taken to reach these objectives. A theoretical model based on classical economic theory can be devised and the existing situation evaluated on the basis of what can be explained by the model. This approach was followed by

Kerr in his study. A more sophisticated technique can also be adopted where empirical analysis is introduced in an attempt to determine the incidence of the subsidy. Such an analysis involves a determination of the elasticities of supply and demand for the feeds enabling an estimate of the gains and losses experienced by the respective affected groups to be made. A third approach which may be used involves construction of a model that coincides with the real world situation and using this to determine empirically the effect of the subsidy upon specified activities. Reference will be made in the development of this study to the application of the former two, but the latter approach will be adopted. This approach is more objective in character and brings about a reduction in the effects of the subsidy which remain unexplained. It enables the volume of production by area of the respective products, the interregional movements of such products, and their prices to be determined, given particular cost conditions. Extensive research is required to conduct an analysis of this type and consequently the amount of detail which can be incorporated is limited by the time and funds available. Notwithstanding these limitations, a model will be developed which hopefully does provide a reasonable interpretation of the situation existing in the real world. This model will subsequently be used to determine the situation which would prevail if alternative conditions were imposed.

CHAPTER II

TRENDS IN LIVESTOCK PRODUCTION AND MARKETING

One of the difficulties inherent in any analysis of trends in the production and marketing of livestock and livestock products is that these trends have developed under the influence of the subsidy. To extend such trends into the pre-war period is not a desirable procedure since the advent of World War II sufficiently disrupted what had been the normal pattern as to render any realistic comparison between the periods subject to grave error. On the other hand, certain trends have become evident under the subsidy and since these will provide the basis for comparison at a later stage, a description of them is pertinent at this time.

Livestock on Farms

Estimates of the number of livestock on farms by provinces and crop years appear in Appendix III. Significant changes are evident during the 1941-63 period.

(1) Prince Edward Island

In this province the number of milk cows has declined by approximately twenty per cent, accompanied by a threefold increase in the number of beef cows and steers over one year. Over the period, cattle numbers have increased to 117,000 from 93,000. Cattle production is becoming orientated toward the production of beef

rather than milk, a reflection of increasing specialization. The total number of hogs on farms has declined slightly. Fewer mature hogs are kept to maintain a fairly constant number of hogs under six months. This suggests increasing production efficiency. Poultry numbers have declined by over fifty per cent while the decline in turkey production has been much less marked, substantial annual variation appearing in the numbers on farms of the latter. The apparent trend in this province is toward beef and away from poultry production.

(2) Nova Scotia

This province has experienced a decline in total cattle numbers from approximately 200,000 to 160,000. There has been a dramatic shift away from cattle kept for milk toward those kept for beef but the reduction in steer numbers suggests that a decline occurred in feeding operations. Hog numbers have declined moderately with a slight increase in production efficiency evident. Poultry on farms has doubled over the period accompanied by a threefold increase in the number of turkeys. Cattle production is evidently on the decline in this province whereas that of poultry is increasing markedly.

(3) New Brunswick

The number of milk cows kept in this province declined by fifty per cent over the period. A six fold increase in the number of beef cows failed to compensate for this change and as a result cattle

numbers declined from approximately 200,000 to 150,000. Steer numbers remained fairly constant indicating little change in the level of feeding operations. Hog numbers declined substantially whereas a slight decline in poultry numbers occurred along with a forty per cent drop in that of turkeys. The scope of livestock operations in this province is apparently being reduced.

(4) Quebec

The total number of milk cows on farms has remained fairly constant at around a million head. However, the numbers of beef animals kept has substantially increased and this is reflected in an overall growth of the cattle population of about 300,000 head. The number of hogs kept has increased slightly. Poultry numbers increased, particularly toward the end of the period. Turkey numbers increased dramatically immediately following the war but in recent years have tended to remain constant. It can be said for this province that the production of cattle and poultry is on the increase.

(5) Ontario

The number of cattle on farms has increased by about one third over the period. A significant decline in the number of milk cows has been more than offset by the increase of beef cattle. Steer numbers almost doubled reflecting further development of feeding operations. Hog numbers have shown no particular trend, remaining centered around 1,800,000. Poultry numbers have increased by one

tenth while turkey numbers increased by over four times. The increase in the latter during recent years has been impressive. Ontario can be said to be moving toward an increase in the average scale of beef cattle operations and also toward further turkey specialization.

(6) Manitoba

A rapid increase in the numbers of beef cattle has only been partially offset by a decline in milk cows with the result that over the period the total cattle population increased by about forty per cent to over 1,000,000 head. This was associated with a decline of similar proportions in the number of hogs. Poultry numbers have gradually been reduced whereas those of turkeys have remained relatively constant. This province is apparently moving toward specialization in beef production.

(7) Saskatchewan

The total numbers of cattle on Saskatchewan farms increased by almost fifty per cent over the period to almost 2,000,000 head. The shift from dairy to beef cattle experienced elsewhere is even more pronounced in this province and this trend will continue in the future since replacements for the former are continuing to decline in number. The hog population has declined by almost two thirds with a similar situation prevailing for poultry. Turkey numbers have declined by about sixty per cent. Saskatchewan is moving toward a situation of greater dependence upon forage supplies as a result

of these shifts.

(8) Alberta

The shift away from dairy animals is not so pronounced in Alberta as in some of the other provinces. The growth in numbers of beef cattle has resulted in an overall doubling of those relating to all cattle, to over 2,700,000 head. This increase is the greatest for any province. Hog numbers have declined by about fifty per cent but numbers have apparently stabilized at around 900,000 head in recent years. Poultry and turkey numbers have declined by about one tenth but now appear to be on a plateau. Alberta's livestock population indicates the extent of the diversity of agricultural production in that province and a greater degree of stability in production than in the other prairie provinces may be observed.

(9) British Columbia

There has been little change in the numbers of milk cows kept on British Columbia farms but a substantial change has occurred in the number of beef cattle which has caused the total cattle population to increase by one half. The increase in emphasis on cattle production has been directed toward grazing animals rather than those for grain feeding. Hog numbers have continued to decline. On the other hand, poultry numbers have doubled and those of turkeys have multiplied by almost nine times. This increase in poultry and turkey numbers can be considered phenomenal in view of the deficit grain

production in the sections of the province where the increase was concentrated. This province has apparently adopted specialization in livestock production, in beef animals and in turkeys and poultry - the former emphasizing utilization of forage and the latter efficient conversion to meat of the grain resource.

Output of Livestock Products

Marketings of livestock products by the respective provinces reflect production efficiency, numbers of livestock on farms, the stage of maturity at which sold, and the type of product. Data on total output by province is not available directly for some products, consumption on farms or interprovincial movement sometimes being ignored. Production efficiency between provinces is consequently difficult to measure. Trends in marketings will, however, serve to indicate the present marketing patterns which have developed under the subsidy and provide benchmarks to be used for comparative purposes at a later stage in the analysis. Data on the marketings of the respective livestock products are given in Tables 3-8 inclusive.

The data contained in the first three tables required considerable calculation during derivation. The procedure followed for each was similar so only that used for Table 3 will be outlined in detail. The remaining tables of the series are drawn directly from the indicated publications.

Estimated marketings of cattle in meat equivalent are composed

of two segments, one arising from cattle marketed commercially and the other from non-commercial marketings. The volume of the latter segment is assumed to be equivalent to the on-farm output (slaughter) of beef. Data for Canada as a whole were used in the initial calculations. The first step was to obtain the average dressed carcass weight per animal slaughtered by dividing the total dressed carcass weight of all animals slaughtered by the total number slaughtered. This figure was in turn multiplied by total net marketings and to this product was added the net exports in meat equivalent to obtain the total output of commercial beef. The basic data for these calculations were obtained from Livestock and Animal Product Statistics and the Livestock Market Review. On-farm output was obtained by subtracting the output of commercial beef from the total dressed carcass weight of all carcasses. On-farm output per farm capita was obtained by dividing on-farm output by the product of the number of farms reporting cattle and the average number of persons per farm, the latter two statistics being drawn directly or by extrapolation from Census of Canada. The on-farm output per farm capita for Canada was subsequently used to estimate the non-commercial output for each of the provinces by multiplying this figure by the product of the respective numbers of farms reporting cattle and the average number of persons per farm. Commercial output was calculated for each of the provinces by the procedure followed above for Canada. Output of cattle in meat equivalent by provinces was obtained by summing the respective

on-farm and commercial outputs. It is recognized that non-commercial output may not be equivalent to on-farm output but any discrepancy will be nominal.

(1) Prince Edward Island

Marketings of cattle in beef equivalent increased substantially over the 1941-63 period while those of calves declined indicating a tendency to market cattle at heavier weights. Pork production increased but at a slower rate than for beef with a levelling off noticeable in recent years. A significant decline occurred in the output of poultry meat with some stability indicated in that of eggs and turkey.

(2) Nova Scotia

The output of beef in this province shows a high degree of variability with that resulting from cattle marketings increasing by about six fold and that from calf marketings doubling. Pork output has multiplied by about ten times with most of the increase arising in recent years. Increasing concentration is evident in the production of poultry meat and eggs. A similar situation exists for turkey but the total output of this meat is relatively low.

(3) New Brunswick

No definite trend was evident in the beef output of this province in the post-war years, even though the annual production

TABLE 3

ESTIMATED MARKETING OF CATTLE IN MEAT EQUIVALENT BY PROVINCE, 1941-63
(thousands of pounds)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941	2563	1108	2357	47693	205708	55480	102769	111868	17035
1942	3088	707	1476	33603	173061	82674	122712	119402	19918
1943	2449	779	1466	27652	161954	71740	131901	124590	22497
1944	2653	1292	2401	34359	190907	78495	183214	165132	24321
1945	4905	1288	3386	46935	253129	94909	234673	224803	28043
1946	4145	1914	4645	41144	214568	107120	230502	207299	27423
1947	3887	569	2713	31050	190421	73546	174189	176386	21833
1948	4148	2476	3428	64260	255475	98914	217819	220908	27780
1949	3339	1923	4178	56917	270347	93094	191282	223482	22413
1950	5620	3450	7452	70166	238085	81152	170986	193733	27017
1951	5939	3535	5173	55172	216192	69728	143673	151560	31553
1952	5118	2196	4054	37114	219221	71042	128581	161916	18769
1953	6338	2435	4991	43033	243982	84039	177826	200580	20254
1954	6101	2883	4301	47278	260798	90517	194359	231880	26201
1955	5820	2820	4837	51828	281115	86744	184771	236913	28476
1956	6311	3634	5365	54644	269953	97285	201428	279859	39759
1957	8499	4399	6227	61823	293219	122596	259913	344466	38125
1958	10320	3541	7003	74285	325411	124741	270422	356098	38397
1959	9675	3065	5353	54380	269714	101062	228517	306445	36381
1960	7251	3092	4264	53830	219127	109175	217091	360270	34933
1961	8742	5951	4652	55235	317572	140466	275264	389630	36197
1962	10969	8191	5528	63714	388082	100768	239112	372610	44206
1963	8334	6641	4204	66591	417537	119958	221457	369449	33425

Source: Based upon data contained in Livestock and Animal Products Statistics, Livestock Market Review, and Census of Canada. The method of calculation is explained in the text.

TABLE 4

ESTIMATED MARKETINGS OF CALVES IN MEAT EQUIVALENT BY PROVINCE, 1941-63
(thousands of pounds)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941	498	470	2253	25770	32477	9499	8380	10358	367
1942	788	375	2201	23655	30346	10338	8584	10461	452
1943	619	206	1772	22928	27170	10090	7180	9357	709
1944	426	109	1458	22596	28034	9954	9781	10476	727
1945	689	176	1713	26204	31937	11445	13510	14449	715
1946	1011	443	2783	26927	28372	10902	12203	12041	608
1947	873	270	1916	23505	26286	9859	9867	10305	378
1948	553	320	2295	28979	28844	10879	12832	14130	816
1949	476	377	3175	31756	30287	10980	12372	14882	621
1950	528	594	3922	33275	26849	9942	11225	14381	747
1951	256	666	2399	29103	19874	7426	8146	9173	899
1952	134	230	2637	25112	21390	7476	6354	7958	764
1953	237	295	2966	33237	25670	9935	10762	11182	889
1954	304	456	1934	35999	26840	10604	12123	13210	1282
1955	275	602	2509	37301	27683	9876	11091	13074	1088
1956	443	735	2366	39661	29351	10912	12177	13983	1980
1957	560	838	2705	41230	28919	12414	14944	19706	1352
1958	530	745	2458	39443	22341	12399	18845	19446	987
1959	327	548	1744	38340	17259	11089	16821	14368	1347
1960	243	476	1632	40679	17251	11269	16403	16590	1300
1961	354	843	1657	37203	7499	14664	25717	23228	1406
1962	384	1038	1859	44913	9915	12654	28804	25364	2503
1963	253	760	1201	45225	10111	12333	20465	16905	2178

Source: Based upon data contained in Livestock and Animal Products Statistics, Livestock Market Review, and Census of Canada. The method of calculation is explained in the text.

TABLE 5

COMMERCIAL MARKETING OF HOGS IN PORK EQUIVALENT BY PROVINCE, 1941-63
(thousands of pounds)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941	7461	825	3622	69295	358181	80863	131734	299816	5093
1942	9305	1109	3671	57024	331541	98082	158155	357904	5228
1943	10191	1747	5019	74072	343987	128007	238833	405510	4545
1944	11408	4315	8634	130558	348800	140934	319902	493213	8313
1945	9842	2154	5509	87304	294705	79372	153790	317419	5917
1946	8995	663	4133	78079	288938	56364	83857	204109	3593
1947	10845	1130	5632	115923	346862	51246	72055	183135	2710
1948	14343	3870	10218	137848	308991	44012	57765	188804	7609
1949	13792	3413	8987	139392	316222	42725	46031	151839	5282
1950	15797	4137	10827	164294	238358	43097	45210	155523	6109
1951	15589	5271	10485	171887	332806	47570	53485	156273	5354
1952	17425	5994	12050	242939	419471	73401	86670	220804	7162
1953	12596	3397	6156	130906	297911	51883	67830	233372	6368
1954	13409	3350	6633	146199	291238	54670	68594	240816	5254
1955	13239	2870	6179	170321	231997	70162	90605	272451	6574
1956	11845	2547	5788	171312	355049	62686	93212	254024	6806
1957	11243	2857	5233	153181	329608	54195	87411	234050	4777
1958	12685	3486	5829	184929	357879	76074	115398	297748	5186
1959	15380	5360	8330	241910	484887	81464	146155	364582	7302
1960	12798	6387	7712	185423	400308	104001	96136	281182	6552
1961	13188	8064	7161	187894	376821	83862	94604	268075	5384
1962	12421	9243	6023	214814	386036	75061	82424	269120	5150
1963	12804	9790	5991	244881	428145	59699	59699	218375	4572

Source: Based upon data contained in Livestock and Animal Products Statistics, Livestock Market Review, and the Census of Canada. The method of calculation is explained in the text.

TABLE 6

OUTPUT OF FOWL AND CHICKEN MEAT BY PROVINCE, 1941-63*
(thousands of pounds)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941	2425	4080	3555	27100	76454	18300	30920	25130	9305
1942	3010	4900	4195	30890	82670	22000	38345	27065	9960
1943	2840	5400	4330	31155	88985	22450	36440	29015	11260
1944	3200	6325	4940	39290	91390	24295	44260	33540	12285
1945	3225	5660	5155	37410	93825	22391	38995	30590	12195
1946	3334	6876	5476	34512	93446	21686	33906	26118	12260
1947	3983	7853	5154	40729	97710	22100	32754	26578	18949
1948	2645	6055	3778	33945	85083	21767	26338	23157	13147
1949	4722	5200	4397	39362	116097	19472	19325	25164	11760
1950	2895	4787	4352	36780	109217	19879	20678	22794	10403
1951	2646	6312	4343	38029	139872	23708	25390	28733	15205
1952	3260	7229	5841	53706	151848	24475	30222	28316	18118
1953	3508	8679	5305	59174	131790	22365	28032	27763	22776
1954	3657	9036	8201	53891	135837	26871	27534	30996	24335
1955	3257	7708	5099	53842	132336	21639	22401	26263	19783
1956	2685	6342	4445	56327	140009	22905	23401	29572	23226
1957	2543	7005	5559	62273	136660	23559	24140	32948	20649
1958	2198	9467	6084	82491	154385	25847	24108	29510	21922
1959	2025	9988	5325	80727	158994	26577	23127	30240	28195
1960	1732	11421	5160	91290	143230	22510	18601	34140	29775
1961	1648	13333	5517	117782	153813	26755	22295	40540	34704
1962	1252	13395	4802	129623	148908	21795	20776	36664	34298
1963	849	14258	4845	139695	155163	22333	16035	35703	36522

*Dressed weight basis 1941-54. Eviscerated weight basis 1955-63.

Source: Production of Poultry and Eggs.

TABLE 7

OUTPUT OF TURKEY MEAT BY PROVINCE, 1941-63*
(thousands of pounds)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941	158	174	393	2027	7532	6622	10897	7179	530
1942	172	147	537	2353	7448	9519	12265	7459	654
1943	139	138	353	1325	7015	5322	9231	5897	548
1944	86	178	363	2382	6571	4974	12052	6164	625
1945	91	209	378	3278	6534	4473	11617	5962	908
1946	126	273	449	2631	8504	4407	6694	6172	1560
1947	188	661	615	5059	9242	3715	7767	7996	3848
1948	188	593	458	4068	10222	3300	7176	6020	3084
1949	298	738	675	5979	10062	4890	6785	8986	4046
1950	235	552	638	6915	10848	5559	4361	7176	4220
1951	197	648	564	8751	11072	4163	7139	7172	4009
1952	261	717	817	14170	12347	7664	9847	9170	5009
1953	187	629	890	10722	12142	6982	8909	10612	3755
1954	181	749	1127	13218	16733	12651	14019	13789	8900
1955	240	827	899	13251	16337	10230	11935	8327	5528
1956	255	1219	1009	13825	27095	12163	12881	13716	7805
1957	216	1073	622	12992	31151	13390	13269	12441	6110
1958	315	1254	897	14540	37410	15492	17285	13899	6747
1959	301	681	506	14379	49004	18963	20086	17625	9069
1960	382	578	562	13247	40168	14973	15457	13943	8334
1961	227	609	602	17329	52781	21400	22950	20151	7782
1962	257	625	398	18489	63547	18961	18422	16633	9823
1963	108	765	381	17940	67119	19026	14938	15651	7078

*Dressed weight basis 1941-54. Eviscerated weight basis 1955-63.

Source: Production of Poultry and Eggs.

TABLE 8

PRODUCTION OF EGGS BY PROVINCE, 1941-63
(thousands of dozens)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941	3986	6904	5981	38899	95842	21937	34869	28094	20133
1942	4833	7818	6515	42588	106560	26983	39192	32940	21556
1943	5254	9426	7763	44593	120487	31290	44022	34753	22546
1944	5987	11057	9210	56725	125545	32926	52604	37968	25479
1945	6606	10693	9483	58971	138705	34374	47161	37841	24513
1946	6122	10419	8459	52686	132926	31237	39001	32866	25097
1947	6036	11592	8472	60757	154769	32392	41395	35385	27802
1948	5573	11376	7399	58659	140583	30758	37747	34384	26220
1949	5259	10054	6675	54651	116047	28196	32702	30737	22752
1950	5140	10039	6455	50156	119662	25003	28948	28450	19874
1951	5213	11297	6366	48881	114770	23381	27606	29599	24023
1952	6041	12673	7750	55133	139335	28683	32321	33800	26791
1953	6177	14755	7626	55001	145431	30766	32590	36918	25920
1954	6410	17861	7925	63185	157247	32519	32391	39602	28679
1955	6145	17467	7786	60570	155337	32202	37192	41882	27430
1956	5870	18026	8077	59544	160526	32854	38352	45689	30820
1957	5176	17931	7421	63850	183088	35897	41787	48793	35900
1958	5257	17582	7242	59488	187173	38479	41910	48811	35496
1959	4989	19433	7948	64378	189592	38066	40005	45823	38002
1960	4952	18928	8500	59963	183281	38073	37035	44937	39937
1961	4156	18513	8373	66785	179516	35840	32435	42387	41918
1962	3975	17718	9154	70844	182384	36998	30351	39370	43406
1963	4189	19440	9350	66659	171090	37879	29478	37390	45600

Source: Production of Poultry and Eggs.

was highly variable. An increase in pork output following the war was followed by a decline, a situation which prevailed for poultry meat, eggs and turkey as well. Livestock production in this province appears in a period of incipient decline.

(4) Quebec

About two-thirds of the beef output in this province continues to arise from the marketing of calves, a by-product of the dairy industry. Over the period, total output increased by over thirty per cent. An increasing volume of pork was produced with marketings of hogs in pork equivalent tripling over the period. The increase in poultry meat and turkey marketings was dramatic while egg output remained relatively stable.

(5) Ontario

Beef output arising from the slaughter of mature animals doubled over the 1941-63 period. On the other hand, marketings of calves declined substantially indicating increasing concentration on feeding activities. Hog marketings increased slowly. The output of poultry meat doubled while that of turkey increased ten fold. Egg output almost doubled with a plateau being reached in recent years. The increase in poultry production may be explained by the associated low feed concentrate to meat ratio. The increase in beef output has been associated with an increase in the local production of corn.

(6) Manitoba

Meat obtained from the slaughter of calves has remained fairly constant over time. Beef output from mature animals doubled over the 1941-63 period though wide variation occurred between years. Pork production was also highly variable with little evidence of any significant trend. Poultry meat production has remained fairly constant. On the other hand, the output of turkey has been increasing. Egg production has shown a considerable degree of stability in recent years, a plateau having been reached.

(7) Saskatchewan

Cattle marketings doubled over the period, accompanied by a one hundred and fifty per cent increase in those for calves, the latter showing a high degree of variability between years. The trend in hog production is down, but large swings have occurred between years which indicates instability in the industry. A gradual decline has occurred in the output of poultry meat while that of eggs has remained fairly constant. A tendency toward increased turkey production has been evident during the last decade.

(8) Alberta

Cattle marketings in beef equivalent increased approximately three fold over the 1941-63 period. An increase of about fifty per cent occurred in those of calves. No definite trend has been established for hogs, but considerable variation in output has

occurred between years. Moderate increases have also occurred in the output of poultry meat, turkey and eggs. The data indicates that producers in this province are tending to concentrate on beef production.

(9) British Columbia

The output of beef from mature animals in this province approximately doubled over the period, while that from calves increased six fold. The latter event has been associated with an increase in ranching activities. Hog marketings, though variable, fail to show any definite trend. The output of poultry meat increased four fold and that of turkey about fourteen times. Egg production more than doubled over the period. The production patterns of poultry products in this province have a degree of similarity with those for Ontario, a reflection of increasing urbanization and a restricted supply of locally produced concentrates.

Size of Production Units

An indication of the increase in size of the average livestock production unit over time may be obtained by scrutiny of Table 9. Cattle and hog operations are smaller on the average in Quebec and the Maritimes than in other regions of Canada. In recent years, increasing specialization in poultry and turkey production has occurred, however, on particular farms. The increasing average size of poultry and turkey operations is apparent in all provinces. The trend toward

TABLE 9

AVERAGE NUMBER OF LIVESTOCK PER FARM REPORTING BY PROVINCE, CENSUS YEARS 1951, 1956 AND 1961
(head)

Census Year	Class of Livestock	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B. C.
1951	Cattle	10.83	8.33	8.00	14.69	20.40	15.79	15.26	23.34	19.44
	Hogs	9.74	4.17	5.22	12.52	18.76	10.04	9.10	18.74	7.90
	Poultry	121.40	115.21	69.20	112.73	229.97	168.49	112.16	138.63	206.41
	Turkeys	119.43	107.77	91.68	149.72	156.04	41.26	28.54	34.46	296.83
1956	Cattle	14.92	10.62	10.86	19.15	26.14	22.33	24.91	38.61	27.97
	Hogs	8.83	4.76	5.53	12.99	21.19	11.99	12.24	26.54	12.10
	Poultry	117.92	167.17	81.91	145.06	283.90	180.97	121.93	171.43	285.17
	Turkeys	183.01	262.51	147.98	265.26	500.92	102.94	46.34	58.27	440.30
1961	Cattle	18.49	15.47	16.08	22.91	32.78	36.45	43.09	64.35	39.55
	Hogs	14.16	12.42	9.26	19.16	29.91	36.58	30.38	51.76	14.87
	Poultry	120.40	369.90	149.56	246.56	409.47	249.65	127.44	199.79	575.23
	Turkeys	721.31	625.90	388.87	505.87	2240.86	221.33	80.15	93.98	968.17

Source: Census of Canada

large scale operations in cattle and hogs is more apparent on the prairies than elsewhere. While size of operation has increased dramatically during the last two decades, the ultimate has not been reached, since in no case, does the average approach the optimum size of unit.

The difference in average size of production units between the respective provinces have implications for production efficiency, but this aspect will not be pursued here. The size of unit does have an important influence on the volume of feed which may be purchased at any particular time, and also in aggregate. The inference can therefore be drawn that any savings resulting from the subsidy will be minimal for small scale farms and, consequently, greater for those of large scale. In addition, greater opportunities for market imperfections exist where the farm production units are small in size. The suggestion can therefore be made that the greatest benefits to producers from the subsidy will accrue to turkey producers in all provinces, particularly Ontario, poultry producers in Nova Scotia, Ontario and British Columbia, with somewhat smaller benefits to Ontario and Quebec cattle and hog producers. It must be recognized that within each province, wide variations exist in size, which implies that those which may be classified as large obtain greater benefits than those classified as small by receiving a greater total benefit and by being able to achieve cost reductions through volume purchase. The latter situation is of great importance, since the wholesale-retail stage of distribution may be

telescoped if not avoided. The subsidy in this context may stimulate movement toward increasing the average size of operations in those provinces to which it applies.

Exports of Livestock and Livestock Products

(1) Live Cattle and Hogs

Net exports of cattle over the 1941-63 period showed great variation from year to year, Table 10. The majority of the cattle were exported for further feeding in the United States. The variability of exports to that country may be accounted for by an unfortunate outbreak of foot and mouth disease in Canada in 1952, and also by the interdependence of the American and Canadian cattle markets, the former being able to absorb a large volume of animals in relation to Canadian output. A high point occurred in 1961 when almost half a million head were exported.

Exports of hogs are of minor importance. A substantial share of this movement is made up of breeding animals.

(2) Beef and Pork

While net exports of beef during particular years have been substantial, Table II, Canada is now on an export-import threshold. In recent years, imports have tended to exceed exports.

The large volume of exports of pork during World War II were in the form of Wiltshire sides destined for Britain. This movement has largely ceased in recent years, and has been replaced with exports of

TABLE 10

NET EXPORTS OF LIVE CATTLE AND HOGS, CANADA, 1941-63

(head)

YEAR	CATTLE	HOGS
1941	254030	37210
1942	215645	5999
1943	62604	9326
1944	58895	9739
1945	79296	9218
1946	104155	7590
1947	82708	11160
1948	456672	7363
1949	419820	2334
1950	457927	1646
1951	237935	4321
1952	11721	703
1953	66698	21124
1954	85681	26508
1955	61218	8930
1956	47118	12317
1957	381249	1655
1958	665978	1865
1959	309311	8069
1960	263705	4530
1961	499322	27611
1962	488603	4617
1963	275022	3646

Source: Livestock and Animal Products Statistics

TABLE 11

NET EXPORTS OF BEEF AND PORK, CANADA, 1941-63

(thousands of pounds)

YEAR	BEEF	PORK
1941	6396	477884
1942	15046	536494
1943	13174	587169
1944	107388	717049
1945	212148	462032
1946	136057	297145
1947	48830	245287
1948	127535	227934
1949	99740	72368
1950	78425	79366
1951	85019	303
1952	56716	10168
1953	14895	54839
1954	4081	59082
1955	- 7042	63942
1956	378	55254
1957	33338	36671
1958	36967	61749
1959	- 6223	68626
1960	- 5112	49985
1961	6546	10535
1962	- 9899	12320
1963	-12053	-42045

Source: Livestock and Animal Products Statistics

specialty products. However, the volume of the latter trade is relatively small. Canada was actually in a deficit pork position in 1963.

(3) Eggs, Poultry Meat and Turkey

Exports of eggs have declined in volume since the World War II period, Table 12. Great variation in the volume of exports occurs from year to year and the country is no longer a consistent net exporter of eggs. Over the 1941-63 period, Canada was more often a net importer than exporter of poultry meat and turkey, though the volume of trade was, on the average, small.

Interprovincial Movements of Livestock and Livestock Products

Statistics on the interprovincial movement of livestock leave something to be desired. No doubt, part of the difficulty arises from the lack of adequate definition of the various categories of animals. On the other hand, farm to farm movement may not always be recorded. Some inconsistency, therefore, appears in the available statistics. On the other hand, data on movements of livestock products is virtually non-existent. Kerr[28] attempted to circumvent this problem by relating national per capita consumption figures and provincial populations to output of the respective products by provinces and subsequently presented tables indicating the relative surplus or deficit positions of

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[28]Kerr, op. cit., p. 108.

TABLE 12

NET EXPORTS OF EGGS, POULTRY MEAT AND TURKEY, CANADA, 1941-63

YEAR	EGGS (thousand dozen)	POULTRY (thousand pounds)	TURKEY (thousand pounds)
1941	16131	1392	433
1942	28462	4137	1184
1943	40718	636	163
1944	62184	18217	493
1945	114581	10716	172
1946	61303	1723	-3595
1947	86127	9565	1162
1948	81211	39323	1366
1949	42314	15414	1994
1950	13895	4279	87
1951	2439	-3255	-1320
1952	11870	1659	-127
1953	6158	-5505	-5394
1954	5087	-5112	-5556
1955	1954	-3353	-10566
1956	-179	-8137	-13046
1957	8021	-4824	-6831
1958	16952	-9200	-558
1959	27483	-5614	-369
1960	9139	-16232	-4673
1961	1805	-10134	-4525
1962	-2200	-3106	-2538
1963	-7321	-5504	242

Source: Production of Poultry and Eggs and Trade of Canada

the particular provinces. The procedure adopted in this study will be to present available data as a basis for comparison with the results obtained from the analysis using the model developed.

Feeder Cattle and Calves

Estimates of the surplus or deficit positions of the individual provinces with respect to feeder cattle and calves are provided for the 1941-63 period in Tables 13 and 14, respectively. The estimates provided do not take into account the numbers of feeder animals moving direct on export. Available statistics on movements direct on export apply to all classes of cattle collectively. Unfortunately, an adequate means to accurately determine the proportion of such movement made up of feeder animals is not available so therefore movements of feeders direct on export are ignored. Since "surplus" provinces may be expected to contribute most heavily to these movements, the estimates presented will tend to bias the actual surplus position of such provinces downward while for the "deficit" provinces any bias will be slight. Consequently, the data presented in these tables only allow a subjective rather than objective appraisal of the actual situation to be made. This fact should be borne in mind during the ensuing discussion.

The Maritimes are approximately self-sufficient in feeder cattle and in a minor surplus position in calves. Quebec usually has a small surplus of calves, but is in a similar deficit position for

TABLE 13

ESTIMATED SURPLUS OF FEEDER CATTLE BY PROVINCE, 1941-63*
(head)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941	--	-121	--	-1469	-67761	13743	42829	-3091	457
1942	-17	-21	-121	-1602	-90405	31186	39303	-8368	257
1943	-336	-86	--	-4009	-73154	18925	33783	-7426	724
1944	--	-42	-24	-1337	-62512	3707	36312	-12429	651
1945	-12	-86	-18	-1332	-69606	5871	56436	-23523	1193
1946	--	-72	--	-1937	-78112	15295	52125	-18969	-641
1947	-30	-677	-75	-803	-70431	6717	47577	-2966	-119
1948	-21	-62	-48	-759	-77686	28984	84433	9282	690
1949	-90	--	-50	-478	-62470	28426	76122	18748	16073
1950	--	-43	-21	-1087	-80716	28852	84270	35121	22544
1951	-112	--	-146	-2084	-91536	16827	55590	15370	20664
1952	3	-60	--	-1802	-64516	7749	40414	4755	10502
1953	--	-3	-62	-1856	-101572	13555	56458	8630	10485
1954	-102	-58	-75	-1368	-115533	17157	68558	10181	3105
1955	-40	-86	-28	-1235	-122172	16549	70834	1101	3156
1956	-40	-129	25	-1240	-175592	22556	90334	7593	12412
1957	--	73	-17	-1151	-139366	33769	111937	9858	6608
1958	--	-132	44	-1378	-109716	46370	118381	40167	6886
1959	-34	97	355	-2284	-130150	29721	106754	28114	15608
1960	27	-177	-84	-1861	-98610	22630	79328	5787	12677
1961	-42	48	657	-4710	-116902	46532	115294	8044	12231
1962	--	-54	561	-1634	-67595	17013	82356	4030	14211
1963	45	2	141	-2384	-62028	18775	72701	-1208	10340

*Indicated Surplus = marketings of feeder steers and heifers plus movement to country points in other provinces minus inward movement.

Source: Livestock Market Review

TABLE 14

ESTIMATED SURPLUS OF FEEDER CALVES BY PROVINCE, 1941-63*
(head)

Year	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1941									
1942									
1943									
1944			(included with cattle)						
1945									
1946									
1947									
1948									
1949	-7	--	--	-120	-7519	-382	8589	2829	-42
1950	--	3	--	61	-12354	2532	17027	21298	-269
1951	-9	--	--	-1199	-21674	2771	18439	16024	432
1952	--	6	--	-924	-23843	3417	17242	7414	44
1953	--	-76	--	-90	-39774	5744	29472	12278	571
1954	--	-50	--	151	-46498	5742	31653	16106	695
1955	--	-45	--	-135	-49473	4729	33417	15745	802
1956	--	--	-44	208	-39497	5076	34223	8410	2268
1957	-44	-36	--	641	-38587	5655	44916	37773	1711
1958	--	75	48	695	-54085	24966	97696	67558	3142
1959	174	68	533	1258	-74105	26861	86181	62697	5808
1960	30	108	460	1874	-90426	18007	71079	100460	3836
1961	259	679	2666	2752	-153670	39632	129682	98584	3922
1962	232	605	3165	2703	-159234	36199	138899	49693	9968
1963	124	417	1420	326	-158900	40391	106889	43972	8168

*Included with feeder cattle before 1949

Indicated Surplus = Marketings of stock calves plus movement to country points in other provinces minus inward movement.

Source: Livestock Market Review

feeder cattle. Ontario is in a substantial deficit position for both cattle and calves. Manitoba has a small surplus of feeder cattle which has been exceeded in recent years by that of calves. Saskatchewan has a substantial surplus of both cattle and calves. On the other hand, Alberta is approximately self-sufficient in cattle, but has a moderate surplus of calves. Feeder animals, therefore, move from the western to the central provinces with trade between other regions in Canada being insignificant.

Slaughter Animals

The direction of flow of cattle and calves between provinces becomes evident following an examination of Tables 15 and 16. Receipts at stockyards may be used either for slaughter or for further feeding and this clouds the issue. An indication of the flow of slaughter cattle and calves from Western to Eastern Canada may be obtained from Table 17. A substantial volume of movement occurs from Winnipeg to both Ontario and Quebec with a lesser volume moving to the Maritimes.

Considerable interprovincial movements of animals between adjacent provinces are due to proximity of market centres and the location of slaughtering facilities. Transportation costs often greatly influence these movements as well. In all cases, the major share of the output of cattle and calves is slaughtered in the province of origin. Major interprovincial movements occur from Saskatchewan to Manitoba and from Ontario to Quebec. Table 17 also

TABLE 15

CATTLE RECEIPTS AT PUBLIC STOCKYARDS AND SHIPMENTS DIRECT FROM COUNTRY POINTS TO PACKING PLANTS BY PROVINCE OF ORIGIN, 1962-63
(head)

To \ From	B.C.	Alta.	Sask.	Man.	Ont.	Que.	Mar.
B.C.	31986	4945	928				
Alta.	13778	819099	10800				
Sask.		2178	260125				
Man.		7324	144624	234452	3636		
Ont.	600	2582	21061	8970	755156	1567	328
Que.	85	254	3795	821	64872	121651	2296
Mar.						14	36650

Source: Livestock Market Review

TABLE 16

CALF RECEIPTS AT PUBLIC STOCKYARDS AND SHIPMENTS DIRECT FROM COUNTRY POINTS TO PACKING PLANTS BY PROVINCE OF ORIGIN, 1962-63
(head)

To \ From	B. C.	Alta.	Sask.	Man.	Ont.	Que.	Mar.
B. C.	6422	66	11				
Alta.	3797	172637	1923				
Sask.		524	77952				
Man.		288	55678	89626	1557		
Ont.		624	2362	4329	140690	2548	687
Que.					80831	299626	3702
Mar.						60	11756

Source: Livestock Market Review

TABLE 17

MOVEMENT OF LIVESTOCK BY RAIL FROM WINNIPEG AND POINTS WEST TO EASTERN CANADA, 1962-63*
(head)

Receiving Province	Cattle			Calves			Hogs		
	1	2	3	1	2	3	1	2	3
Ontario	30375	51001	16627	817	143073	13857	4487	106	7
Quebec	22124	1162	704		66	197	207		
Maritimes	1754	37		2					

* 1 = slaughter

2 = feeding

3 = stockyards

Source: Livestock Market Review

indicates that most of the west to east movements of cattle and calves during 1962-63 were for feeding purposes, while relatively insignificant numbers of hogs moved mainly for slaughter. The somewhat different pattern existing for hogs as compared to cattle is shown in Table 18 where substantial movements also occur from Alberta to British Columbia.

Trends in Consumption of Livestock Products

In a study such as this, knowledge of any differentials existing in consumption rates of the respective products between regions is highly desirable. However, such differentials are not established by available data. Furthermore, per capita consumption figures given for the nation cannot themselves be construed as being entirely accurate, since they are founded upon estimates in various phases of their determination. Certain trends in per capita consumption are evident, nonetheless, in the national figures which are presented in Table 19. The consumption of veal on a per capita basis is gradually declining, whereas that of beef is increasing. Pork consumption has remained fairly constant on a per capita basis in recent years. Fowl and chicken disappearance has been increasing, a situation also evident for other poultry. Other poultry includes turkey, goose and duck, consumption of the latter two declining whereas that of turkey is increasing. The extent of the increase in turkey consumption is therefore not directly evident from the table. There has been little change in the per capita consumption of eggs.

TABLE 18

HOG RECEIPTS AT PUBLIC STOCKYARDS AND SHIPMENT DIRECT FROM COUNTRY POINTS TO PACKING PLANTS BY PROVINCE OF ORIGIN, 1962-63
(head)

To \ From	B. C.	Alta.	Sask.	Man.	Ont.	Que.	Mar.
B. C.	30142	195875	616				
Alta.	7	1250742	6413				
Sask.	10	40615	274069				
Man.		21958	159236	450812	201		
Ont.		3236	492	1175	2360419	5274	
Que.		8			161726	1411522	
Mar.						8783	173961

Source: Livestock Market Review

TABLE 19

APPARENT PER CAPITA CONSUMPTION OF SPECIFIC FOODS IN CANADA, 1941-63
(pounds per capita except where otherwise specified)

Year	Veal	Beef	Pork	Fowl* & Chicken	Other** Poultry	*** Eggs
1941	10.7	58.5	51.6	16.9	3.7	20.2
1942	11.9	60.7	58.9	19.7	4.8	21.7
1943	11.1	62.8	62.3	19.9	3.6	22.2
1944	11.1	65.7	62.6	21.1	3.7	22.0
1945	12.4	65.4	52.8	21.3	4.0	21.6
1946	10.8	69.0	43.7	18.3	3.4	21.8
1947	9.8	64.6	52.6	19.5	3.9	22.0
1948	10.6	59.7	48.0	14.9	3.3	20.8
1949	9.9	56.7	55.0	16.7	3.4	19.3
1950	9.4	50.8	55.0	17.1	3.4	19.7
1951	7.6	49.3	58.6	19.5	3.6	19.7
1952	6.9	54.4	56.0	24.0	4.6	22.1
1953	8.1	65.1	48.7	21.5	4.7	22.7
1954	8.6	70.2	45.4	22.4	6.0	24.3
1955	8.4	69.1	49.2	23.4	6.1	23.8
1956	8.5	71.4	49.2	19.2	6.4	36.4
1957	8.9	72.0	44.4	19.4	6.6	38.1
1958	7.3	68.0	49.4	21.1	6.5	37.2
1959	6.9	65.6	56.7	22.0	8.4	36.0
1960	6.9	70.0	52.6	20.9	6.9	36.7
1961	6.8	69.9	49.9	23.0	8.1	33.9
1962	6.5	69.2	49.8	22.9	8.1	33.8
1963	6.6	73.8	50.7	23.7	8.8	32.2

*Dressed weight 1941-55, eviscerated weight thereafter.
**Dressed weight 1941-55, eviscerated weight thereafter.
***Dozen 1941-55, pounds thereafter.

Source: Handbook of Agricultural Statistics, Part IV Food Consumption and Part VI Livestock and Livestock Products

Evaluation of Trends

The trends indicated by the tables have occurred following the imposition of the subsidy. Part, but not all of the shifts may be accounted for in terms of the impact of the subsidy. During the war, unusual emphasis was placed upon livestock production by the Government, and various measures were adopted to increase output. On the other hand, following the war, adjustment was required, particularly in the case of hogs, following the decline in the importance of the British market. Subsequent developments, while occurring under the subsidy, have also been influenced by many other factors. Therefore, it cannot be said that the trends which are currently evident arise from the subsidy. In fact, other factors may be dominant and the impact of these may be sometimes mitigated by the subsidy while at other times may be exacerbated. In consequence, a study of the effect of the subsidy must be conducted on a basis other than analyzing these trends.

CHAPTER III

ECONOMIC THEORY AND THE SUBSIDY

The freight subsidy applies only to the movement of one factor of production, feed, and is further restricted in that it only applies to certain types of feed moving between particular areas. This limitation to certain areas will tend to favour some at the expense of others, since all will pay a share of the taxes necessary to raise the required funds, yet all will not benefit equally. Furthermore, the importance of the subsidy to production will vary according to the class of animal, the ration fed and the end product. This complex situation serves to render objective appraisal of the effects of the subsidy difficult. A logical sequence of steps in the appraisal will be consideration of its (1) conformity to criteria for an optimum policy, (2) implications for welfare, (3) effects on trade and (4) consequences for regional production patterns. The latter aspect will receive the greatest emphasis.

Criteria for Economic Policy

Boulding defines policy as the principles that govern action towards given ends.[29] He suggests that any study of policy should be concerned with the ends desired, the means by which these may be

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[29] K. E. Boulding, Principles of Economic Policy. Englewood Cliffs: Prentice-Hall Inc., 1964, p. 1.

achieved, and finally the group to which applied. He further contends that the four objectives of economic policy are progress, freedom, stability and justice. These objectives provide an interesting basis for evaluating the feed freight assistance policy.

(1) Progress

There is little evidence to suggest that the policy has any significant positive effect on economic progress. Investment may be encouraged in those areas to which it is applied but this is accompanied by a depressing effect upon investment in other areas. Thus, it appears that investment encouraged in livestock enterprises will be offset by that discouraged in grain production within the subsidy provinces while the situation will be in reverse order within the other provinces. On the other hand, the policy pays homage to the fallacy of equalizing competitive advantage and encourages a particular form of production. The country as a whole is being denied the advances which might occur if this impediment to free competition were removed. Indeed, overall progress of the nation's economy may be impeded since production is not organized on the basis of least cost. The policy, therefore, should not be supported if the intent is to effectively foster national economic progress.

(2) Freedom

The subsidy affects freedom in that economic limitations are placed upon certain groups and not others. A loss in the value of assets used by some groups upon the initiation of the subsidy was

offset by a gain of similar proportions by others, an illustration of theft of value on one hand and windfall gain on the other. To the extent the subsidy is effective, assets of farmers producing livestock products under the subsidy will be enhanced along with those of prairie grain farmers while the reverse will hold true for grain growers and livestock producers in other regions. Thus, while the subsidy does not restrict freedom in the legal or moral sense, economic freedom is impaired.

(3) Stability

Stability is not an end in itself, but is desired as a means for providing an economic climate which will encourage growth. Absolute stability is not desired since this will result in stagnation. However, excessive fluctuations in prices and output are to be discouraged since these bring about redistributions in wealth and income which may not be in the national interest. In this context, the subsidy is of some importance. To the extent that livestock production on the prairies is discouraged, the subsidy fosters instability in prairie agriculture. The encouragement of a one-crop economy influenced to a great degree by the vagaries of the weather within the area certainly tends toward instability. This is not to say that intra-farm diversification is necessarily desirable, but that diversification between farms has definite benefits. On the other hand, increasing diversification within the areas receiving the subsidy is fostered, areas which are already producing several commodities due to the proximity of large markets.

The conclusion may therefore be reached that the accompanying differential effects on inter-regional stability are not in the best interests of the nation.

(4) Justice

Economic justice involves a consideration of how the fruits of society are distributed, whether on the basis of merit or need. Our society, historically, has tended to distribute rewards according to contribution. At the present time, the tendency is to give some weight to need in the distribution. This requires interpersonal comparisons and also has welfare implications which will be examined presently. If distribution according to contribution is the objective, there is no basis for the subsidy under which distribution is made according to location. On the other hand, if distribution according to need is the rule, the subsidy does not foster justice either. No criteria have yet been established to determine the degree of need of a particular individual or region. The subsidy has been made available to all members of a particular occupational group within general areas, any discrimination in the level of subsidy paid being based upon distance from the Lakehead or other source of supply. It is interesting to note that the points raised in support of the subsidy are based on the premise of need which thus far has not been adequately demonstrated. In any case, there is no direct relationship between the areas considered to be in need and those to which the subsidy applies.

Evaluation

When examined according to the criteria for desirable economic policy, the subsidy can only be deplored. There is little to commend and much to criticize. The primary problem of the subsidy policy arises from the fact that the real ends desired following the war have never been properly defined. The means used to accomplish the ends cannot be expected to be satisfactory under such a circumstance. Identification of those affected, in consequence, becomes difficult.

Welfare Theory and the Subsidy

There is general acceptance among present-day economists of the statement by Reder[30] that:

> ". . . welfare increases (decreases) whenever one or more individuals become more (less) satisfied without any other individuals becoming less (more) satisfied."

It will be noted that welfare is a condition of the mind and the above statement avoids expressing welfare in absolute terms.

The marginal conditions of maximum welfare arise from the general definition. Maximum welfare is achieved when it is impossible to make one person better off without making some other person worse off.[31] The marginal conditions of maximum welfare have been enumerated as:

> "1. The marginal rate of substitution between any two products must be the same for every individual who consumes both.

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[30]M.W. Reder, Studies in the Theory of Welfare Economics. New York: Columbia University Press, 1963, p. 15.

[31]Ibid., p. 21.

2. The marginal rate of transformation between any two products must be the same for any two firms that produce both.

3. The marginal rate of transformation between any factor and any product must be the same for any pair of firms using the factor and producing the product.

4. The marginal technical rate of substitution between any pair of factors must be the same for any two firms using both to produce the same product.

5. The marginal rate of substitution between any pair of products for any person consuming both must be the same as the marginal rate of transformation (for the community) between them.

6. The marginal rate of sbustitution between the amount of (product X) received for aiding in its production (by a given firm) and the time spent in rendering this aid must be the same for each factor owner as the marginal rate of transformation between the time of his factor unit spent in aiding production (in this way) and (the product) X.

7. The marginal rate of substitution between resource control at any pair of moments (t_i and t_j) must be the same for every pair of individuals or firms (including pairs, one member of which is a firm and the other an individual)".[32]

The marginal conditions for maximum welfare in relation to the subsidy are discussed below. Secondary conditions have also been suggested but these while recognized will not be developed here.[32a]

(1) Optimum Allocation of Products

Products will be allocated in optimum fashion as long as such

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[32] Ibid., pp. 35-36.

[32a] S.K. Seaver, "Spatial Research - Measurement for What", Journal of Farm Economics, 46: 1365-1371, December, 1964.

distribution occurs along the contract curve, an imaginary line joining the points of tangency of the indifference curves of two individuals. This implies that exchange of any pair of articles of consumption between the individuals will not increase the satisfaction of one without adversely affecting that of the other. There is no reason for such a distribution of produced goods to be influenced by the subsidy since no impediments are placed upon exchange at the consumer level. On the other hand, production of a greater relative quantity of one good relative to the other may occur which may effect the location of the contract curve.

(2) Specialization

Maximum welfare requires that the production of each firm be so distributed among firms that total output is optimum. If two similar products are produced by two firms, the marginal rates of transformation between the products will be the same for each of the firms under these conditions. This premise will be considered further in the discussion of interregional trade where consideration is given to areas rather than firms.

The effect of the subsidy upon specialization is difficult to assess. In subsidy areas, a few large scale operations have developed, particularly in broiler production in which a relatively high output of meat per input of feed prevails. These may have developed due to economies inherent in volume purchase as well as from the subsidy. However, the dominant factor has been the economies of large scale

production made possible by improved technology. Large scale operations, in consequence, have also developed in areas where the subsidy did not apply. The subsidy will have a positive effect upon plant size to the extent that it is effective in receiving provinces since new entrants tend to establish operations of optimum size.

(3) Factor-Product Relationship

Much has been written concerning input-output relationships. The theoretical requirement for maximum welfare in this area is straightforward - the marginal rate of transformation between any factor and any product must be the same for any pair of firms using the factor and producing the product. This means that no more economic method can be used to transform the input into the output even though a more efficient method may exist in physical terms. The relevant question here is economic efficiency as opposed to physical efficiency.

No judgement can be made regarding the effect of the subsidy upon this production aspect. A wide range of input-output relationships exists due to the varying degrees of ability farmers have as livestock producers. There is little to suggest that the subsidy has any measureable effect on methods of production except insofar as operations of optimum size may be encouraged and these seek out superior techniques. The necessary information for an objective appraisal of the extent to which this situation prevails is not available. There is sufficient only to suggest that a wide discrepancy exists between what is currently the most efficient and what is the most prevalent method of production, thereby indicating that this condition for maximum welfare is not being met.

(4) Allocation of Factors

There is a close relationship between the factor-product relationship and the optimum allocation of factors of production. Maximum welfare requires that the marginal technical rate of substitution between any pair of factors must be the same for any two firms using both to produce the same product. This implies equal technical knowledge by all producers, a situation which does not prevail in agriculture. Since no production information is distributed along with the subsidy, its effect upon factor allocation appears zero upon first glance. However, the situation is much more complex since the reduction of transportation cost for feed movement may encourage undue use of this factor by the recipients. This may have the effect of preventing the achievement of equivalent technical rates of substitution on an area basis.

(5) Consumer Preference

Maximum welfare implies that products will be produced according to effective consumer preferences. In other words, the marginal rate of substitution between two products by a person (or the persons) consuming both must be the same as the marginal rate of transformation between them. Achievement of such a condition is not impaired by the subsidy but a different distribution of goods will occur and this will affect consumers individually and collectively. A reduction in the cost of production of some products and not others as will occur under the subsidy will encourage increased output of those products whose

costs have been reduced relative to other products. The increased output will bring about a change in the relative prices of products and subsequently affect production allocation. This suggests that the subsidy impedes attainment of the necessary condition for maximum welfare insofar as direction of production is concerned.

(6) Allocation of Time

Maximum welfare requires that the reward that is paid the owner of a unit of a factor must be equal in value to the marginal physical product achieved by employment of that factor. With respect to time, this implies that a holder will so distribute his time that he will achieve the greatest return, whether from using it to produce a product himself or leasing the time to some other producer. The subsidy will tend to bring a change in the allocation of time since some producers will be encouraged in production while others will be discouraged. The inefficiency resulting will, of course, be limited by the proximity of foregone alternatives.

(7) Welfare Between Periods

Consideration of this aspect of welfare merely entails an extension of the above discussion to cover inter-period in contrast to intra-period distributions of time. This means control of resources over time will be such that these resources will be distributed according to the returns obtainable by their use. Such a distribution is achieved by means of the interest rate in our society. The subsidy

appears to have only a very distant connection with interest rates. However, since time is involved and the necessary funds for payment of the subsidy have been obtained by annual parliamentary appropriations, a procedure accompanied by a degree of risk, inefficiency is encouraged. The probability aspect will be reflected in the investment of funds over time. Consequently, the use of resources, while being inefficient, is rendered even more inefficient by this aspect of the subsidy. Obviously the welfare of any individual in physical terms is affected by a change in the welfare of anyone else since their relative positions will be changed. Since any assistance or impediment applied affects the welfare of individuals, Reder goes on to say:

> ". . . an economic reorganization will increase, decrease or have welfare unaffected according to whether the algebraic sum of the compensating taxes and bounties (levied on all affected persons) is positive, negative or zero."[33]

This has been called the "compensation principle".

Extension of Welfare Criteria

Reder fails to consider the influence of spatial considerations upon welfare. Many other economists do likewise.[34] Such an omission

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[33] Reder, op. cit., p. 17.

[34] A discussion of this aspect occurs in W. Isard, Location and Space-Economy. Cambridge: M.I.T. Press, 1962, pp. 24-27.

imparts a lack of realism to their analysis since the implicit assumption is made that our environment is without dimensions. The marginal conditions outlined for firms can be extended to areas such that optimum degrees of specialization, factor-product relationships, and allocation of factors occur. In such a context the detrimental effects of the subsidy upon welfare become apparent. Factors are not employed in accordance with the best interests of all parties. In fact, the subsidy is designed to prevent such employment occurring. Consequently, the subsidy has to be justified on other than economic grounds.

No attempt is made when imposing the subsidy to maximize the national welfare. Compensation is not paid to those adversely affected by those benefitting. In fact, on a theoretical basis, over all welfare is impaired since a new distribution of production is fostered, which is not in accord with comparative advantage.

The Subsidy and the Theory of International Trade

The feed freight subsidy may be considered a tariff in reverse, a subsidy payment replacing the imposition of a levy against imports. There is a distinction, however, since the subsidy applies only to movement between certain areas within one country, Canada, and not between countries. This has important implications for welfare. While an individual producer may be expected to aim at maximizing his profits, the Federal Government should not aim at maximizing its revenue or in this case, minizing its costs but at maximizing the

welfare of the country as a whole.[35] In this study, moreover, concern does not encompass all possible welfare distributions on an area basis, but rather the change in the distribution which occurred as a result of the subsidy. The welfare of the country as a whole will only be increased if those areas or groups benefitting from the subsidy can fully compensate those adversely affected and still be better off than without it.

Trade between areas arises from differences in technology, factor endowments and tastes in relation to these endowments with the latter often being influenced by trade itself. Maximum welfare may be attained when production is distributed according to the principle of comparative advantage. The benefits associated with free trade on a global basis have been adequately developed elsewhere and need not be discussed here.[36] Actions which jeopardize or prevent the free movement of goods should therefore be approached with caution. Similarly, the same sort of caution should apply to the imposition of subsidies. A factor of production may gain from a subsidy but only at the expense of other factors. Kindleberger contends that unless redistribution of gains is required for welfare reasons (and is otherwise unobtainable), a subsidy

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[35] Scitovsky expands on this point in his article "A Reconsideration of the Theory of Tariffs" reprinted in H. S. Ellis and L. A. Metzler, Readings in the Theory of International Trade. Homewood: R. D. Irwin Inc., 1963, pp. 358-389.

[36] An excellent treatise on International Trade Theory is that of C. P. Kindleberger, International Economics. Homewood: R. D. Irwin, Inc., 1963.

argument valid for one region is invalid for the country.[37]

The effects of the subsidy as examined in the context of trade theory for the purpose of this study can be separated into four general areas.

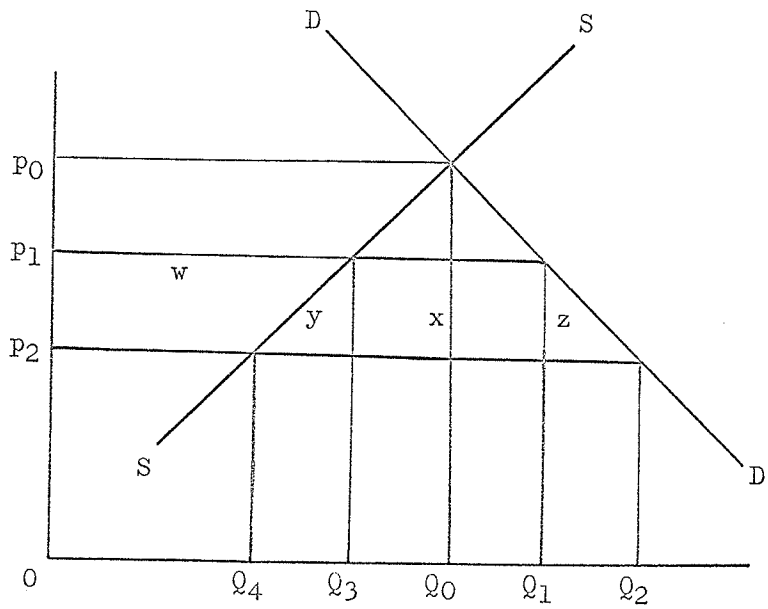

FIGURE 1. ALLOCATION OF EFFECTS OF SUBSIDY

Figure 1 illustrates this division of the effects of the subsidy into sacrifice, consumption, cost, and redistribution categories. It is assumed that the subsidy will have no effect upon the asking price for western feed grain or in other words, the supply function for this grain is perfectly elastic. The price p_0 would prevail for feed if there were no movement of feed into the area. The price p_1 prevails when local feed supplies are allowed to be supplemented by an inflow

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[37] Ibid., p. 217.

of prairie grains. Total consumption of grain in the area is increased by Q_oQ_1, local production is reduced by Q_oQ_3 and shipments of prairie grain into the area are equal to Q_1Q_3. Suppose a subsidy is now imposed on the movement of prairie grain equal to p_1p_2. The total quantity of grain consumed equals OQ_2, an increase of Q_1Q_2, which is the consumption effect. This is composed of an increase in inward movement of $(Q_2Q_4 - Q_1Q_3)$ while local production becomes OQ_4, a reduction of Q_3Q_4, the sacrifice effect, as a result of the subsidy. The area $(P_1P_2 \cdot Q_2Q_4)$ is the expenditure by the government, representing the product of the level of the subsidy P_1P_2 and the total movement Q_2Q_4, the cost effect. The government is placed in the position of paying the subsidy on the increase in volume resulting therefrom as well as on the initial movement. The redistribution effect is equal to the difference between the reduction of economic rent to local producers $(P_1P_2 \cdot Q_3)$ minus the area "y". The prairie feed grain producers will not receive any benefit as long as the assumption of a perfectly elastic supply curve applies. The total cost is, therefore, equal to the cost to the government plus the losses through the redistribution experienced by local grain producers. If the assumption of perfect elasticity in prairie supply is relaxed, the losses of local producers will be offset by gains by those located on the prairies, the distribution of losses and gains being dependent upon the relative elasticity of supply and demand.

The above discussion provides theoretical explanation of the incidence of the subsidy upon local (those in areas where the subsidy

applies) feed grain producers and those on the prairies. It should be noted that only one side of the situation is described, that involving grain producers. On the other hand, an analogous situation exists for livestock raisers since feed grain is a primary input to this process. The effects of the subsidy will be less direct since grain is only one of several inputs. This tends to make the effects obscure. Livestock producers in the subsidy provinces become the beneficiaries while those on the prairies become the losers, the opposite to the situation which prevails for feed grain. The net gain from such a distribution will serve to offset the cost to the government. It can be safely assumed that the supply of eastern livestock is relatively less elastic than the supply of western grain since the export market is less important proportionately. This will tend to make the gains to livestock producers in subsidy provinces greater than the gains to grain producers on the prairies. An empirical assessment of the effects of the subsidy, therefore, requires determination of the elasticity of demand and supply of the affected products.

The Subsidy and Location Theory

Location theory has been largely ignored by economists until recent years. The tendency was for spaceless theories to be formulated, abstractions from the real world. Contributions were made, however, by such individuals as von Thünen, Weber, and Losch. The pathbreaking efforts of these individuals were not fully recognized until comparatively recent times. Rapid development of the theory has occurred in

the post-World War II period, partially stimulated by efforts during the war to obtain optimum use of available transportation equipment. The development of the theory has been accompanied by increasingly complex models, the practical application of which has been rendered feasible by the progressive development of the electronic computer. Unfortunately, the elegance of some of these models has served to obscure the underlying theory.

Location theory assumes that a firm will strive to maximize its profits. Such a firm will, therefore, manipulate the inputs available to it in such a fashion that the greatest net return will be achieved. Behaviour of this sort is economically rational though it is recognized that behaviour may also be rationalized on other grounds.[38] For example, some prairie farmers may not produce hogs since this would interfere with their social activities during certain periods of the year. Thus, hogs may be produced in areas where minimum costs do not prevail. Many other aberrations could be illustrated but these will not be considered here.

Optimum location is a function of assembly costs, production costs and distribution costs. Assembly costs are those expended for

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[38] It was found in a study in New England that a manufacturing firm located in Worcester when Boston was obviously a more suitable site. The reason given was that the owner's mother-in-law lived in the former city and his wife didn't want to leave her! See J. Friedman and W. Alonso, ed., Regional Development and Planning. Cambridge: M.I.T. Press, 1964, p. 79.

movement of raw material to the plant and similarly distribution costs are those incurred for movement of the finished product to market. Production costs, known as processing costs in location studies, are the summation of the expenditures on the various factors required to convert the raw material into the finished product. The influence of the subsidy on location immediately becomes apparent. Transportation cost of one of the raw materials is reduced, and it is therefore to be expected that optimum location of production will be different under the subsidy to that experienced without it. The theoretical implications of the subsidy for welfare and trade cast doubt upon its value as a policy. Location theory suggests a reorganization of production occurs. Elucidation of the theory will therefore provide a useful background to any objective appraisal that may be attempted.

Theoretical Development

Transportation costs are basic to any study of location. These costs are made up of two components, terminal costs and movement costs. The first component arises from loading and unloading, packaging for transport and the associated paper work. This cost is independent of distance. On the other hand, movement costs which arise from carrying the product to the destination do vary with distance. These may be expressed as a fixed rate per mile or as a rate which gradually decreases with increasing distance. The latter rate structure is more realistic since long hauls are more economic than short hauls for

practical reasons including the high cost of stop-start operations. Differentials in cost exist between products due to such features as size and shape, bulkiness, and perishability. The total cost of transport varies according to the product carried and the type of carrier. Low terminal costs and relatively high movement costs are associated with truck movement whereas the opposite situation prevails for movement by ship. Rail costs tend to be intermediate. Transportation rates actually established reflect the degree of competition present, policies of the carrier, and government interference in addition to the actual costs of movement. In consequence, anomalies exist but these while recognized, are not considered of such import as to invalidate the basic principles.

Figure 2 indicates the components of the cost of transportation. The cost of transportation per unit (usually expressed as rate per hundred pounds) from origin O to Location D is equal to the terminal cost t plus the movement cost mD associated with the distance between the two points. In this illustration, the total cost is increasing with distance but at a decreasing rate.

In the simplest case where a raw material is processed into a finished product without change in weight or other feature which affects transportation cost, it will be found that two equally attractive locations based on this cost exist given equal processing costs. This may be illustrated by the accompanying diagram, Figure 3.

The combined cost of movement of the raw material from the site

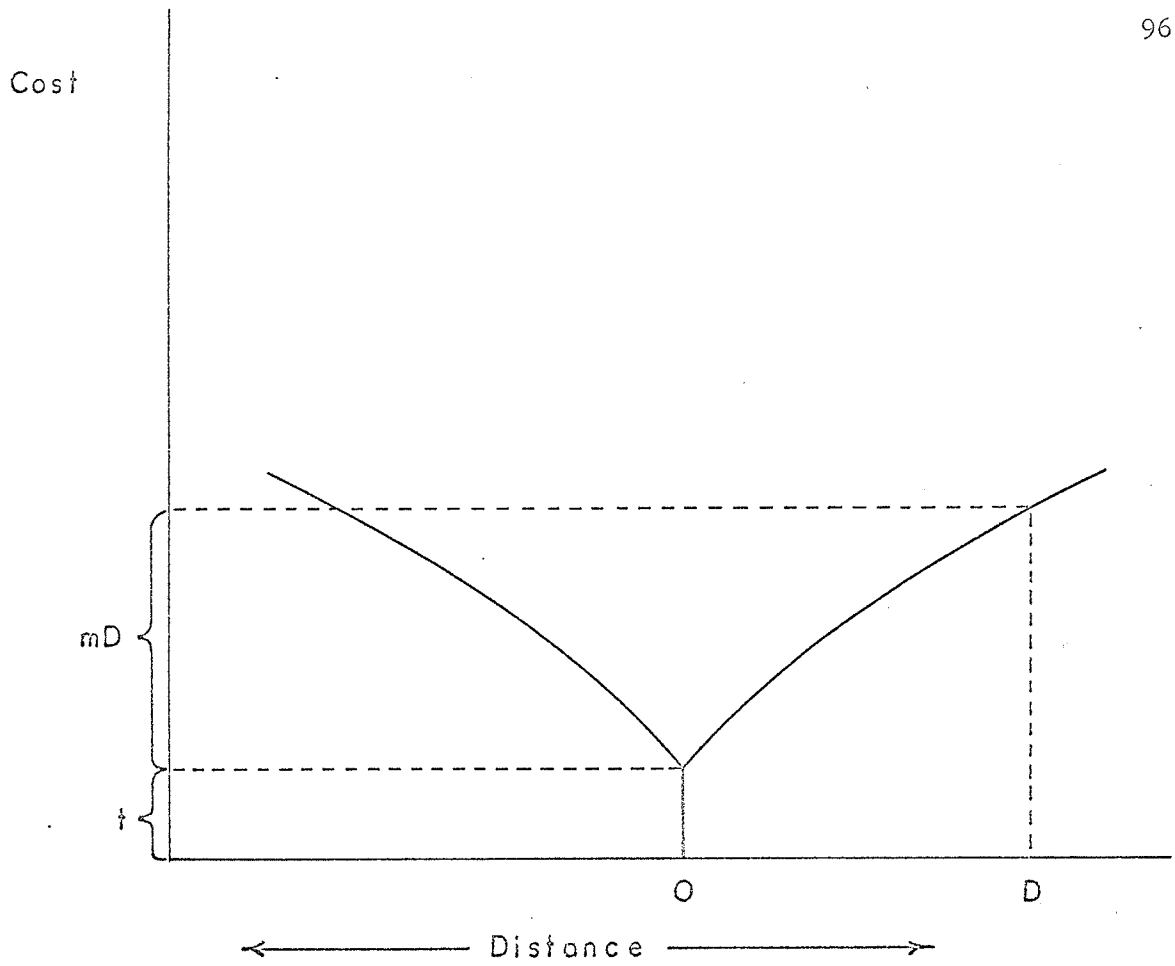

Figure 2: COMPONENTS OF TRANSPORTATION COST.

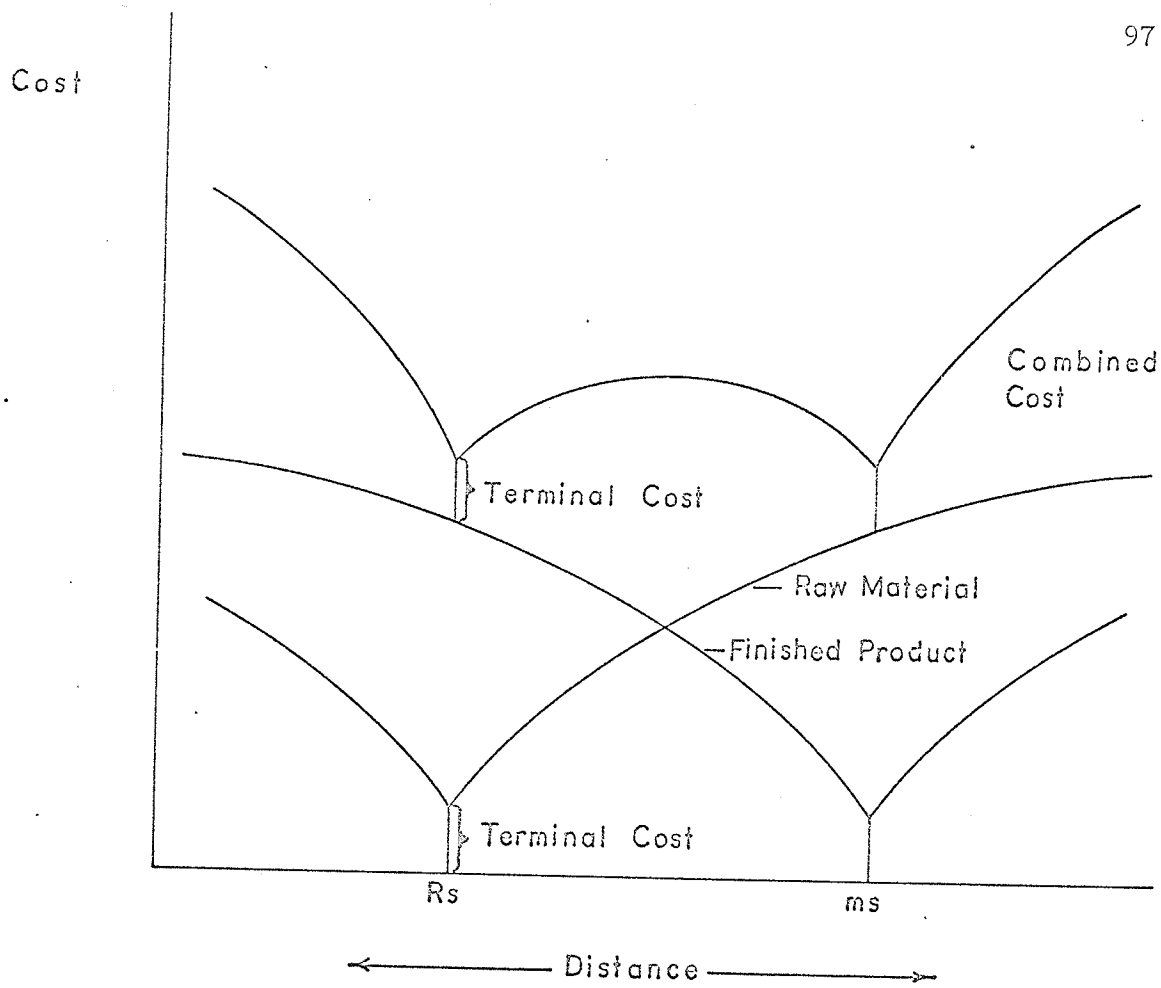

Figure 3: COMBINED COST OF MOVEMENT OF RAW MATERIAL AND FINISHED PRODUCT.

RS to the site MS plus the terminal cost associated with the finished product is found to be equivalent to the combined cost of movement of the finished product from RS to MS and the terminal cost of the raw material. Under these restrictive conditions, plant locations at sites between RS and MS involve greater transportation costs and should be avoided. The presence of terminal costs and curvilinearity in rates with distance fosters end-point locations of plants.

Relaxation of the 1:1 weight relationship between raw material and finished product will make one or the other end-point locations more attractive. If this ratio is changed to 7:1 as occurs in conversion of grain into beef, other things remaining the same, a raw material site will be attractive. If, however, the rate on the finished product increases proportionately more than the conversion rate, then a market site is attractive. Such a situation would occur if the rate for beef was greater than seven times that of grain, recognizing, of course, the presence of terminal costs. Furthermore, additional inputs may be required in processing and these may be either ubiquitous or available only at certain locations. Further complications may arise from differentials in processing costs between locations. The combinations are almost without limit and the underlying theory rapidly becomes concealed. Since many of these factors are variable and affect the determination of optimum location of livestock production, the complexity of the task becomes evident.

Transportation costs can be illustrated on a plane surface as is

done in the accompanying diagram, Figure 4. In this figure, the funnel shaped diagram of transportation cost is converted to a series of concentric circles (circles in this case since transportation costs are considered equivalent in all directions). Such a procedure is useful in illustrating how optimal sites may be chosen.

Determination of location can be illustrated using the isotim-isodaplane technique as in the following example illustrated by Figure 5. Assume that a process requires three tons of one raw material located at site A, two tons of another raw material at site B to produce one ton of the finished product for a market at C. Transportation costs are equivalent in all directions. Terminal costs are ignored to simplify the presentation.

Transportation costs are four dollars per ton per hundred miles for movement of the raw materials A and B, and six dollars per ton per hundred miles for the finished product (movement costs are considered linear with distance).

A sequence of steps may be taken to select the optimum location for the plant site. First, a series of rings around A indicating the transportation cost of the amount of the raw material at that site required for one ton of the finished product over varying distances is constructed. The same procedure is adopted for B for cost of movement of the amount of raw material required that is located at that site. At C, the finished product is involved rather than the raw materials. The rings or curves constructed are given the name isotims. The total

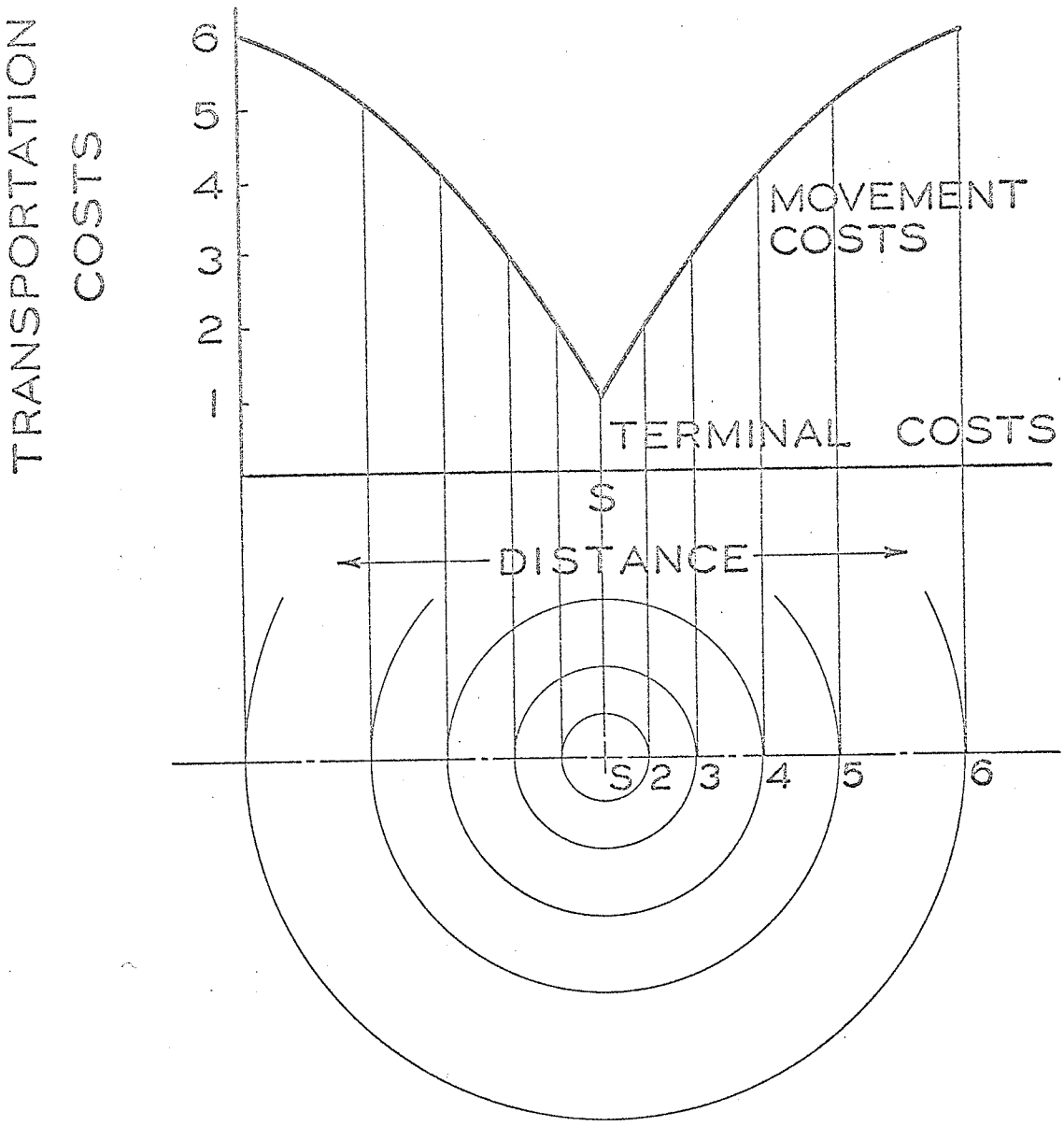

Figure 4: PLANE SURFACE ILLUSTRATION OF TRANSPORTATION COSTS.

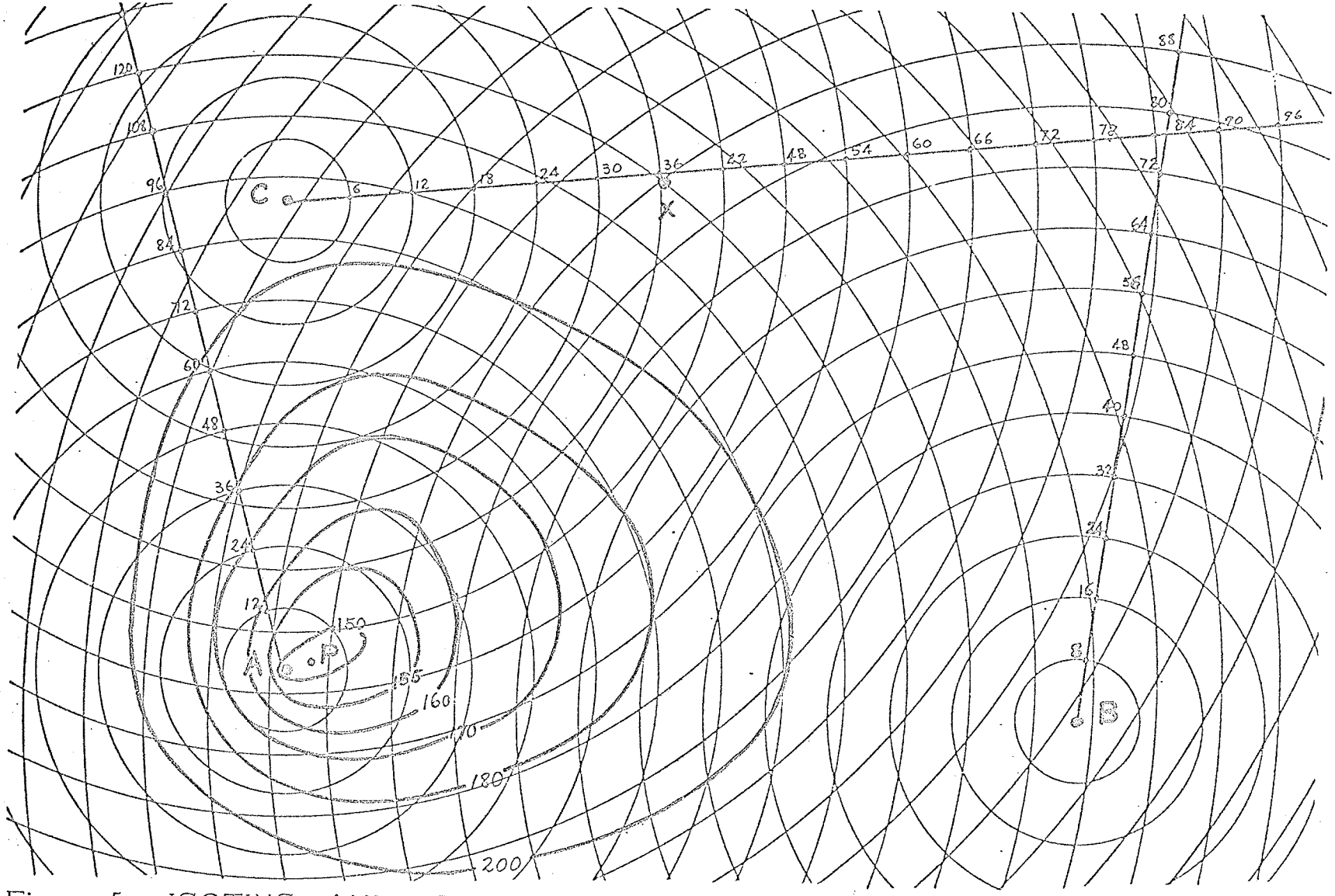

Figure 5: ISOTIMS AND ISODAPLANES.

transportation costs at the inter-section points of the isotims are then calculated by summing the indicated costs from each site. For example, at point X the total transportation cost is 36 + 120 + 80 = 236. Points having equal transportation costs are joined and the connecting lines are called isodaplanes. The criterion for optimum location is minimum transportation cost (processing costs being assumed equal at all locations). The plant should, therefore, be located in the vicinity of point P. If processing costs were not independent of location, the analysis would be extended so that these costs were summed with those of transportation. Plants or industries having minimum cost locations in proximity to raw material sites are said to be supply oriented whereas if such locations are near to consumption centres, they are said to be market oriented. On the other hand, if the cost differential between alternative locations is small, such plants or industries are termed footloose.

The analysis could be further developed to encompass limited supplies of several raw materials located at different sites with many points having varying levels of consumption. These extensions cause the problem to be analogous to that of trade between regions. Each region has its own production (transportation plus processing) costs which give rise to the local supply curves while on the other hand, each region has its own demand curve. At equilibrium, product will flow from the low price market to the high priced market with the differential in price between the markets equal to the transportation cost between them.

This situation may be shown by a "back-to-back" diagram such as appears in Figure 6. Excess supply curves are used to determine the equilibrium price with trade. Quantity moved from the low priced market 1 to the high priced market is CD, AB = CD. Where the difference in price between the markets is less than the transportation cost there will of course be no flow of product between them.

Samuelson[39] has defined the gains from interregional movement as the "net social pay-off" which he defines as the sum of the social pay-off in the regions minus the transportation cost. The logic becomes more evident when examined in relation to the "back-to-back" diagram of Figure 6, the excess supply curves of which appear without change in Figure 7. Social pay-off is defined as the area under the excess demand curve which is the same as that under the excess supply curve, but opposite in sign. Since the situation in Region 2 has been rotated on the price axis by the 180 degrees, the social pay-off in that region becomes positive. It will be recalled that consumption increased in that region in response to the lower price as result of the additional supplies obtained elsewhere, clarifying the logic. The <u>total</u> social pay-off becomes equal to the area under the excess supply curve of region 2 minus that of region 1. This is the area OAC in the diagram which is equivalent to the area DEF. If a transportation cost of t is

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[39] P. A. Samuelson, "Spatial Price Equilibrium and Linear Programming", <u>The American Economic Review</u>, Vol. 42, No. 3, June 1952, pp. 283-303.

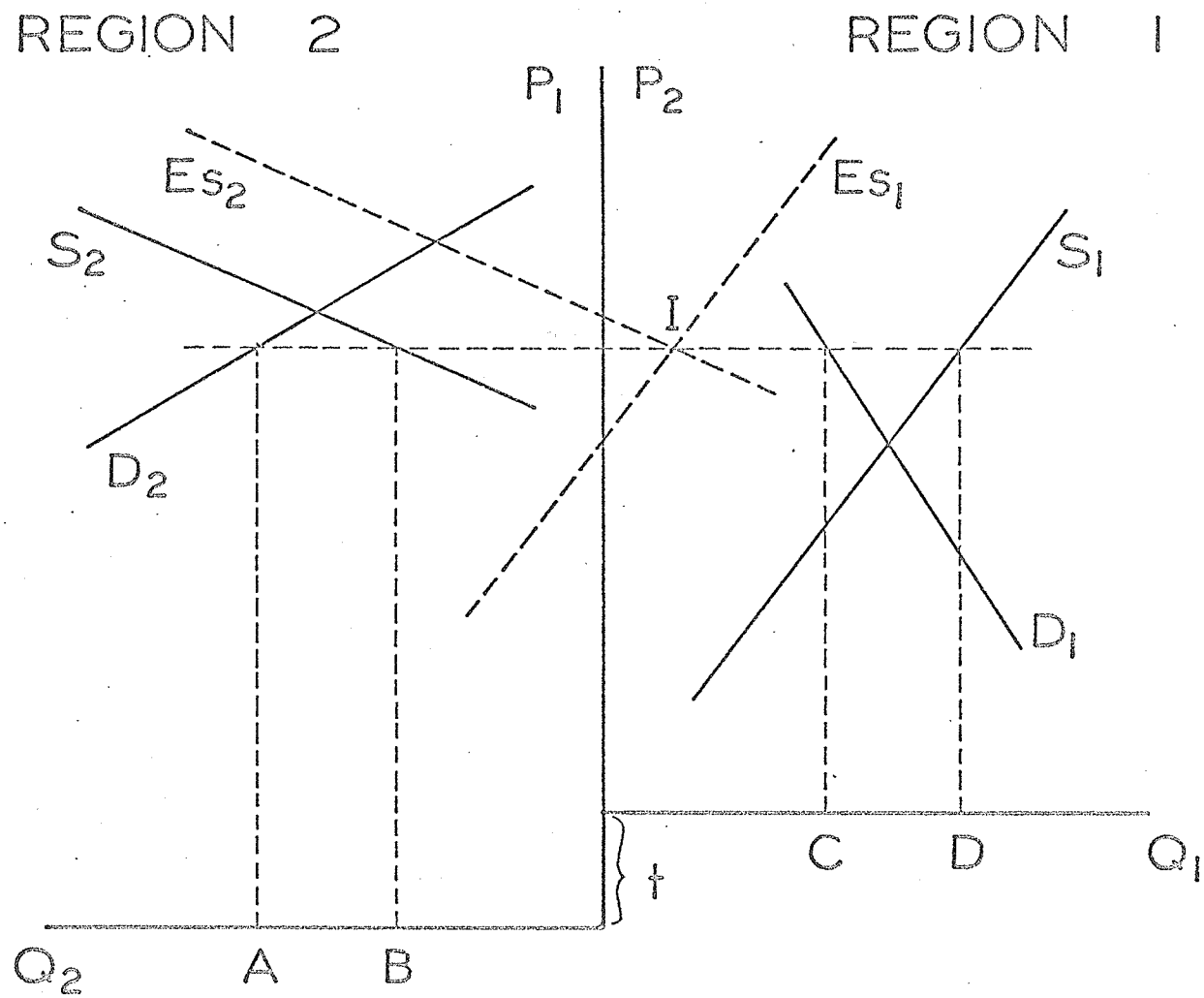

Figure 6: MOVEMENT BETWEEN MARKETS.

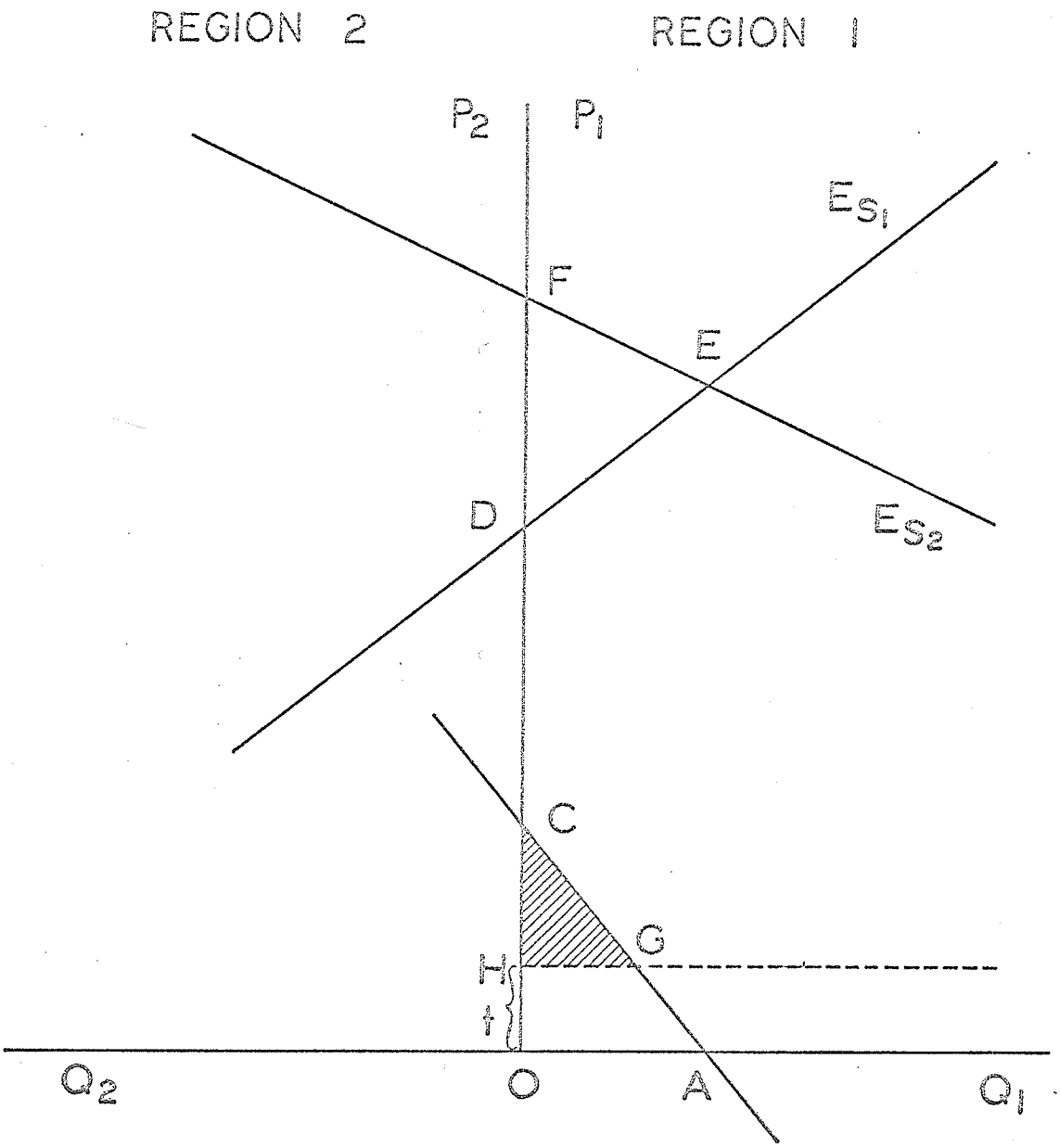

Figure 7: NET SOCIAL PAY – OFF.

introduced, this can be illustrated by shifting the Q axis in Region 1 upward by this amount, an analogous procedure to that used in Figure 6, leaving a net social pay-off of HGC. The optimum movement of product between regions is that which maximizes this area.

Spatial equilibrium problems, therefore, have two stages, one stage determining the optimum plant locations and the other the optimum flows to market outlets. Solutions to such problems, as suggested by Samuelson, may be obtained by the linear programming technique where the objective of minimizing cost or maximizing profit as may be appropriate is used. A large number of such studies have been completed with varying degrees of complexity.[40]

The theoretical development of such models has been described by several writers only a few of which will be mentioned here. Lefeber attempts, in his development of the theory of spatial competition, to provide a "norm" against which the efficiency of actual markets can be judged. By comparison with this "norm" deviations can be measured. In outlining the framework for his study he says:

> "The setting of the entire analysis is a purely competitive one in the sense that no individual firm or owner of resources can affect the market in which he is dealing. This does not imply, of course, that Chamberlin's arguments concerning

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[40] One such study of relevance to the current analysis is that conducted by Schrader and described in his thesis: L. F. Schrader, A Spatial Equilibrium Analysis of Cattle Feeding in the United States, unpublished Ph. D. dissertation, University of California, Berkeley, 1961.
The author is also indebted to Prof. O. Tangri for his stimulating course, Ag. Econ. 711 Marketing Organization, which provided several of the ideas incorporated into the analysis.

> the inherently monopolistic features of spatial organization are being disputed. On the contrary, the reason for assuming a purely competitive system is to provide a theory of optimal spatial allocation of factors and distribution of final goods. If such a theory can be developed, the extent and significance of monopolistic deviation can be appraised, and planning for corrective measures becomes possible."[41]

He then proceeds to develop a theory for spatial allocation of factors of production, spatial equilibrium of production and distribution and finally for a combination of the two which he calls the choice of industrial location. Stevens[42] develops a mathematical model, an adaptation of linear programming, for the solution of interregional problems. Isard[43] extends Stevens model to cover the general case, the aim of which is to provide the ultimate framework from which specific interregional linear programs can be derived that apply to regional problems.

The general models developed are steps along the road to a general equilibrium. However, in studies in the real world, simplifying assumptions have to be made resulting in an analysis within a partial equilibrium framework. Such studies under these limitations sometimes

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[41] L. Lefeber, Allocation in Space. Amsterdam: North-Holland Publishing Company, 1958, p. 11.

[42] B. H. Stevens, "An Interregional Linear Programming Model", Journal of Regional Science, Vol. No. 1, 1958, pp. 60-98.

[43] W. Isard, Methods of Regional Analysis. Cambridge: M.I.T. Press, 1960, pp. 413-492.

fail to yield the results expected. Wallace[44] questions the assumption that the difference between the existing situation in actual markets and that provided by spatial studies can be explained as "inefficiency". He contends that this residual may cover a multitude of sins of omission and commission within a particular model as well as the actual inefficiency that prevails. In this, he begs the question since the studies, given the existing state of the arts, can only be made in terms of a partial equilibrium. Extension toward the general model would no doubt yield improved results. Judgement must be made on whether the extra refinements will justify the additional cost and on this aspect he is silent.

Heady[45] takes a pragmatic approach toward interregional models. Aggregation of data arises from the necessity of finding practical approaches for solving problems. Aggregation is accompanied by two types of problems, conceptual and practical. The former are easily solved since supply, production, and demand relations can be thought of as existing right down to the individual farm level. Solutions to the latter type are more evasive. He contends that because research workers have finite lives and data become out of date, they are prevented from designing models and assembling data with the optimum degree of

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[44] R. A. King, ed., Interregional Competition Research Methods. Raleigh: Agricultural Policy Institute, 1963, pp. 11-17.

[45] Ibid., pp. 129-145.

detail. The proper procedure is to analyze the problem carefully, ascertain the resources available and, if these are sufficient for a meaningful study, to proceed. Heady suggests that only those outputs, inputs, or resources, respectively, should be aggregated that do not violate physical requirements. For example, roughage and concentrate supplies should not be aggregated if the object is to feed hogs. The large numbers of producing units in agriculture necessitate determination of the "average" farm as the production plant even though the limitations of such a procedure are obvious. For a study such as this, the "average" farm may be at variance with the farms which take advantage of the subsidy. On the other hand, an effective alternative is unavailable. Heady contends the errors involved in aggregation apply with equal, if not greater, force to regression as to linear programming models and fails to see how models of the latter type can be rejected on this basis.

Types of Models Used in This Study

From a perusal of the literature, two methods of approach appear to have merit in attempting to ascertain the effects of the feed subsidy. One involves a study of the demand and supply relationships concerning feed grain in Canada and the other an interregional competition study of the meat-livestock economy. A demand and supply analysis will not indicate the effects of the subsidy except in so far as to provide an approximation of its primary incidence. A study of this

type will therefore enable only a small reduction in the area of ignorance, and therefore minimal attention will be devoted to it. An interregional competition study using linear programming as a tool will allow an empirical determination of the effects of the subsidy. The complexity of the problem to be analyzed will require a considerable degree of aggregation due to limitations imposed on funds and time, but these should not prevent a rigorous and meaningful investigation. The latter approach is, therefore, emphasized in this study.

Hypotheses

The theory review is seminal to the development of the hypotheses. The subsidy appears as an interference with the normal functioning of the feed-livestock economy. It is hypothesized that this intereference has certain effects:

1. Subsidizing the transportation of feed grain between certain areas has increased the volume of movement of this raw material whereas that of more finished products has declined.

2. A new spatial equilibrium in livestock production, not in accord with comparative advantage, has developed.

3. The total cost incurred in satisfying the given consumer demand for animal products has increased.

Assumptions

Basic assumptions made in the study are:

1. Economic welfare can be maximized by obtaining the desired

product at minimum cost.

2. Producers are rational in that they seek to maximize their net returns.

3. Consumers do not differentiate between products from different regions.

4. Pure competition prevails in agriculture at the farm level.

CHAPTER IV

DEMAND AND SUPPLY ANALYSIS FOR FEED GRAIN UNDER SUBSIDY

It will be recalled that demand and supply analysis was suggested as one of the avenues which could be followed to reduce the area of ignorance regarding the effects of the subsidy. Such an analysis may serve to establish the relative shares of the subsidy payment which accrue to the buyers and sellers, respectively, of feed grain. On the other hand, the secondary effects are more difficult to quantify. Since the purpose of this study is to ascertain the effects of the subsidy upon the location of production and demand and supply analysis appears to be a circuitous route to attain this goal, such an analysis in depth does not appear justified. On the other hand, the relative distribution of benefits between provinces is of considerable interest since it will tend to indicate the direction of locational shifts.

A Theoretical Model of the Demand and Supply of Feed Grain

The following diagram, Figure 8, is presented to clarify the demand and supply position of feed grain. The demand for feed grain will be a function of its price in addition to several other factors. Feeders will be prepared to buy feed only if the price is sufficiently low to enable profitable operations. The hypothetical demand curve is therefore drawn as a straight line. The supply of feed grain while also a function of its price among other factors arises from three

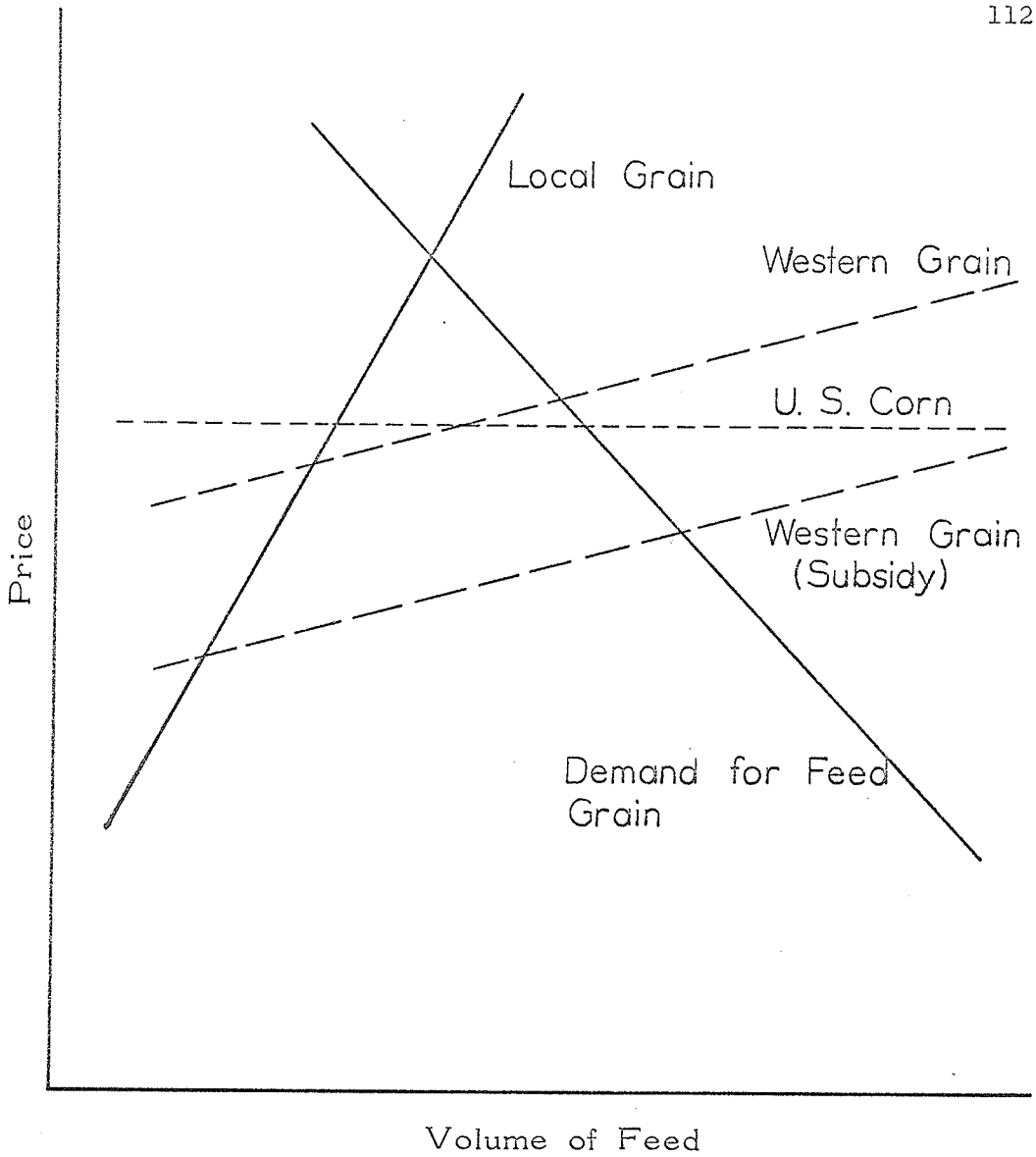

Figure 8: HYPOTHETICAL DEMAND CURVE AND SUPPLY CURVES FOR FEED GRAIN.

different sources. These are home production in the purchasing area, grain from the prairie provinces, and American corn. Opportunities for home production in the purchasing areas are restricted rendering supply from this source relatively inelastic. The supply of feed grain from the prairies is more elastic due to the alternatives which are available in production and also the presence of additional market outlets. The supply of American corn can be considered very elastic since the Canadian market for this grain is of insignificant volume in comparison to total production. If a subsidy is applied to the movement of prairie feed grain the effect will be to shift downward on the price axis the supply curve for this grain.

If the various supply curves are summed, the aggregate curve is found to be curvilinear in nature as illustrated in Figure 9. A subsidy on the movement of prairie grain has the effect of increasing the quantity that will be supplied at a given price to the purchasing areas. The total payment which will be made under such a subsidy is equivalent to the area of the parallelogram a b g f. On the other hand, the reduction in cost accruing to feed buyers in equal to the area a b c d e. Through demand and supply analysis an estimate may be obtained of the distribution of benefits from this payment between buyers and sellers of the grain. Determination of the elasticities of demand and supply, respectively, are required before such an estimate can be made. A transportation subsidy appears as a reduction in the marketing margin and the distribution of any change in the margin is determined by the relative slopes of the

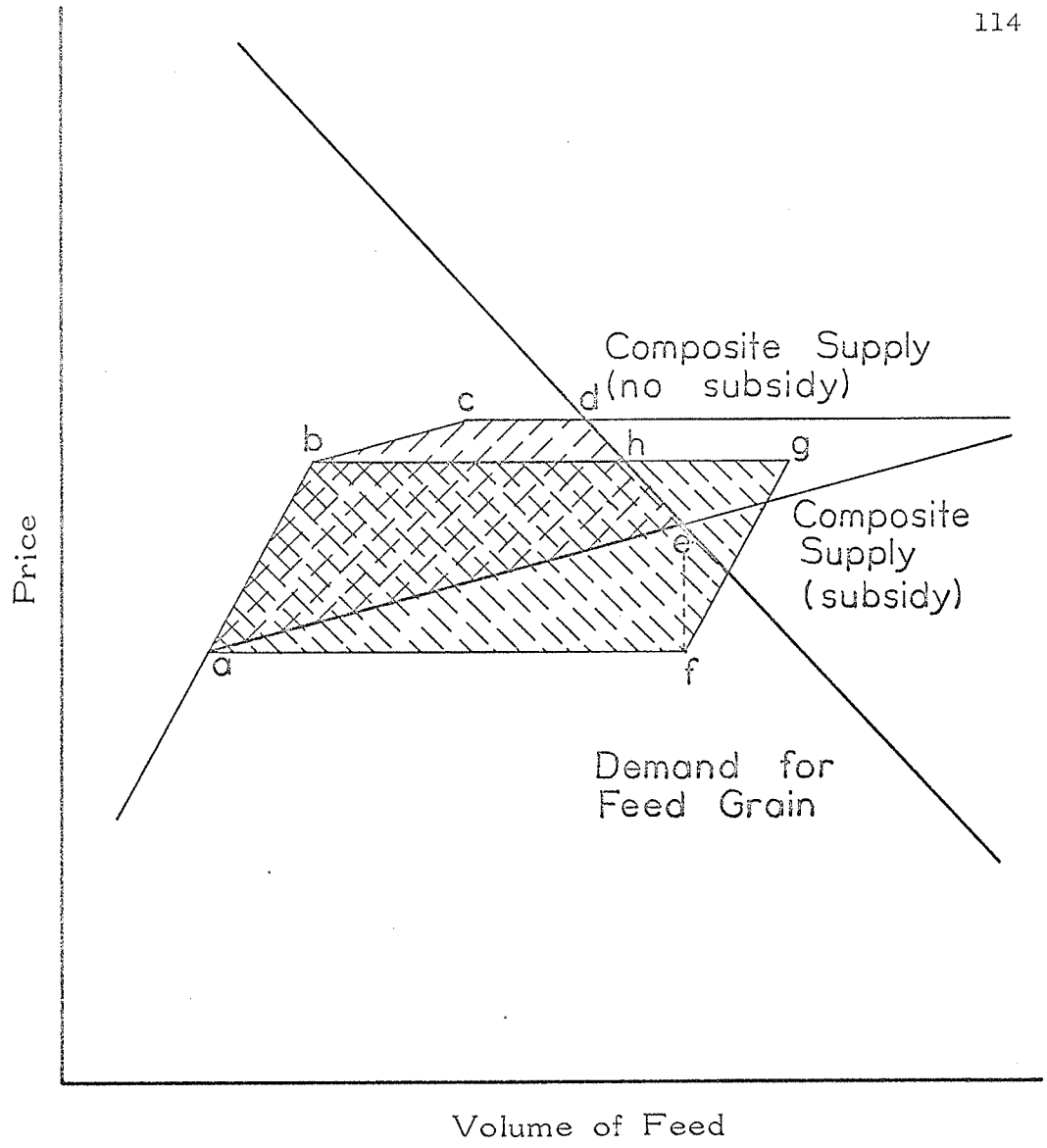

Figure 9: HYPOTHETICAL DEMAND CURVE AND COMPOSITE SUPPLY CURVES FOR FEED GRAIN.

demand and supply curves.[46]

Cobb-Douglas type functions were considered appropriate to use in the analysis of demand and supply. Such functions enabled direct estimates to be made of the elasticities, the power coefficients representing such elasticities as illustrated below, where

$$Q = f(X_1, X_2, X_3 --- X_n)$$

$$Q = a\ X_1^{b1}\ X_2^{b2} - - - X_n^{bn}$$

$$\frac{\partial X_1}{\partial Q} = a\ b_1\ X_1^{b1-1}$$

where X_1 may be considered to represent price

$$\text{Elasticity of price} = \frac{\partial X_1}{\partial Q} \cdot \frac{X}{Q}$$

$$\therefore \text{Elasticity} = \frac{a(b_1 X_1^{b1-1} - - - - \cdot X_n^{bn}) \cdot X_1}{Q}$$

$$\text{since } Q = a\ X_1^{b1}\ X_2^{b2} - - - X_n^{bn}$$

$$\text{Elasticity becomes} \quad \frac{a\ b_1 X_1^{b1} - - - - X_n^{bn}}{a\ X_1^{b1} - - - - - X_n^{bn}} = b_1$$

Other researchers have found that such functions allow useful approximations of demand and supply elasticities, which are static at all price-quantity relationships, to be made.

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[46] W. C. Waite and H. C. Trelogan, Agricultural Market Prices. New York: John Wiley and Sons, 1951, p. 209.

The time period used in the analysis was 1941-63, with the annual observations recorded on the basis of crop years. The analysis was conducted on both a provincial and aggregate basis since the subsidy was not considered to have equal impact upon all areas.

Demand for Feed Under Subsidy

The demand for feed under subsidy is considered to be a function of the hog-barley ratio, the number of grain consuming animal units, the price of barley, the volume of locally grown feed, the price of corn in Ontario and the ratio of indexes for livestock and grain prices. In the selection of these variables the criteria used were their importance from a logical standpoint and the availability of the data.

The hog-barley ratio provides an indication of the profitability of hog production and therefore may be considered an appropriate independent variable. This ratio is quoted in available data on the basis of Winnipeg and while the ratio will vary between areas, the ratio prevailing at that city may be considered typical.

The numbers of grain consuming animal units in the feed purchasing area provide an indication of the potential consumption of feed. Data are available on numbers of animals by province. These statistics were converted to grain consuming animal units using the factors provided in the Quarterly Bulletin of 1.0 for milk cows, .51 for other cattle, 1.14 for horses, .187 for hogs, .04 for sheep and .045 for poultry.

The price of barley may be considered representative of the cost of purchased feed. The quotation for No. 1 Feed barley at the Lakehead was used and this price was deflated by the wholesale index to obtain inter-year comparability. It is recognized that actual prices paid for feed grains will vary by type and location and only lack of suitable additional data justifies the use of this more general price quotation.

It is hypothesized that the demand for feed from outside sources will be affected by the volume of locally grown feed. The volume of feed produced within the area is subject to considerable variation due to changes in the acreages sown to the respective grains and in the yield which is affected by many uncontrollable factors. The volumes of the respective feed were expressed in terms of therms of digestible energy. This procedure enabled the volumes of the various feeds produced to be expressed as an aggregate.

The price of corn, a feed substitute for prairie grains, has an important bearing on the volume of these grains which are purchased by feeders outside the area. The price of No. 2 yellow corn f.o.b. Chatham, Ontario was used in the analysis. The quoted prices were deflated by the wholesale index to provide between year comparability. It could be argued that the price of American corn would provide a more useful measure. However, in view of the increasing volume of production of corn in Ontario and the close relationship existing between the

prices of corn from these two sources such a quotation appears representative.

The ratio of indexes of livestock and grain prices provides a useful measure of the relative profitability of livestock operations. In periods of high prices for livestock relative to grain, livestock production will tend to increase, thereby increasing the consumption of feed. Indexes are available for feed prices and livestock and animal product prices. These indexes were converted where necessary so that the data were consistently expressed in terms of a 1935-39 base. A composite index was then calculated as an expression of the ratio between the feed and the animal product indexes.

Finally, the consumption of feed under subsidy was expressed in terms of therms of digestible energy. By so doing, a quantitative measure was obtained which provided an indication of the aggregate disappearance in terms of nutrient value of feed moved under the subsidy.

Demand functions were derived using least squares procedure for the subsidy provinces in aggregate and for each in particular. The respective equations are listed below, standard errors of the regression coefficients appearing in brackets, where

X_1 = Hog-barley ratio at Winnipeg

X_2 = Grain consuming animal units in area expressed in 10^3 units

X_3 = Price of No. 1 Feed barley at the Lakehead, deflated by the Wholesale index

X_4 = Volume of locally grown feed expressed in 10^6 therms of digestible energy

X_5 = Price of No. 2 Yellow corn in Ontario, deflated by the wholesale index

X_6 = Ratio of indexes of feed and livestock prices

X_7 = Demand for feed under subsidy in terms of 10^6 therms of digestible energy

Subsidy Provinces in Aggregate

$$X_7 = 4.486777\ X_1^{\underset{(.532558)}{-.428975}}\ X_2^{\underset{(1.546392)}{1.550383}}\ X_3^{\underset{(.746676)}{-.591150}}\ X_4^{\underset{(1.331790)}{-1.315551}}\ X_5^{\underset{(.385888)}{.475045}}\ X_6^{\underset{(.711143)}{-.672334}}$$

R = .469590

Prince Edward Island

$$X_7 = 2.255897\ X_1^{\underset{(.634325)}{-1.316748}}\ X_2^{\underset{(1.459300)}{2.324973}}\ X_3^{\underset{(.814603)}{-.549669}}\ X_4^{\underset{(.617059)}{-1.280759}}\ X_5^{\underset{(.754648)}{.303020}}\ X_6^{\underset{(.862287)}{.694493}}$$

R = .713339

Nova Scotia

$$X_7 = -.195561\ X_1^{\underset{(.451442)}{-.251712}}\ X_2^{\underset{(1.213871)}{1.351899}}\ X_3^{\underset{(.641105)}{-.020059}}\ X_4^{\underset{(.445710)}{-.069107}}\ X_5^{\underset{(.488364)}{-.014013}}\ X_6^{\underset{(.583157)}{.668256}}$$

R = .421814

New Brunswick

$$X_7 = 1.038726\ X_1^{-.704353}\ (.477827)\ X_2^{1.996399}\ (.909434)\ X_3^{-.290055}\ (.682838)\ X_4^{-.788204}\ (.642629)$$

$$X_5^{-.070993}\ (.637175)\ X_6^{.551225}\ (.691676)$$

R = .701233

Quebec

$$X_7 = -3.005380\ X_1^{-.155523}\ (.434090)\ X_2^{1.043358}\ (1.603195)\ X_3^{.128157}\ (.398147)\ X_4^{.707778}\ (.817054)$$

$$X_5^{-.170743}\ (.120761)\ X_6^{.243969}\ (.488654)$$

R = .508193

Ontario

$$X_7 = 27.029047\ X_1^{-.849238}\ (.714182)\ X_2^{1.198751}\ (2.006302)\ X_3^{-1.111725}\ (.784938)\ X_4^{-6.021931}\ (1.683731)$$

$$X_5^{-.223316}\ (.238524)\ X_6^{1.635889}\ (1.171474)$$

R = .700802

British Columbia

$$X_7 = 6.983002\ X_1^{-.350427}\ (.500964)\ X_2^{.377555}\ (.899870)\ X_3^{.064893}\ (.600613)\ X_4^{-1.366564}\ (1.347718)$$

$$X_5^{-.244437}\ (.183335)\ X_6^{.862382}\ (.710554)$$

R = .442812

The demand equations derived leave something to be desired. Variations in the independent variables accounted for only approximately

twenty-one per cent of the variations in consumption of subsidy feed for the provinces in aggregate. On an individual province basis the results are somewhat improved except in the case of Nova Scotia. The variations in the independent variables accounted for about seventeen per cent of the total variation in consumption for the latter province. On the other hand, variation in the independent variables accounted for about fifty per cent of the total variation in consumption in Prince Edward Island, New Brunswick and Ontario. In many instances the regression coefficients were not significantly different from zero. Cursory analysis revealed that autocorrelation was not significant. There was also little evidence of appreciable multicolinearity. A considerable degree of risk would be inherent in using the equations as estimators of the consumption of feed under subsidy. However, it was felt that the regression coefficients for the price of barley in the respective areas (price elasticity) would provide a basis for the ordering of benefits.

Supply of Feed Under Subsidy

A similar procedure to that used for demand was followed in analyzing the supply of feed under subsidy. The hog-barley ratio, the number of grain consuming animal units in the area, the price of No. 1 Feed barley in the year (t-1), the carryover of wheat on farms in the year (t-1), barley yield in bushels per acre and the ratio of livestock and grain prices were taken as independent variables. The hog-barley ratio, the number of animals and the ratio of price indexes have been

discussed as demand determiners though the data apply to supply areas where appropriate in this case. It is to be expected that these variables will have an inverse effect upon supply as compared to demand. The supply of feed under subsidy is also expressed in terms of therms of digestible energy. The relevance of the other variables is worthy of examination.

Prairie farmers are considered to be influenced by the price of barley in the previous crop year when making their production plans. A profitable barley enterprise is thought to increase the acreage sown to this grain and therefore the supply available for movement under subsidy. The case of barley may be considered representative of the situation regarding other feed grains. In the analysis the prices recorded were deflated by the wholesale index to provide comparability between years.

The size of carryover of wheat on farms tends to influence the decisions to plant. When large carryovers exist at the end of the previous crop year, it is hypothesized that the acreage sown to wheat will decline and that sown to other feed grains will increase. Such a substitution will not be consistent between areas due to the influence of physical factors upon production.

Yields of grain in the current crop year obviously affect the supply of feed. Barley is taken as a representative crop since it is one of the dominant feeds fed. Yield is expressed in bushels per acre which of course could be coded in terms of therms per acre, though

this is unnecessary in this case.

The supply equations derived for feed grains originating on the prairies and moved under subsidy follow while the standard errors of the regression coefficients bracketed appear below.

X_1 = Hog-barley ratio at Winnipeg

X_2 = Grain consuming animal units in the area expressed in terms of 10^3

X_3 = Price of No. 1 Feed barley at the Lakehead in the year (t-1) deflated by the wholesale index

X_4 = Wheat carryover on farms in the year (t-1) in thousands of bushels

X_5 = Barley yield in bushels per acre

X_6 = Ratio of indexes of feed and livestock prices

X_7 = Supply of feed grain under subsidy in 10^6 therms of digestible energy

Prairies in Aggregate

$$X_7 = 2.148007\, X_1^{-.111614}\ (.379303)\ X_2^{.537679}\ (.442625)\ X_3^{.617625}\ (.456286)\ X_4^{.075341}\ (.064022)$$

$$X_5^{-.253655}\ (.379557)\ X_6^{-.014135}\ (.957711$$

R = .442506

Manitoba

$$X_7 = .815139\, X_1^{.545871}\ (.545153)\ X_2^{.495848}\ (.849612)\ X_3^{1.366809}\ (.608350)\ X_4^{.045856}\ (.107793)$$

$$X_5^{.527748}\ (.484538)\ X_6^{-2.984141}\ (1.326212)$$

R = .767403

Saskatchewan

$$X_7 = -.180981\ X_1^{-.224150}\ (.476587)\ X_2^{.863872}\ (.401664)\ X_3^{.945223}\ (.523877)\ X_4^{.208331}\ (.067212)$$

$$X_5^{.307038}\ (.268270)\ X_6^{-.725113}\ (1.091915)$$

$R = .700993$

Alberta

$$X_7 = 8.304409\ X_1^{-.707390}\ (.463056)\ X_2^{-1.864040}\ (.588698)\ X_3^{-.832024}\ (.602185)\ X_4^{.234980}\ (.086615)$$

$$X_5^{.774978}\ (.382670)\ X_6^{.636927}\ (.991261)$$

$R = .838497$

Variations in the independent variables account for from nineteen per cent of the variations in the supply of subsidy feed for the prairies in aggregate to seventy per cent for Alberta. Substantial variation exists between the importance of the individual variables as determiners of supply for the respective provinces. This variability, in general, tends to conform with observation, the price of barley and the ratio of prices being important in Manitoba while the number of animal units along with the price of barley and the wheat carryover are important in Saskatchewan. The factors most important in Alberta are the number of animal units in the area, the yield of barley and the wheat carryover on farms. When the data are aggregated for the prairie provinces the variations in one area offset those in another with the result that the overall equation derived for supply leaves a lot to

be desired as a useful estimator of the supply of feed grain.

Incidence of the Subsidy

A change in the marketing margin such as occurs with the payment of a subsidy on transportation is divided between buyers and sellers according to the slope of the demand and supply curves, respectively. The slopes of the curves are components of the elasticity formulas since

$$E = 1/\text{slope} \cdot p/q$$

Since at equilibrium the p/q expression is common to both demand and supply it can be disregarded as a factor and therefore the division will be in proportion to the elasticity. The ratio of incidence of the change in margin upon buyers and sellers respectively can be approximated by the following formula:

$$\text{Ratio of Incidence} = \frac{\dfrac{E_D + E_s}{E_D}}{\dfrac{E_D + E_s}{E_s}}$$

The price elasticity of demand of feed under subsidy for the receiving provinces was calculated to be -.591150. On the other hand, the price elasticity of supply for the prairies was found to be .617625. Using the above formula, the distribution ratio of benefits between buyers and sellers will be

$$\frac{\dfrac{.591150 \div .617625}{.591150}}{\dfrac{.591150 + .617625}{.617625}} = \frac{2.044785}{1.957134}$$

which indicates that the buyers of the feed receive fifty-one per cent of the subsidy while the sellers receive the other forty-nine per cent.

In view of the fact that the regression coefficients used (elasticities) were not statistically significant their use as determiners of the incidence of the subsidy must be approached with caution. The division of the subsidy between buyers and sellers illustrated above should therefore not be accepted as that which actually applies but rather as an illustration of a technique and to indicate that benefits accrue to both parties.

Ordering of Benefits Among Buyers and Sellers

The magnitudes of the elasticities of demand and supply, respectively provide an indication of the order of benefits received between provinces. Such benefits will be distributed in inverse relation to the absolute value of the respective coefficients. If the calculated elasticities are taken as indicators the descending ordering of benefits among purchasing provinces is Nova Scotia, New Brunswick, Prince Edward Island, and Ontario. The data for Quebec and British Columbia are perverse since positively sloped demand curves are indicated. Among the supplying provinces Saskatchewan appears to benefit

more than Manitoba. The coefficient applying to Alberta is also perverse since a negatively sloped supply curve is indicated.

Limitations of the Analysis

The lack of significance of many of the coefficients calculated brings into question the usefulness of the approach. Purchasing and production decisions are obviously made using additional criteria to those used in the analysis. The model itself may not be the most descriptive one which could be used. While a more complex model holds forth the prospect of enabling improved accuracy, the lack of adequate data makes a decision to use such a model subject to question. The supply and demand analysis approach, despite its limitations, does provide an indication that benefits from the subsidy are received by both buyers and sellers though to varying degrees and to this extent the area of ignorance is reduced. On the other hand, the analysis provides little insight into the effect of the subsidy upon the location of production.

The Canadian Wheat Board and the Supply of Feed Grain

The monopoly powers granted the Canadian Wheat Board in the sale of western wheat, oats and barley both interprovincially and for export have the potential for influencing the sale price for prairie feed grain. The quota system imposed to regulate producer deliveries, inequitable by many standards and considered iniquitous by many people, has resulted during periods of congestion and restrictive

quotas in a multiprice system at the producer level. Such a situation cannot help but engender inefficiency.

The underlying purpose of the Board in imposing quotas on deliveries of grain to elevators has been to provide justice in the matter of opportunity for sale of the product. Initially, quotas were justified on the basis of the inability of the elevator system to absorb the total volume of deliverable grain off farms at harvest. With the passage of time, quotas became the means of limiting total deliveries to the elevators since the market could not absorb all the grain at the price asked by the Board. Such a situation exacerbated the difficulties in achieving economic justice between farmers.

The Board in its wisdom has imposed both specific and acreage quotas on deliveries. Each type affects the incomes of farmers, both tending to enhance relatively the incomes of farmers having limited volumes of grain to deliver. The specific quota is usually applied without reference to acreage. Subsequently, additional quotas based on acreage become a greater impediment to the large scale farmers than to the small.

The Board in using quotas to limit total deliveries within a crop year is acting on the premise that total returns can be enhanced by attempting to influence price through restricting supply. As applied to feed grain this appears to be a tortuous course. It assumes that an inelastic market exists for western feed grain, a situation unlikely to prevail due to the alternative sources of supply.

To be effective, the increase in price achieved as a result of the restriction policy has to both offset the cost of storage in public elevators and the opportunity cost of cash to farmers. The latter will vary widely between individuals. The opportunity costs are not necessarily limited to the prevailing rate of interest due to the imperfections of the money market. In periods of restricted delivery a multiprice system develops with the Wheat Board establishing one price and a multitude of other prices being established outside which reflect the bargaining power of farmers with grain available in excess of quota. The total effect of such a system upon feed grain producers is difficult to ascertain since data necessary for the analysis is withheld by the Board. Consequently, such an analysis could not be undertaken in this study. On the other hand, the on-farm price quotations used for the respective grains, those recorded in the Quarterly Bulletin of Agricultural Statistics, have the impact of the quota policy upon price incorporated into them since they represent the average return received from all market outlets. The inability to conduct such an analysis, while regretable was therefore not considered to negate the study.

Kerr suggested[47] that the Board operated as a monopolist in setting of price of western feed grains to Canadian feeders outside the prairies. Such a contention deserves further scrutiny. The avowed

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[47]Kerr, op. cit., pp. 49-55.

purpose of the Board is to maximize the returns from the sale of wheat, oats and barley by prairie farmers. It would be expected that merchandizing techniques such as arbitrage between grades and locations would be used to the benefit of producers. Prairie feed grains are sold upon both the domestic and export market. The stated Board policy is to adopt a uniform selling price on the basis of quality to all buyers or in other words, not to practise price discrimination. This does not mean that the Board still could not in effect adopt a monopoly position in sales, limited of course by the threshold price of American corn on an equivalent nutrient content basis. However, if sales of like quality, regardless of volume, are simultaneously made in the domestic and export markets then the Board cannot be accused of monopoly selling practices. If, on the other hand, different grades of grain are sold in the export than in the domestic market, it may be possible to discriminate against local buyers by changing the price spread between grades so that on a nutrient basis relatively higher prices are charged. If such a situation occurs with regularity the effect of the subsidy upon the location of production will be minimal since benefits from the subsidy would be captured for the grain producer.

The Relationship Between the Prices of Feed Grains

In view of the indeterminateness of Board pricing policies an analysis of price relationship existing between oats, barley and American corn was considered essential. In addition, the impact of

exports and carryovers of coarse grains and imports of corn upon feed prices appeared worthy of investigation.

The prices of No. 1 Feed oats and No. 1 Feed barley at the Lakehead and the duty paid price for American corn f.o.b. the point of entry by crop years for the 1941-63 period were deflated by the Consumer Price Index and then expressed in terms of 1000 therms of digestible energy. The modified prices are recorded in Table 20.

Over the period a decline in the price of corn relative to oats and barley is evident. In the earlier years corn sold at a premium which did not prevail at the end of the period when, on occasion, corn was lower in price on a nutrient basis than were coarse grains. During the period coarse grain prices remained comparatively stable in comparison to corn, the closing of the gap resulting primarily from a decline in the price of the latter rather than an increase in the price of the former. This tendency existed throughout the whole period, the advent of the Board handling coarse grains beginning in 1949 did not appear to affect the established direction of price movements. A regression between the price of barley and the price of corn indicated a high correlation between the two, "r" being excess of .90, while a highly significant negative regression coefficient confirmed the tendency previously discussed. Price discrimination by the Board cannot be substantiated on the basis of this analysis.

A further regression analysis for the 1941-63 period was undertaken where the price of barley was used as the dependent variable X_8

TABLE 20

PRICES OF FEED GRAINS BY CROP YEARS, CANADA, 1941-63
(dollars per thousand therms)

Crop Year Beginning August 31	No. 1 Feed Barley at Ft. William	No. 1 Feed Oats at Ft. William	U.S. Corn at Point of Entry
1941	8.472	9.566	17.333
1942	10.980	13.384	18.158
1943	11.704	14.559	21.814
1944	11.637	14.349	23.843
1945	11.570	14.412	29.929
1946	13.017	15.293	26.540
1947	17.884	19.636	33.842
1948	15.431	16.090	19.306
1949	18.232	18.293	17.746
1950	16.074	16.048	20.499
1951	14.278	14.349	20.454
1952	12.991	12.335	18.247
1953	11.020	12.021	16.285
1954	11.610	12.881	17.010
1955	11.435	12.881	16.040
1956	10.457	10.657	14.056
1957	9.786	10.007	12.763
1958	9.639	10.636	11.982
1959	9.344	11.790	11.325
1960	9.947	11.391	10.846
1961	12.052	11.832	11.414
1962	10.792	10.909	11.726

Sources: Prices for oats and barley obtained from Grain Trade of Canada and those for corn from Trade of Canada. All quotations converted to dollars per thousand therms.

while the imports of U. S. corn X_1, the price of corn X_2, the price of oats X_3, exports of barley X_4, exports of oats X_5, the carryover of barley X_6, and the carryover of oats X_7 were used as the independent variables. Prices were expressed in terms of dollars per thousand therms while the other variables were expressed in 10^6 therms. The estimating equation for the price of barley was calculated to be

$$X_8 = -2.091938 + \underset{(0.000330)}{0.000981\, X_1} \underset{(0.054967)}{-0.044444\, X_2} + \underset{(0.096000)}{1.095935\, X_3}$$

$$+\underset{(0.000135)}{0.000662\, X_4} - \underset{(0.000201)}{0.000576\, X_5} - \underset{(0.000154)}{0.000533\, X_6} + \underset{(.000168)}{0.000258\, X_7}$$

The regression coefficient was found to be R = .975695 or in other words, variations in the independent variables accounted for approximately 95 per cent of the variations in the dependent.

For the regression coefficients to be significantly different from zero at the 5% level $\frac{bi}{s_{bi}}$ must be $\geq$ 2.145. The simple correlation coefficients between the price of barley and the following independent variables were found to be

Imports of U. S. corn	-.14320
Price of U. S. corn	.54747
Price of oats	.91415
Exports of barley	-.30116
Exports of oats	.07631
Carryover of barley	-.50050
Carryover of oats	-.45086

The sign of these coefficients could be anticipated. However, on the basis of this analysis the validity of the premise that the Board consistently acts as a monopolist in the pricing of oats and barley in the domestic market cannot be demonstrated.

Evaluation

Demand and supply analysis indicates that the benefits attached to the subsidy will be divided between the sellers and the purchasers of feed grain. Accurate estimation of the division between the two parties cannot be made because of data limitations. On the other hand, on the basis of available data it cannot be established that the relative shares are significantly affected by Board selling policies. Demand and supply analysis while indicating the direction of benefits does not provide a means of measuring the effect of the subsidy upon the location of production. An attempt is made to measure this effect in the ensuing analysis.

CHAPTER V

THE MODEL

Feed is a raw material used in the production of meat, eggs, milk and other products. The freight subsidy is restricted to movements of particular feeds between specific locations. The problem to be solved is to determine the influence of the subsidy upon the location of livestock production. This requires a comparison of the situation that prevails with the subsidy to that which would prevail without it. The linear programming model developed allows for such a comparison within the time and financial restrictions imposed on the study. Each region has certain feed supplies which can be augmented by supplies from other areas. These feed supplies are fed to basic herds of animals to provide the meat and eggs which may be used for local consumption or else shipped elsewhere. Local supplies of these products may also be supplemented by those available from other areas. Since the subsidy affects feed and therefore production cost, the solution to the problem may be achieved by comparing the minimum costs of production associated with satisfying the indicated levels of consumption, with and without the subsidy.

Algebraically, the model may be stated as follows:

Minimize:

$$\sum_i CijX^{c}ij + \sum_i CijX^{h}ij + \sum_i CijX^{po}ij + \sum_i CijX^{t}ij + \sum_i CijX^{cs}ij$$

$$+ \sum_i CijX^{hs}ij + \sum_i CijT^{c}ij + \sum_i CijT^{h}ij + \sum_i CijT^{b}ij$$

$$+ \sum_i CijT^{v}ij + \sum_i CijT^{p}ij + \sum_i CijT^{po}ij + \sum_i CijT^{e}ij$$

$$+ \sum_i CijT^{t}ij$$

subject to:

$$b \quad iC \leq s_c i$$

$$b \quad iR \leq s_R i$$

$$b \quad iB \geq d_B i$$

$$b \quad iV \geq d_V i$$

$$b \quad iP \geq d_P i$$

$$b \quad iPO \geq d_{PO} i$$

$$b \quad iE \geq d_E i$$

$$b \quad iT \geq s_T i$$

$$b \quad iSC \leq p_{SC} i$$

$$b \quad iBH \leq n_{BH} i$$

Where:

Cij = per unit cost of the "j" activity in the "i" region

$X^{c}ij$ = level of particular cattle feeding activities in the "i" region

$X^{h}ij$ = level of particular hog feeding activities in the "i" region

$X^{po}ij$ = level of particular poultry feeding activities in the "i" region

$X^{t}ij$ = level of particular turkey feeding activities in the "i" region

$X^{cs}ij$ = level of particular cattle slaughter activities in the "i" region

$X^{hs}ij$ = level of hog slaughter activity in the "i" region

$T^{c}ij$ = movement of various weights of cattle from region "i" to "j"

$T^{h}ij$ = movement of hogs from region "i" to "j"

T^{b}_{ij} = movement of beef from region "i" to "j"

T^{p}_{ij} = movement of pork from region "i" to "j"

T^{po}_{ij} = movement of poultry meat from region "i" to "j"

T^{e}_{ij} = movement of eggs from region "i" to "j"

T^{t}_{ij} = movement of turkey from region "i" to "j"

and

biC = concentrate supplied by the "i" region

biR = roughage supplied by the "i" region

biB = beef consumed in the "i" region

biP = pork consumed in the "i" region

biPO = poultry meat consumed in the "i" region

biE = eggs consumed in the "i" region

biT = turkey consumed in the "i" region

biSC = amount of slaughtering capacity used in "i" region

biBH = basic herd utilized in the "i" region

The model is more comprehensive than many developed by other analysts. Space and form of product are included allowing movements of intermediate products. Various methods may be used to produce a particular product. Several raw materials are processed into the required end products. The model does not, however, incorporate regional demands as a function of price as these are considered fixed nor are economies of scale introduced. These latter two features are not considered of

importance in this study. While the model could be modified to incorporate them, the multiplication in complexity would render such a procedure impractical. The model is nonetheless stage D according to the complexity scale given by Schrader.[48]

The model provides for 489 equations and 1730 activities. Approximately 12 hours of running time on the IBM 7040 32K computer were required to reach the initial optimum solution. While features could be included in the model and thus impart greater realism the additional solution time that would be required renders such a modification economically infeasible. Total computer time required was in excess of fifty hours for the nineteen alternative situations considered.

The Matrix

The primary objective in designing the matrix was to allow the model to conform as closely as possible to the real world situation bearing in mind the economic limitations placed upon the analysis. Since this study is concerned with the influence upon the location of livestock production arising from the application of a subsidy on the movement of feed grains between particular areas, emphasis is placed in the design upon the distribution of this feed. A schematic diagram of the distribution of feed within a particular province appears in Figure 10. Movements of both raw materials and finished products occur

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[48] L. F. Schrader, op. cit., p. 12.

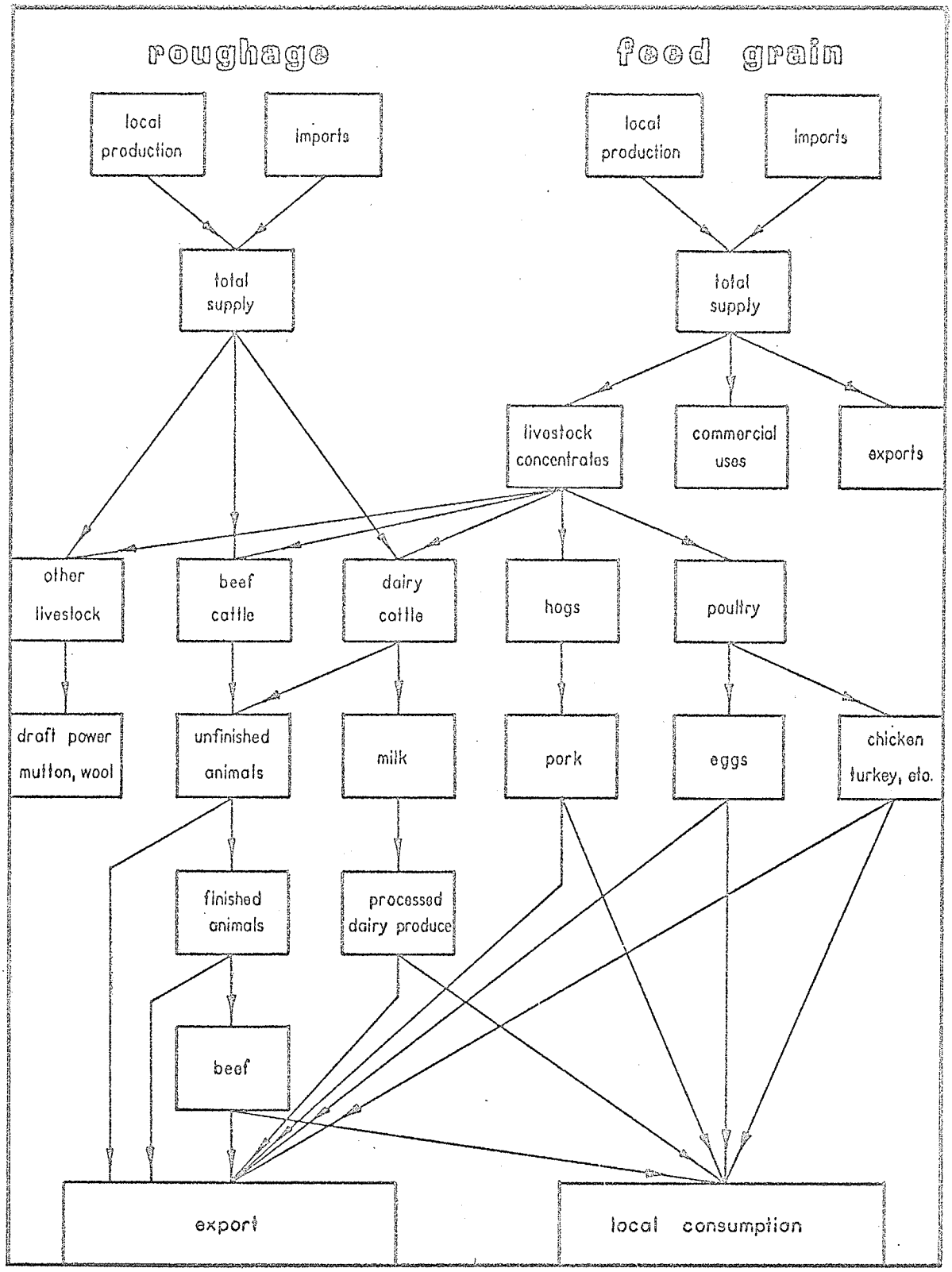

Figure 10: FEED GRAIN MOVEMENT --- ONE PROVINCE CASE.

between provinces. Extending the diagram to encompass such movements would render the chart unmanageable. However, these movements are incorporated in the matrix design.

Assumptions Made Preliminary to Developing the Matrix

Prior to developing the matrix certain basic assumptions were made. A list of these follows:

(1) The crop year 1962-63 may be regarded as a "typical" year for analysis purposes and therefore can be used as an appropriate period for testing the hypotheses.

(2) Producing regions may be regarded as points in space. In this analysis such points are considered as the provincial capitals with the exception of Calgary and Saskatoon which are considered more appropriate than Edmonton and Regina, respectively, since a comparatively greater volume of livestock production occurs in areas adjacent to these cities.

(3) The complete production process for all classes of animals occurs within the year under review. The life cycles of all classes of animals are of course not completed within one year but given that the mix of age classes of animals is stable the feed consumption and product output of the classes may be considered to occur within one year.

(4) A certain number of male and female animals may be considered to constitute the basic herd, the base from which additional animals and products are produced and this number is

assumed constant throughout the year considered. Culls from the basic herd are considered to be replaced by other animals fed to maturity. In addition, cull animals are considered to be equivalent in terms of feed consumption to other animals raised to maturity, to have similar non-feed costs, and to provide processed products of similar quality.

(5) Since the location of horses, sheep and dairy animals is assumed not to be affected by the subsidy, the feed consumed by these classes of animals may be removed from the analysis.

(6) Supplies of inputs other than feeds, basic herds, and packing plant capacity are completely elastic at given prices.

(7) Demand for the respective meats, veal, beef, pork, poultry, and turkey, as well as eggs is given and fixed for the year under consideration.

(8) Exports and imports of raw materials, intermediate products, and end products are given and fixed for the year under review.

(9) Transportation costs may be derived by using existing competitive rates as a base and may be considered the same between specific locations regardless of direction of movement.

(10) Costs of slaughtering animals do not enter directly into the solution. Slaughtering costs may be assumed to be equal to the value of by-products. Some error may arise here in that prices received for by-products may not be proportional to slaughtering costs between locations.

(11) Production costs other than those for specific feeds may be derived from published data. Prices for grains are assumed to be those published as prevailing at the farm level.

Many other arbitrary assumptions were necessary in the determination of the restrictions imposed and in the production coefficients in the matrix. Attention will be drawn to these in the description of the procedures followed in developing the coefficients.

Considerations in Development of the Matrix

At the outset, formulation of the matrix in such a fashion as to allow conformity in so far as possible with the real world situation was held to be desirable. Restrictions imposed by the funds, research time and also computer facilities available, however, served to prevent the model from conforming in more than an elementary fashion with the situation actually existing. In developing the matrix the approach taken was to parallel existing production methods for the respective end products by the provision of alternative activities. This involved separating animals into classes, allowing these animals to be produced using alternative methods, allowing slaughter at several stages of maturity, providing for substitution of one concentrate source for another and also substitution of roughage for concentrate in accord with physical limitations and also according to cost minimizing procedures. This procedure was followed for beef cattle, hogs, chickens and turkeys. Feed used by classes of animals not included in the

analysis was removed from the supply available through the use of an appropriate restriction. Exports and imports of products which occurred in the crop year under review (1962-63) were taken as given and were placed in the model as restrictions which were required to be observed.

Alternative Conditions Incorporated Into the Matrix

The procedure adopted in the research was to compare the location of livestock production arising from minimization of cost given the subsidy with that which would prevail without the subsidy. This required the use of two cost situations but in order to accommodate other comparisons four in total were used. In each situation the costs of performing the respective activities involved in producing the desired end products were considered equal except those which arose from the transportation of prairie feed grain beyond the region of origin. The different cost situations became the objective functions in the linear programming model. The first cost situation, 1 COST, incorporated the subsidy by reducing the actual transportation rate by the average rate applied to the respective provinces on a tonnage basis. The second, 2 COST, used the actual transportation rates as given. The third, 3 COST, reduced the actual rate by the net rate of the subsidy applied to movement beyond Ontario. This allowed testing the effects of Kerr's proposal. The final cost situation, 4 COST, eliminated all transportation costs of moving prairie feed grain beyond Ft. William. By so doing, the effects of the subsidy could be

ascertained should its stated intent of equalizing prices of purchased feeds outside the prairie region be accomplished. It was considered that such a series of objective functions would allow sufficient comparisons to be made to indicate the effects on the location of livestock production associated with changing the level of the subsidy.

There appeared to be merit also in establishing a set of levels for the restrictions imposed upon the model. The sizes of existing basic herds reflected the situation which had developed over twenty years with the subsidy imposed. In addition, this allocation of herds was reflected in the distribution of production patterns for the respective feed grains and forages. The existing allocation of feed grains on the prairies between domestic use and export shipments could not be considered fixed since it represented, by inference, the most economic use of these grains within the established framework. Four sets of restrictions were therefore imposed upon the model. The first or "standard" set, representing the situation prevailing in the current year provided available feeds at existing levels, these feeds resulting from given production patterns and basic herd sizes as given by production statistics on a provincial basis, and by the distribution of prairie feed grains between the domestic and export markets as provided by published data. This became right-hand side one in linear programming jargon. The first relaxation of the restrictions allowed the acreage used for feed grain and forage production to be allotted on the basis of minimum cost for the particular provinces. An additional relaxation

of the restrictions provided for the distribution of the total basic herds within Canada between the provinces on the basis of least production cost for the required products. The final modification in the restrictions allowed feed to be used within the respective prairie provinces up to the total level of production or in other words not providing for a given level of exports. These sets of modified restrictions were established as right-hand side two, three and four, respectively.

The four objective functions and four sets of restrictions allow sixteen separate comparisons to be made, all of which appear to have some value. It was considered desirable to provide for these comparisons in the formulation of the matrix at the outset since such a procedure served to provide the desired information with a minimum of difficulty. Should all the alternatives not be considered little would be saved whereas matrix modification at a later date would involve considerable effort. The alternative situations are not an inclusive list but merely represent the maximum number which could be considered within the scope of the present study.

Resource Restrictions

Resources with which the study is directly concerned include the volume of the respective feeds available for feeding the various sizes and classes of animals, the size of the basic herds, the amount of slaughtering capacity available, and the present consumption of the

different types of meat as well as that of eggs. Other materials used in production are assumed to be completely elastic at given prices. This information was accumulated on a provincial basis, the province being the smallest area for which data existed in most instances.

Supplies of Feed

The supplies of grains and roughages which may be used for the production of animals and animal products are in many instances not directly available from existing statistics. In consequence, the volume of these supplies must be derived by manipulation of or by extrapolation from published data. Many months of effort were taken up by these calculations even though many heroic simplifications had to be made. Initially, it was considered advisable to evaluate all feed supplies in terms of therms of net energy so that they could be readily compared.[49] When some data consistency problems arose the feeds were converted to therms of digestible energy.[50] A therm is equivalent to one megacalorie or 1,000,000 calories, where one calorie is the amount of heat required to raise the temperature of one gram of water from 14.5 to 15.5 degrees centigrade. Net energy may be defined as the gross energy minus the energy lost in the feces, urine,

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[49] Committee on Animal Nutrition, Nutrient Requirements of Domestic Animals, Glossary of Energy Terms, Publication 1040. Washington: National Research Council, 1962, pp. 1-2.

[50] F. B. Morrison, Feeds and Feeding, 21st ed. New York: Morrison Publishing Co., 1948, p. 55.

combustible gases and the heat increment. Digestible energy, on the other hand, is the gross energy of the food intake minus the energy lost in the feces. There is disagreement among animal nutritionists on whether net energy or digestible energy is the most appropriate measure of food value. Morrison holds to the former while the National Research Council uses the latter. When a regression analysis was made between disappearance of feed in therms net energy and animal numbers the results were inconsistent. A subsequent consultation with an eminent animal nutritionist convinced the author that the feeds should be evaluated in terms of digestible energy.[51] Morrison's tables were used to determine digestible energy[52] and a ratio of 2000 K cal of D.E. to one pound of T.D.N. was used.[53]

Whole Grains

Before any meaningful estimate of the volume of the respective grains available for livestock feeding could be made it was necessary

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[51] Dr. J. M. Bell, Head, Dept. of An. Sc., University of Saskatchewan, Saskatoon, 1967. He suggested that the net energy measure was suitable for dairy cattle but digestible energy was more useful where different classes of animals were involved.

[52] F. B. Morrison, op. cit., pp. 1086-1142.

[53] Committee on Animal Nutrition, Nutrient Requirements of Beef Cattle, rev. ed. Washington: National Research Council, 1963, p. 5.

to construct feed balance sheets by provinces for the respective crop years. These balance sheets were available for wheat, oats, and barley but only for a limited number of years.[54] Examples of the type of balance sheets constructed may be found in Grain Trade of Canada 1962-63.[55] Current data on acreage, yield, and production were obtained from the Quarterly Bulletin of Agricultural Statistics.[56] This publication was also the source of information pertaining to seeding rates. Non-feed uses for feed grains produced outside the prairie provinces and the Peace River block were assumed to be limited to Ontario Winter Wheat, data for which was received from the Dominion Bureau of Statistics.[57] Historical data were obtained from the Handbook of Agricultural Statistics, Part 1, Field Crops.[58] The residual calculated in the balance sheets, "animal feed, waste and dockage", was reduced by three per cent to account for waste and dockage and the remainder was assumed to be used for feed purposes.

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[54] W. L. Porteus, Chief, Crops Section, Agriculture Division, Dominion Bureau of Statistics kindly furnished copies of the balance sheets available as well as instructions for constructing the remainder.

[55] Dominion Bureau of Statistics, Grain Trade of Canada 1962-63, Cat. 22-201. Ottawa: Queen's Printer, 1963, p. 106.

[56] Dominion Bureau of Statistics, Quarterly Bulletin of Agricultural Statistics. Ottawa: Queen's Printer, appropriate years.

[57] The attention given by Mr. Porteus to this matter is gratefully acknowledged.

[58] Dominion Bureau of Statistics, Handbook of Agricultural Statistics, Part I, Field Crops, Cat. 21-507. Ottawa: Queen's Printer, 1964.

Balance sheets were constructed for wheat, oats, barley, mixed grain and grain corn by provinces for the 1941-63 period. While construction of the balance sheets was relatively straightforward it was also found to be a very time consuming task which required several weeks of work. A summary of the net feed use of these grains appears in Appendix IV.

Millfeeds and Groundfeeds

Processed feeds, other than millfeeds and ground feeds, were not considered to be of direct concern to the study. At the time of ration formulation cognizance was taken of the place of such materials as an ancillary source of feed and therefore the cost of the use of them was incorporated as part of that assigned to the production activities. Millfeeds and ground feeds, on the other hand, were considered to be useful for ration balance purposes and represented grain otherwise unaccounted for as feed disappearance in the balance sheets.

Data on millfeeds were not available on a provincial basis. The output of millfeeds is classified according to the two divisions, eastern and western, used by the Board of Grain Commissioners when collecting their statistics. This lack of specificity required several heroic assumptions to be made. Exports of millfeeds were deducted from total Canadian output. The residual quantity was assumed fed within the country. From this residual the quantity which moved under subsidy was deducted. The balance was assumed to be fed in the prairie provinces. The distribution of millfeeds within the prairie provinces was assumed

to be according to recorded mill capacity.[59] Since millfeeds are grouped collectively in statistics on subsidy movements, valuation in terms of feed value was based on the average proportional output of bran, shorts, and middlings, from the mills over the 1941-63 period. The calculated feed values admittedly contain errors but on the other hand represent what may be obtained by logical deduction from the data available.

Data on ground feed output from Canadian mills was available for the western and eastern divisions, respectively. However, data was not available beyond the 1956-57 crop year. Data for subsequent years was obtained by extrapolation. For the purposes of the study all ground feeds produced in the eastern division were assumed to be included in subsidy movements whereas the ground feeds produced in the western divisions were assumed to arise in the prairie provinces. Distribution of the output between the respective prairie provinces was based on indicated mill capacity. In assigning feed value to ground feeds recognition was taken of the various component feeds, ground wheat, barley, oats, mixed feed, and feed not otherwise specified, the latter being assumed to be screenings.

Roughages

Roughages were considered to include pasture, tame hay, fodder

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[59] Dominion Bureau of Statistics, Flour Milling Industry, Cat. 32-215. Ottawa: Queen's Printer, particular years.

corn, and for the western provinces the grain crop aftermath. Production was assumed to be consumed entirely within the crop year. Outputs of fodder corn and tame hay were readily available from the Handbook of Agricultural Statistics, Part I, Field Crops. The feed value of the grain crop aftermath was considered to be represented by an output of one ton of oat straw per acre sown to oats. This figure was included in the total feed available on the prairies and made the relative feeding efficiency in these provinces comparable to that prevailing outside the area.[60]

Statistics on output of the major component of the roughage group, pasture, was not available and had to be calculated. Reference to a study by Hildreth and Jarret provided little direction in the making of estimates. They used a procedure which combined the results of two previous studies.[61] Campbell et. al.[62] make some interesting comments on the carrying capacity of the range in terms of acres per animal per unit-month and they suggest that such carrying capacity equals

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[60] An initial calculation ignoring the aftermath revealed that in terms of available feed, insufficient was available on the prairies to feed the existing livestock population at the rate observed in the remainder of the country.

[61] Hildreth, C. and Jarret, F. G., A Statistical Study of Livestock Production and Marketing, Cowles Commission Monograph 15. New York: J. Wiley and Sons, 1955, pp. 47-49.

[62] Campbell, J. B. et al., Range Management of Grasslands and Adjacent Parklands in the Prairie Provinces, Pub. 1133. Ottawa: Research Branch, Canada Dept. of Agr., 1962, p. 14.

$$\frac{660}{0.55 \text{ X pounds dry matter per acre}}$$

While their procedure was not followed in the analysis, nevertheless some of their ideas were used in the development of estimates of the volume of feed produced by pasture.

In this study a somewhat different approach was taken in as much as the pounds of dry matter per acre produced by pastures in the respective provinces was an unknown quantity. One grazing equivalent was assumed to be either one horse, one head of cattle or four sheep recorded on June 1st of a particular year. Acres in pasture were assumed to include improved pasture and other unimproved land. Statistics for grazing units and pasture acreage were obtained from Census of Canada for 1941, 1951, and 1961,[63] respectively. The acres per grazing equivalent were then calculated by dividing the number of grazing units into the pasture acreage. The length of the pasture period was assumed to be the period of time in months when the average mean temperature was 40° F. or higher. Temperature data was obtained for points representative of the primary grazing areas in the respective provinces. The length of grazing period so derived multiplied by the number of grazing equivalents equal the months per grazing equivalent. A composite figure of 7.23 therms per grazing equivalent day or 219.91

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[63] Dominion Bureau of Statistics, Census of Canada. Ottawa: Queen's Printer, 1941, 1951, 1961.

per month was calculated using Morrison's feeding standards.[64] The feed output of pasture in therms per acre year was calculated according to the formula

$$\frac{\text{months grazed X 219.91}}{\text{acres per grazing equivalent}} .$$

The weakness of such a measure is obvious and only the lack of more accurate data justifies its use.

Volume of Subsidy Movements

Statistics on the movements of wheat, oats, barley, corn, rye, millfeeds and screenings under subsidy during the 1941-63 period were obtained from the Plant Products Division, Canada Department of Agriculture, Ottawa. Volumes of feed moved were subsequently converted to therms of digestible energy. The data for subsidy movements are in all probability the most accurate of any of the feed sources.

Tables for sources of feed and quantities as calculated by provinces appear in Appendix V.

Acres Devoted to Feed Grains

A limitation was placed upon the acreage available for the production of feed grains and hay equal to the area devoted to the production of oats, barley, mixed grain and tame hay during the 1962-63 crop year. This restriction was made operative as one of the alternative resource combinations.

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[64] F. B. Morrison, op. cit., pp. 1147-1149.

Numbers of Livestock

Livestock numbers by class and types are recorded in the publication Livestock and Animal Products Statistics.[65] Data are provided as of June 1 and December 1, the consequence of the respective mail surveys conducted. The estimates are revised following the next census.

The crop year was taken as the basic time period in the study and the number of the respective classes and types of livestock per crop year by province for the 1941-63 period was calculated by averaging the figures provided for December 1 of one year and June 1 the following year. Attention has already been drawn to this data which is recorded in Appendix III.

Size of the Basic Herd

No data are available on the numbers of animals comprising the respective basic herds. This situation required that these numbers be derived from existing statistics. A brief account of the methods used in making the estimates follows.

For cattle, all females two years old and over were assumed to be breeding animals. The number of females recorded for the ten year period 1953-63 was related to the number of animals slaughtered after an appropriate adjustment was made for the increase in cattle numbers

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[65] Dominion Bureau of Statistics, Livestock and Animal Products Statistics, Cat. 23-203. Ottawa: Queen's Printer, appropriate years.

over the interval. This ratio was calculated to be 1.336409 indicating that a viable calf crop of approximately 75 per cent existed, a figure considered realistic by experience. The ratio of females to bulls over the period was found to be 1:0.047215. The size of the basic cattle herd by provinces was calculated by multiplying the number of females two years old and over on farms by 1.047215.

More information on hogs was available in that statistics on surviving pig litter sizes by provinces existed.[66] In consequence a slightly different procedure was followed. However, when the number of hogs over six months was related to the number of farrowings by provinces in the 1962-63 period wide variations were found to exist. For example, the ratio of mature hogs to farrowings was over twice as great in Saskatchewan as in Prince Edward Island. As a consequence of this inconsistency, the size of the basic hog herd was assumed to be composed of sufficient sows to account for the number of farrowings on the basis of two litters per year plus an adjustment for boars on the basis of one boar to twelve sows. This estimate, while not representative of the apparent relationship which exists on the average, is nonetheless considered to be realistic in relation to commercial operations.

Estimation of basic herd size for poultry and turkeys, respectively, required a different procedure. In the case of poultry data

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[66] Dominion Bureau of Statistics, Quarterly Bulletin of Agricultural Statistics. Ottawa: Queen's Printer, appropriate issues.

are available on the number of layers by province.[67] The output of eggs for hatching required a ratio of approximately one rooster to ninety laying hens to maintain an adequate egg fertility level. The number of layers was therefore adjusted to allow for this requirement. Similar data are not available for turkeys. However, statistics on the total marketings of birds are available. One turkey hen may be assumed to lay approximately forty eggs.[68] One tom is required for each ten hens to maintain egg fertility. Adjusting for this requirement results in an output of about thirty-six fertile eggs per basic herd unit. Assuming sixty per cent hatchability and a survival rate of ninety-six per cent each basic herd unit may be considered to provide approximately twenty-two marketable birds per basic herd unit. The data for total marketings of birds by provinces were subsequently related to this figure in order to obtain estimates of basic herd sizes.

The estimates for the sizes of the respective basic herds by provinces appear in Table 21.

Non-Analysis Use of Feed

Non-analysis use of feeds may be defined as the volume of feed consumed by those classes of animals not directly involved in the analysis. These classes were considered to include horses, sheep,

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[67] *Ibid.*, appropriate issues.

[68] Dr. R. D. Crawford, Dept. of Poultry Science, University of Saskatchewan.

TABLE 21

SIZES OF BASIC HERDS BY PROVINCES, 1962-63
(thousands of units)

Class	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Cattle	43.983	79.169	75.714	1163.456	1362.427	466.011	961.867	1226.289	238.241
Hogs	6.066	5.741	4.983	121.871	208.535	36.832	37.374	111.580	3.737
Poultry	272.5	1094.0	580.4	4267.4	10364.4	2382.2	2059.1	2520.2	2639.0
Turkeys	2.367	11.834	5.794	172.774	69.942	174.161	135.232	148.372	95.650

Source: Derived from data in the Quarterly Bulletin of Agricultural Statistics. The calculation procedure used is described in the text.

ducks, geese and dairy cattle in milk production. The volume of feed consumed by the first four groups is small. On the other hand, a significant volume of feed is consumed by cows in milk. The location and numbers of these animals were assumed to be fixed irrespective of the subsidy on feed grain movement.

Early in the analysis it was evident from the total feed disappearance data that less than optimum efficiency prevailed in the feeding of livestock in Canada. An estimate of feeding efficiency was therefore necessary. A detailed procedure was subsequently developed to derive this estimate.

The total volume of feed consumed annually by livestock in Canada within the respective provinces was considered to be equivalent to the sum of the total disappearance for feed purposes of wheat, oats, barley, mixed grain, ground feeds, millfeeds, screenings, rye, corn, tame hay, fodder corn, oat straw and pasture. The calculations made for the respective provinces on an annual basis for the 1941-63 period are recorded in Appendix V.

Data for daily food intake requirements for the various classes of animals were obtained from National Research Council tables.[69] A summary of the annual intake requirements appears in Table 22.

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[69] Committee on Animal Nutrition, Nutrient Requirements of Domestic Animals, Poultry, Swine, Dairy Cattle, Beef Cattle, Sheep, Horses, Nos. 1-6 respectively. Washington: National Research Council, 1957-63.

The daily food intake requirements were then related to the number of animals in each class and sub-class on an annual basis for the 1954-63 period. Such a procedure was found very time consuming. This total annual average feed disappearance, as recorded in Appendix VI, was

TABLE 22

ANNUAL FEED REQUIREMENTS OF LIVESTOCK
(therms of digestible energy)

Class of Livestock	Annual Feed Requirement Per Unit
Milk Cows and Heifers	10745.5
Bulls	10220.0
Beef Cows and Heifers	8570.0
Yearling Heifers for Milk	8103.0
Yearling Heifers for Beef	7665.0
Steers, 1 year and over	7665.0
Calves, under 1 year	6840.0
Horses	6715.5
Hogs, 6 months and over	4393.4
Hogs, under 6 months	2372.7
Sheep	1352.9
Lambs	371.1
Hens and Chickens	57.9
Turkeys	106.1
Geese	106.1
Ducks	106.1

Source: Author's calculations based on N.R.C. tables. The procedure used is described in the text.

found to be approximately one hundred and twelve per cent of the N.R.C. standards. The feed intake requirements were therefore adjusted accordingly.

Feed requirements for the respective classes of animals, other

than milk cows, not in the analysis were calculated by multiplying the per unit annual feed requirements by the number of animals on a provincial basis. A special procedure was necessary in the case of milk cows. Dairy cattle are responsible for a significant share of the output of meat. Therefore, this class of animals had to be considered and for analytical purposes the animals of dairy origin were considered to be equivalent to those of beef when used for the production of meat. An adjustment became necessary, in consequence, to account for the difference between the feed intake of a dairy cow and that of a beef cow. Dairy cows were assumed to produce six thousand pounds annually of four per cent milk. The annual feed requirement of beef cows was then subtracted from the annual feed requirement of dairy cows of the above quality to get a net figure for the additional feed required annually for the dairy animal. This figure was used in calculating the non-analysis use of feed of the dairy cow class. The total roughage and concentrate requirements of the classes of livestock assumed outside the analysis are given in Table 23.

Slaughter Capacity

Various estimates[70] have been made in recent years of the present capacity of slaughtering plants within the various provinces. The

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[70] Such estimates have been made by Gilson et. al. op. cit., pp. 8.16-8.18, and also by R. C. Nicholson, Livestock, Meat and Farmers, Pub. No. 101. Saskatoon: Dept. of Agric. Econ., University of Saskatchewan, pp. 116-125.

TABLE 23

NON-ANALYSIS USE OF ROUGHAGE AND CONCENTRATE BY PROVINCE, 1962-63
(thousand of therms of digestible energy)

Province	Roughage	Concentrate
P.E.I.	51758	102735
N.S.	83027	167012
N.B.	75727	164498
Que.	627206	2676514
Ont.	730814	2535083
Man.	310887	531677
Sask.	659938	689485
Alta.	928638	920950
B.C.	214064	279182

Source: Author's calculations based upon data and according to methods described in the text.

initial computer run indicated that such estimates could not be directly applied. A modified procedure was therefore adopted.

Reference was made to the Report[71] of the Restrictive Trade Practices Commission on Meat Packing. While the data presented referred to the 1957 season, there was little evidence that conditions had changed appreciably by 1962. The data presented showed the share of the total inspected slaughter achieved by Canada Packers plants and also the estimated share such plants had of the total slaughter. Through relating these figures to the total inspected slaughter by provinces it was possible by extrapolation to obtain estimates of the total slaughter capacity for cattle, calves and hogs. These estimates appear in Table 24.

TABLE 24

ESTIMATED SLAUGHTERING CAPACITY BY PROVINCES
FOR CATTLE AND HOGS, 1957
(thousand head)

Province	Total Capacity	
	Cattle	Hogs
P.E.I.	29.6	94.8
N.S.	56.8	189.6
N.B.	86.5	284.4
Que.	655.6	4579.2
Ont.	1083.6	6134.4
Man.	612.0	2245.4
Sask.	196.8	1183.4
Alta.	743.7	2625.0
B.C.	258.4	821.4

Source: Author's calculations based on data contained in the Report of the Restrictive Trade Practices Commission. The procedure followed is explained in the text.

[71] Restrictive Trade Practices Commission, Report (Concerning the Meat Packing Industry). Ottawa: Dept. of Justice, 1961, p. 119.

Domestic Consumption of Meat

No estimates are available on the consumption of meat or eggs on a provincial basis. Observation would suggest that per capita consumption of specific meats and eggs varies to some degree from province to province. Unfortunately, it was impossible to differentiate consumption on this basis.

The procedure followed was to relate the indicated per capita consumption of beef, veal, pork, poultry, turkey and eggs, respectively, for Canada to the average of the population estimates for the individual provinces for 1962 and 1963. Estimates of consumption by provinces appear in Table 25.

Net Foreign Trade in Livestock and Livestock Products

Data on foreign trade is available in Trade of Canada. Trade in cattle is recorded under four groups; calves under 200 pounds, calves 200 to 700 pounds, cattle over 700 pounds, and dairy cattle. These weight and type classifications did not conform in general to those used in this study and therefore it was necessary to make an estimation of the distribution of the live weights of these animals. Hogs for export were considered to be 200 pounds in weight. Determination of volume of trade in the respective meats was straightforward. Estimates of the volume of foreign trade in the respective products during the 1962-63 crop year were obtained by averaging the movements for calendar years 1962 and 1963. These estimates appear in Table 26.

TABLE 25

ESTIMATED CONSUMPTION OF MEAT AND EGGS BY PROVINCE, 1962-63

Province	Product					
	Beef	Veal	Pork	Poultry	Turkey	Eggs
	(thousand pounds)					(thous. doz.)
P.E.I.	7614.8	702.9	5357.0	2492.1	852.0	2343.0
N.S.	53768.0	4963.2	37825.6	17596.8	6016.0	16544.0
N.B	43686.5	4032.6	30733.3	14297.4	4888.0	13442.0
Que.	397923.3	35808.3	272902.7	126956.7	43404.0	119361.0
Ont.	458064.8	42282.9	322247.0	149912.1	51252.0	140943.0
Man.	67460.3	6227.1	47458.1	22077.9	7548.0	20757.0
Sask.	66673.8	6154.5	46904.8	21820.5	7460.0	20515.0
Alta.	99456.5	9180.6	69967.3	32549.4	11128.0	30602.0
B.C.	120084.3	11084.7	84478.9	39300.3	13436.0	36949.0

Source: Author's calculations based upon data contained in Livestock and Animal Products Statistics. The procedure adopted is described in the text.

TABLE 26

ESTIMATES OF NET FOREIGN TRADE IN SPECIFIC LIVESTOCK PRODUCTS, CANADA, 1962-63

Live Cattle (number)	
200 pounds	35929
400 pounds	130402
600 pounds	130402
800 pounds	32182
Beef (thousand pounds)	-33927
Hogs (number)	4132
Pork (thousand pounds)	-10380
Fowl and Chicken (thousand pounds)	-4295
Turkey (thousand pounds)	-1148
Eggs (thousand dozen)	-4746

Source: Author's calculations based on Trade of Canada. The procedure followed is explained in the text.

Activities in the Matrix

Any analysis such as this becomes an abstraction from the real world situation. Limitations must be placed upon the number of production and distribution practices that are taken into consideration. A decision must therefore be made of the degree to which realism can be compromised with computational expediency. In this study an attempt was made to provide sufficient alternative methods of producing the end products that the final solution obtained when imposing existing resource restrictions would be comparable to the observed situation.

Activities used in the analysis may be grouped into those related to production, product movement, receipts of feeds available for movement under subsidy, and basic herd distribution. The activities are subsequently described within these groups.

Production Activities

This group of activities may be subdivided into those related to feed, beef and veal, pork, poultry and eggs, and turkey production. Each of these categories provides alternative means of producing the end product.

(1) Feed Production

Initially the volume of feed production by provinces was taken as given, such data being calculated by the methods previously indicated. Provision was also made for a redistribution of the acreage devoted to oats, barley, mixed grain and tame hay in accord with achieving minimum

costs. The production per acre of the respective crops by provinces was taken as that recorded for the 1962 crop season in the Handbook of Agricultural Statistics - Part I, Field Crops. Production costs per acre for the respective grains, necessary where a redistribution of acreages was allowed, were considered to be equivalent to the product of output and on-farm price. In other words, pure competition was assumed to exist at the farm level. Such an assumption had the effect of minimizing the modifications necessary in the matrix to allow for the alternative situations to be considered. The cost of locally produced feeds on a digestible energy basis was easily determined by relating on-farm prices to nutrient content. For millfeeds the average retail prices on the prairies[72] as related to the proportional content of bran, shorts and middlings were used for determining the cost of this feed in terms of therms. The same source was used to determine the cost of ground feeds on the prairies.

The cost in terms of feed value in therms for two of the forage sources, fodder corn and tame hay, were derived from the Dominion Bureau of Statistics data. Oat straw on the prairies was priced at $6.00 per ton, assuming forty bales to the ton and a ten cent and a five cent per bale charge for baling and hauling, respectively. The cost in terms of feed value was obtained by relating the above figure

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[72]Dominion Bureau of Statistics, Prices and Price Indices. Ottawa: Queen's Printer, appropriate issues.

to nutrient content. The cost per unit feed value of pasture was obtained by relating the output per acre to the cost of production which was assumed to be equivalent to an allowance of seven per cent of the average value of the land devoted to pasture, an assessment of five per cent being made for return on investment and two per cent for taxes and other expenses.

Grains available under subsidy were priced f.o.b. Ft. William - Port Arthur for that portion moving to eastern provinces, the average Canadian Wheat Board quotation for No. 4 Northern Wheat, No. 1 Feed oats and No. 1 Feed barley, respectively, being used for the basis for these determinations. The average, on the crop year basis, of the quotations for No. 4 C.W. was used to price rye. Screenings are normally sold on a job lot basis and therefore no quotations are available. This feed source was subsequently given a value equivalent to the minimum price for any grain on the basis of feed content. The grain was found to be rye. For the above feeds moving to British Columbia a deduction of twenty-six cents per hundredweight was made from the Fort William price to compensate for the prevailing freight rate to that port from the Calgary-Edmonton area, the origin of such movements.

Corn represented a special case. Corn enters Canada from the United States without restriction as to volume. Since Canada is on an import basis the price for similar quality American and Canadian corn should be equivalent in the Ontario consumption area. The average price for No. 2 Yellow corn f.o.b. Chatham was consequently used to

establish the base price for imports of American corn. The prevailing competitive truck rate on corn during 1962-63 from Chatham to Toronto as quoted by the Board of Transport Commissioners was twenty-three and one half cents per hundredweight. The price of corn imports f.o.b. Toronto therefore became the Chatham price plus the cost of movement to the former city. The price of American and Manitoba corn was assumed similarly to be equivalent on an f.o.b. Winnipeg basis.

The prices used for the various feeds are not claimed to be exact. However, on the average the prices will be representative. The multitudinous adjustments that occur within normal trading activities vary with transactions and cannot be entirely taken into account in a macro study such as this. It was considered expedient therefore to use the prices established on the above basis. These prices are recorded in Table 27. The prices were subsequently used in costing activities for transferring such feeds into a position for consumption.

(2) Beef Production

It was considered advisable at the outset to provide sufficient alternative methods for producing beef to allow the model to conform as closely as possible with the real world situation. The breeding herd produced calves which could be fed in alternative ways to produce animals of various weights for slaughter to produce beef and veal. The production of cattle from birth to maturity was subsequently divided into five weight classifications of two hundred pound intervals. These

TABLE 27

PRICES OF FEEDS BY PROVINCES AND FT. WILLIAM, 1962-63
(dollars per thousand therms D.E.)

	Wheat	Oats	Barley	Mixed Gr.	Corn	Rye	Millfeeds
P.E.I.	17.39588	16.36320	13.5409	14.19188			
N.S.	16.87506	18.46106	15.68534	16.99723			
N.B.	17.60419	16.99259	15.41719	16.17212			
Que.	17.50006	18.25122	15.55123	17.98735			
Ont.	17.70838	16.36320	14.74686	14.35690	14.26786		
Man.	17.70838	12.37732	12.87002	13.53180	12.81879		21.78136
Sask.	17.39588	12.37732	12.33373	13.03674			21.78136
Alta.	16.87506	12.58709	12.60187	14.52192			21.78136
B.C.	16.25006	13.00664	11.93154	16.50217			
Ft. William (subsidy movement)	18.32032	16.31071	16.15434		16.73796 (Toronto)	14.06452	

Source: Calculated from data in Grain Trade of Canada and other official publications. The methods used in manipulation of the basic data are described in the text.

TABLE 27 (continued)

PRICES OF FEEDS BY PROVINCES AND FT. WILLIAM, 1962-63

	Ground Fds.	Screenings	Fodder Corn	Tame Hay	Oat Straw	Pasture
P.E.I.				6.64622		4.45258
N.S.				8.69121		2.93534
N.B.				7.66871		2.86207
Que.			9.50293	7.92434		3.43965
Ont.			7.55848	8.09305		7.11637
Man.	18.80920		10.23392	7.15747	3.33333	5.51724
Sask.	18.80920		17.54386	7.92434	3.33333	7.54310
Alta.	18.80920			8.69121	3.33333	7.81034
B. C.			8.77193	10.99182	3.33333	14.07757
Ft. William (subsidy movement)		14.06452				

classifications were chosen to coincide with the N.R.C. data for the feed consumption rates of beef cattle. This data was used to derive the coefficients for feed consumption with due allowance for the inefficiency in feeding previously determined. Calves up to two hundred pounds were assumed to be fully dependent on the dam, the next group obtaining additional nutrients from forage and the three remaining groups depending on both forage and grain. Three rations for each of the basic herd and the latter three weight groups were prepared on the basis of concentrate-to-roughage ratios of 30:70, 50:50, and 70:30, respectively. According to the N.R.C. concentrate-to-roughage ratios falling between the range of 30:70 to 70:30 have been shown to be satisfactory experimentally in promoting live-weight gains in growing and fattening cattle.[73] Furthermore all concentrates were assumed to be substitutes in terms of units of digestible energy and a similar assumption was made for the roughages.

Non-feed costs for the basic herd were based upon the results obtained from an Ontario study.[74] The procedure adopted was to relate the cost per unit of basic herd to the output in terms of the weight of calf produced. The figure obtained was adjusted to the 1962-63 season by use of appropriate price indices and this was further modified

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[73] Committee on Animal Nutrition, Nutrient Requirements of Beef Cattle, Pub. 579. Washington: National Research Council, 1959, p. 6.

[74] Data are recorded by I. F. Furniss in Costs of Production in Agriculture. Ottawa: Economics Branch, Canada Dept. of Agriculture, 1965, p. 27.

by subsequent indexes to account for the differential in production costs prevailing between Eastern and Western Canada. Further adjustment was made to compensate for the loss of animals due to death experienced during the study.

Non-feed costs for the production of beef animals on feed were obtained by reference to an Alberta study.[75] This study showed an average daily gain for cattle on feed in feedlots of 1.8 pounds. The total non-feed expenses were then calculated on a daily basis. Appropriate adjustment for the differential in costs prevailing between Eastern and Western Canada was made by the method indicated above. These costs on a daily basis were used to calculate the non-feed costs for the respective weight groups by using the data provided in the N.R.C. bulletin to obtain the number of days required on feed to move through the particular weight ranges according to the concentrate-to-roughage ration fed. The non-feed costs as calculated therefore allow for the alternative feeding systems followed.

Hogs

(1) Rations

The basic hog rations used were those prepared by Dr. M. E. Seale.[76] Composite rations with wheat, barley, and corn emphasis,

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[75] D. F. Haythorne and K. Elgaard, Alberta Cattle Feeding Study (Farm Feedlots), 1962-63. Ottawa: Economics Branch, Canada Dept. of Agriculture, 1965, pp. 32-36.

[76] Faculty of Agriculture and Home Economics, Principles and Practices of Commercial Farming. Winnipeg: University of Manitoba, 1965, pp. 207-214.

respectively, were prepared to account for the maintenance of the boar and the sow with due regard to the gestation and lactation requirements of the latter. Similar composite rations which reflected the various stages of growth were prepared for the market hog. Reference was made to the N.R.C. standards[77] to obtain the feed required by the respective classes in terms of digestible energy, these requirements being modified to account for the indicated relative inefficiency in feeding. Feeds other than cereal grains used for supplementary purposes were not considered as being part of the ration proper but were nonetheless accounted for by a charge assessed against the particular ration used, such supplements being valued according to the prevailing price of soy bean oil meal.

(2) Costs Other Than for Cereal Grains

Limited information is available on the cost of producing hogs. Reference was made to a table showing estimates of the costs of production.[78] This table was used to estimate both the costs of maintaining the basic herd those incurred in raising the market hog. The indicated costs were adjusted by the appropriate indices to the 1962-63 production year. This adjustment provided estimates for both Eastern

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[77] Committee on Animal Nutrition, Nutrient Requirements for Swine, Pub. 648. Washington: National Research Council, 1959.

[78] I. F. Furniss, op. cit., p. 37.

and Western Canada. The non-feed costs associated with the two classes were further increased by the cost by area of the supplements necessary to balance the respective rations. The final cost figure therefore varied according to both the location of production and the particular ration adopted.

Poultry and Turkeys

(1) Rations

Three rations were adopted for use in feeding the basic poultry herd.[79] The individual rations employed wheat, wheat and oats, and oats respectively, as the principal feed source. The amount of feed required was determined from N.R.C. data[80] and adjustment made for feeding inefficiency. Supplementary feeds were accounted for by adjustments to the non-feed costs of production. In addition to the rations prepared for the basic herd which was assumed to be used entirely for egg production, rations for broilers and capons were provided and the same adjustment procedure was followed as in the case of the basic herd. A similar method was used to establish a ration for the basic turkey herd and also for broilers and mature turkeys. The provision of rations for use in alternative methods of meat production in each case was made

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[79] Faculty of Agriculture and Home Economics, op. cit., pp. 277-301. Rations for turkeys and cost data for both poultry and turkeys were also derived from this source.

[80] Committee on Animal Nutrition, Nutrient Requirements for Poultry, Pub. 827. Washington: National Research Council, 1963.

to enable regional specialization.

(2) Production Costs Other Than for Cereal Grains

Basic data available for calculating non-feed costs for both poultry and turkey production are sketchy in nature. However, that contained in the Manitoba publication was used in the analysis to derive such costs. This data was subjected to adjustment based upon the differences in the price indexes prevailing for Eastern and Western Canada. The same procedure for evaluating the supplemental feeds was followed that was used for hogs, namely, that the supplements were priced as soy bean oil meal according to the province where used. Production costs other than for cereal grains therefore varied by areas and in the case of the basic poultry herd according to the particular ration adopted.

Transportation Activities

Costs associated with product movement between regions are crucial to any spatial equilibrium study. This aspect was therefore investigated in depth. Quotations on competitive rail rates between specific cities for domestic grain, livestock, packing house products including eggs, hay, and fresh meats applying to the 1962-63 period were obtained from the Canadian National Railways.[81] Such quotations

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[81] The assistance of J. R. Scanlan, Regional Freight Sales Manager, at Winnipeg combined with that of his courteous and competent staff is gratefully acknowledged. Quotations were provided on the respective rates and also information on the competitive rail miles involved.

were only available, however, between points where a significant volume of product moved. Competitive rail rates are established, in general, subsequent to the development of traffic and therefore such rates would apply to traffic which might develop due to changes in the level of subsidy in feed grain movement. It was considered expedient therefore to estimate the competitive rates which would prevail if this movement developed.

Transportation rates tend to increase with distance at a decreasing rate reflecting the reduced relative importance of the handling cost. A curvilinear function of the following form was used to make estimates of the non-existing competitive rates:

$$Y = a + b X_1 + c\sqrt{X_1}$$

where Y = rate per hundred pounds

X_1 = distance in competitive rail miles

Results of Regression Analyses

At the outset rates on the movement of domestic grain were obtained. However, such rates were found to be of minimal importance in feed grain movement since grain moves out of the surplus prairie region for export under the Crows Nest rates. Domestic rates therefore apply only to movement beyond terminal locations. It was found that such movement was largely by water rather than by rail.

A regression analysis provided the estimating equation:

$$Y = 93.622789 + \underset{(0.021749)}{0.087288X_1} - \underset{(1.687466)}{3.582834}\sqrt{X_1}$$

where Y = rate per hundred pounds on domestic grain and X_1 = distance in competitive rail miles. "R" was calculated to be 0.937290 and was highly significant. The underlying reasoning as to the form of the estimating equation was thereby supported. Since the rates on domestic grain are primarily of academic importance this matter will not be pursued further.

For livestock the estimating equation was calculated to be:

$$Y = 47.423939 + \underset{(0.028870)}{0.083227X_1} + \underset{(2.273778)}{.345479}\sqrt{X_1}$$

"R" = 0.974016 and was significant at the .001 level.

A similar analysis for the movement of fresh meat provided the following results:

$$Y = 153.735808 + \underset{(0.032450)}{0.176683X_1} - \underset{(0.176683)}{5.129120}\sqrt{X_1}$$

"R" = 0.9799898 and was significant at the .001 level.

For packing house products including eggs the estimating equation was calculated to be:

$$Y = 221.678364 + \underset{(0.036720)}{0.198702X_1} - \underset{(3.000371)}{8.770543}\sqrt{X_1}$$

"R" = 0.970557 and was significant at the .001 level.

Finally, the estimating equation for hay follows:

$$Y = 38.073714 + \underset{(0.005862)}{0.104068X_1} - \underset{(0.312582)}{0.298674}\sqrt{X_1}$$

"R" = 0.997290 and was significant at the .001 level.

Transportation Rates Used for Interregional Movement of Non-Subsidized Products

Estimates of competitive rail rates were made only for product movements between points for which no quotations were given. In making such estimates the assumption was made that such rates would be independent of direction. Actual rates were used where available and for certain products these rates varied by direction.

The necessary estimates of the rates for meat, eggs, and hay were made directly by use of the respective formulae. The rates for hay were subsequently converted from a pound to therm, and those for eggs from a pound to dozen, rate to coincide with the types of measurement used in the analysis. For poultry meat the more economical of either the meat or the packing house product rate was adopted. Such procedure tended to follow standard practice. The estimation of rates for livestock was also straightforward. However, tissue shrinkage accompanies livestock movement. Such shrinkage was assumed to be a function of time which in turn reflected speed and distance. An adjustment was therefore made in the rates to compensate for the loss due to tissue shrinkage as a function of time spent in transit,[82] such

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[82] The importance of tissue shrinkage is discussed by G. C. Carlson, Transportation Costs as a Factor in the Competitive Position of Livestock Slaughter Plants in the Prairie Region of Canada. Saskatoon: University of Saskatchewan, 1964, unpublished thesis, pp. 35 and 168, and also by W. F. Williams and T. T. Stout, Economics of the Livestock-Meat Industry. New York: The MacMillan Co., 1964, pp. 649-662.

shrinkage being valued at the average of the annual prices prevailing at ten public markets for cattle and hogs, respectively. There was assumed to be no differential in shrinkage on a percentage basis between cattle and hogs. The rates used for the specific products appear in Table 28.

Transportation Rates for Feed Grain Movements

As was indicated previously the competitive rail rates on domestic grain are of importance only for movement to British Columbia. Grain derivatives used for feeding purposes normally move by the water down the lakes from Ft. William to receiving ports. The direct water rates were therefore considered to apply on such movements. It is recognized that during the winter period such rates do not apply though a recent modification in rail rates suggests that such an assumption is realistic. By inference, adequate facilities are available for storage and it may be recalled that in effect free storage on feed grain was available for a limited period before the recent rate change.

Effective rates were derived for four situations:

(1) where the subsidy at the average level paid on movement to the individual provinces during 1962-63 was applied to movement between the central points involved.

(2) where the published rates prevailed without

TABLE 28

EFFECTIVE COMPETITIVE RAIL RATES BETWEEN SPECIFIC POINTS
FOR SELECTED FARM PRODUCTS
(dollars per thousand units)

Between	Red Meats (lbs.)	Eggs (doz.)	Poultry (lbs.)	Hogs (lbs.)	Cattle (lbs.)	Hay (therms)
Halifax and						
St. John	11.73	19.61	11.73	8.11	8.34	6.34
Charlottetown	11.67	20.06	11.67	7.47	7.67	5.95
Montreal	14.76	19.71	13.14	13.27	13.83	11.26
Toronto	17.83	22.44	14.96	16.56	17.29	14.61
Winnipeg	26.60	33.00	22.00	24.47	25.72	25.00
Saskatoon	33.30	40.80	27.20	29.47	31.01	28.96
Calgary	38.20	48.60	32.40	33.24	34.75	33.51
Vancouver	47.95	61.26	40.84	40.64	43.01	40.17
St. John N.B. and						
Charlottetown	11.65	20.37	11.65	7.41	7.59	5.74
Montreal	12.66	18.74	12.49	10.34	10.72	8.42
Toronto	15.09	19.95	13.30	13.56	14.09	11.65
Winnipeg	25.90	32.40	21.60	23.37	24.43	22.60
Saskatoon	32.70	40.05	26.70	28.41	29.78	27.44
Calgary	37.60	47.85	31.90	32.05	33.63	31.08
Vancouver	48.83	56.90	37.93	39.46	41.59	37.74
Charlottetown and						
Montreal	14.25	19.37	12.91	12.66	13.19	10.63
Toronto	17.22	21.83	14.55	15.93	16.62	13.99
Winnipeg	26.60	33.00	22.00	24.39	25.60	22.83
Saskatoon	33.30	40.80	27.20	29.43	30.95	27.68
Calgary	38.20	48.60	32.40	33.16	34.91	31.33
Vancouver	45.14	57.33	38.22	40.48	42.77	37.99
Montreal and						
Toronto	11.00	19.16	11.00	8.59	8.79	6.90
Winnipeg	17.70	21.45	14.30	16.83	17.58	17.79
Saskatoon	24.30	29.25	19.50	21.87	22.93	22.62
Calgary	29.30	37.05	24.70	25.01	26.28	26.26
Vancouver	38.72	48.47	32.31	36.72	38.54	32.89
Toronto and						
Winnipeg	17.70	21.45	14.30	16.80	17.54	15.92
Saskatoon	24.30	29.25	19.50	21.71	22.69	20.74
Calgary	29.30	37.05	24.70	24.85	26.04	24.37
Vancouver	36.37	45.30	30.20	36.56	38.31	30.99
Winnipeg and						
Saskatoon	12.56	18.74	12.49	9.87	10.25	8.28
Calgary	22.70	20.04	13.36	14.91	15.50	12.27
Vancouver	21.66	26.57	17.71	26.59	27.80	18.00
Saskatoon and						
Winnipeg	--	--	--	9.27	9.65	--
Calgary	10.00	15.00	1.00	9.75	9.07	7.16
Vancouver	20.00	30.00	2.00	20.69	21.61	14.72
Calgary and						
Vancouver	13.50	23.25	13.50	13.47	14.04	10.02
Winnipeg	16.70	--	--	13.21	13.80	--

Source: Derived from C.N.R. data using the procedures described in the text.

change.[83]

(3) where the balance of the subsidy applying beyond Toronto was allowed. This situation coincides with Kerr's suggestion.

(4) where zero transfer costs prevailed.

Since actual rates did not exist for all feeds, screenings were assumed to move under the oat rate while millfeeds were assumed to move at the wheat rate to Montreal and the rail ex water rate thereafter. The rates were subsequently expressed in terms of movement in therms of digestible energy. The calculated rates appear in Table 29.

Ancillary Production Activities

Several other activities were introduced into the matrix primarily for transfer purposes. These activities included those associated with slaughter, egg hatching, consumption activities, and exports and imports of specific products. Slaughter activities were introduced to allow slaughter at each stage of development, the five weight groups for cattle and at two hundred pounds for hogs. No cost was assessed to the

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[83] The rates published in Grain Trade of Canada for direct water shipment from Ft. William were used for movement easterly from that port. Rates to Vancouver reflect those for domestic movement by rail from the Calgary-Edmonton area less the twenty-six cents per hundred freight rate prevailing to Ft. William. A special procedure was followed to determine the rate on movements of Manitoba corn to Vancouver. Rate situation one refects the minimum net cost of movement under subsidy thereby allowing the maximum effect of the subsidy upon the location of livestock production to be ascertained.

TABLE 29

EFFECTIVE TRANSPORTATION RATES FOR SPECIFIC FEEDS UNDER ALTERNATIVE CONDITIONS*
(dollars per thousand therms)

From Ft. William To	Wheat (1)	Wheat (2)	Wheat (3)	Oats (1)	Oats (2)	Oats (3)	Barley (1)	Barley (2)	Barley (3)
Toronto	- .96	.64	.64	- .54	1.29	1.29	- .74	.90	.90
Montreal	-1.45	1.09	.15	-1.13	1.77	.69	-1.27	1.35	.37
St. John	- .48	3.76	1.11	1.45	6.30	3.27	.45	4.82	2.09
Halifax	-2.87	1.56	-1.28	-2.46	2.59	- .64	-2.59	1.97	- .94
Charlottetown	- .74	3.76	.86	1.16	6.30	2.98	.19	4.82	1.83
Vancouver	- .14	2.44	1.45	- .16	2.78	1.66	- .15	2.51	1.50

From Ft. William To	Rye (1)	Rye (2)	Rye (3)	Screenings (1)	Screenings (2)	Screenings (3)	Millfeeds (1)	Millfeeds (2)	Millfeeds (3)
Toronto	- .90	.78	.78	- .61	1.45	1.45	-1.06	.71	.71
Montreal	-1.42	1.26	.26	-1.27	2.00	.79	-1.61	1.21	.17
St. John	- .05	4.41	1.63	1.64	7.12	3.70	1.29	6.00	3.06
Halifax				-2.79	2.93	- .73	1.36	6.28	3.14
Charlottetown				1.32	7.12	3.37	1.29	6.28	3.06
Vancouver				- .18	3.15	1.87	- .16	2.70	1.61

Corn to Vancouver (1) 1.56 (2) 8.92 (3) not applicable

*(1) actual rate less subsidy
(2) actual rate
(3) rate calculated under (1) plus rate from Ft. William to Toronto

Source: Author's calculations based on data provided by the C.N.R. and in Grain Trade of Canada. The method used in the calculations is described in the text.

slaughtering activity since this cost was assumed to be compensated for by the value of the by-products. In the case of the hatching activities appropriate adjustments were made for hatchability and costs were assessed in accord with data obtained from the same source as the ration formulations. Consumption activities allowed products to be transferred into consumption channels within a region. Exports and import activities provided for the foreign trade indicated for certain products. Imports were valued at a price equivalent to that prevailing on the average in Canada during the 1962-63 period.

Format of the Matrix

The matrix constructed appears in abbreviated form for illustration purposes in Appendix VII. Sufficient detail is recorded to clarify the terminology used and enable an understanding of the various restrictions and activities. This will serve as key to translate into everyday terms the optimal solutions given in tabular form in Chapter VI.

CHAPTER VI

THE ANALYSIS (A)

The effects of the subsidy upon the location of livestock production, though recorded in tabular form in Appendix VIII, require further elucidation. The voluminous nature of the print-out by the computer of the solutions tends to obscure the pertinent data. In addition, a comparison is necessary between the various alternative combinations considered if the net effects of the subsidy are to be ascertained. The procedure followed, therefore, will be successively to examine the alternatives in the sequence of relaxation of the restrictions.

Enumeration of the alternative situations considered will serve to clarify the subsequent presentation. Right hand side one, RHSO1, is most restrictive in that acreages devoted to feed production are fixed on a provincial basis. The same situation prevails for the numbers of animals in the basic herd. Feed consumption of wheat, oats and barley is limited on the prairies to the residual following removal of the volume of the respective grains moving for export. Right hand side two, RHSO2, is similar to right hand side one except that the acreage devoted to the production of oats, barley, mixed grain and tame hay on a provincial basis is allowed to be distributed among these crops such that total costs of producing the required final products are minimized. Right hand side three, RHSO3, is even less restrictive in that the total

basic herd within Canada can be distributed between the provinces so that costs are minimized. Right hand side four, RHS04, the least restrictive, increases the acreage which may be devoted to the production of feed for local use on the prairies by eliminating the export requirements for oats and barley. Four cost situations are applied to each of these restriction combinations. The first situation, 1COST, provides a series of costs associated with the various activities which reflect those presently experienced with the feed freight subsidy applied. The second situation, 2COST, is similar except that the subsidy is now removed. It will be noted that a comparison between the results obtained using these respective cost situations will enable determination of the locational effects of the subsidy. The third cost situation, 3COST, applies the subsidy at a level reduced by an amount equivalent to that previously given to movements between Ft. William and Toronto. The final cost situation, 4COST, eliminates all costs of feed grain movement from Ft. William to recipients in provinces to which the subsidy applies. The sixteen combinations of restrictions and costs will subsequently be subjected to scrutiny.

Preliminary Analysis

Three early runs indicated that certain modifications in the matrix were required to prevent what appeared to be inconsistencies in the solutions. These initial solutions showed high volume movements of calves up to two hundred pounds, non-use of roughage other than

pasture and also a high cost attached to forcing subsidy feeds into the solution at the level on which payments were made. Interprovincial movement of calves of less than two hundred pounds, in practice, is very limited. Consequently, the matrix was modified so that inter-province movements of calves of this weight range were prevented while at the same time exports of this class at the indicated level were allowed. Since pasture is only available for a restricted period of the year, consumption of roughage other than pasture must come from stored supplies. Consumption of pasture was, therefore, made dependent upon using other roughage in the ratio of the pasture to non-pasture months. The high cost of forcing subsidy feeds at existing levels into the solution was considered a reflection of the inefficiency in producing the required products. The effect of the subsidy, in other words, was partially dissipated by production inefficiency. Any positive effect of the subsidy will be restricted to that part not used in overcoming such inefficiency. The matrix was therefore modified to allow the level of feed movements under subsidy to be determined according the minimum overall cost of production while at the same time retaining the actual movement as the maximum limit.

The above matrix modifications served to overcome the gross inconsistencies inherent in the matrix. On the other hand, as the analysis proceeded aberrations of a minor nature appeared. Foremost among these was the zero level of beef cattle production activities in British Columbia. This can be accounted for by the use of coefficients

based on "average" conditions for a whole province. On the other hand, a minor discrepancy results since while sufficient feed is removed from the analysis to account for milk production, no additional feed is used for the associated beef production nor is any credit given for beef produced. This self-cancelling feature tends to keep error at a minimum. Consequently, no further modifications were made in the matrix.

Minimum Costs Under Alternative Conditions

The minimum cost of satisfying the regional (provincial) demands for livestock products under alternative combinations of resources and restrictions are recorded in Table 30.

It will be recalled that the RHS01 - 1COST combination portrays existing conditions under the subsidy. The amount of subsidy which would be paid under this combination is $13,749,372. That actually paid was $14,981,708. If the two sums are compared an indication of how closely the model conforms to the real world situation can be obtained. Using this procedure the model is approximately 90 per cent efficient. On the other hand, the solutions reached by the computer are optimum for the conditions imposed. From this viewpoint, a substantial portion of the discrepancy between the two sums can be considered to result from the inefficient organization of production prevailing at the present time. The difference of $1,232,326 from an economic point of view can therefore be considered to be wasted.

Substantial savings will accrue to adjustment within the feed-

livestock economy. The steps in adjustment were first to allocate available feed grain acreage in accord with minimizing cost; second to allow the respective basic herds within Canada to locate between the provinces to also minimize cost; and third to remove the export requirement for prairie feed grains. The savings which could be achieved by adjustment are shown in Table 31.

TABLE 30

EXPENDITURE REQUIRED UNDER ALTERNATIVE RESOURCE RESTRICTIONS AND ACTIVITY COST COMBINATIONS TO SATISFY THE REGIONAL DEMANDS FOR LIVESTOCK PRODUCTS, 1962-63
(dollars)

	1COST	2COST	3COST	4COST
RHS01	1,375,175,100	1,385,877,300	1,382,657,400	1,379,690,000
RHS02	1,350,993,900	1,358,513,800	1,355,873,300	1,355,064,300
RHS03	1,330,497,200	1,339,106,600	1,336,337,800	1,335,895,100
RHS04	1,329,850,700	1,338,459,500	1,335,690,700	1,335,247,800

Source: Appendix VIII

This table is particularly enlightening. Merely be producing those crops having the greatest nutrient to cost ratio (RHS02) a saving of over twenty-seven million dollars could be achieved without the subsidy. On the other hand, the cost reduction under the subsidy would be less, just over twenty-four million dollars, a reflection of the

reduced requirement for movements of grain to which the subsidy applies. In addition, if basic herds were adjusted between provinces in accord with minimum cost (RHS03), a further saving of over nineteen million dollars would be attainable without the subsidy, as compared to over twenty million dollars under its application. Savings attached to removal of the export requirements for feed grain following the previous adjustments (RHS04) are small. This indicates that making additional grain available for feeding on the prairies would have a minimal effect upon total production costs. Subsidy level modifications, 3COST and 4COST, as would be anticipated, provide reductions in cost associated with the respective adjustments intermediate between those previously mentioned.

TABLE 31

INDICATED SAVINGS IN PRODUCTION COST
ASSOCIATED WITH ADJUSTMENT
(dollars)

Adjustment from RHS01 to	Cost Condition			
	1COST	2COST	3COST	4COST
RHS02	$24,181,200	$27,363,500	$26,784,100	$24,625,700
RHS03	44,677,900	46,770,700	46,319,600	43,794,900
RHS04	45,324,400	47,417,800	46,966,700	44,442,200

Source: Table 30

Efficiency of the Subsidy in Reducing Farm Costs

The amount of the subsidy which would be paid under alternative resource and cost combinations is shown in Table 32. Given existing locations and levels of resources the subsidy is effective in reducing the aggregate cost of production at the farm level by up to nearly eleven million dollars. However, the amount of subsidy which actually would be paid approaches fourteen million dollars.

The difference between the amount of subsidy which would be paid and the actual reduction in cost at the farm level represents gross economic waste since it results from the dislocation of production caused by the application of the subsidy. One formula for measuring the efficiency of the subsidy in reducing cost is the following:[83]

$$\text{Efficiency} = \frac{\text{Total subsidy} - \text{Wasted Expenditure}}{\text{Total subsidy}} \times 100$$

Using this formula the subsidy is from 41.6 per cent to 77.8 per cent efficient in reducing farm production costs, depending upon the particular resource-cost combination imposed. This inefficiency is to be deplored, since it results from a misallocation of resources. Viewed from another angle it is an impediment to desirable adjustment and consequently should be discontinued in the interests of economic efficiency.

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[83] This measure is analogous to that used by Henderson. See J. M. Henderson, The Efficiency of the Coal Industry. Cambridge: Harvard University Press, 1958, p. 81.

AMOUNT OF SUBSIDY PAID BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST CONDITIONS
(dollars)

Province	Right Hand Side One (Existing Conditions) 1COST	2COST	3COST	4COST	Right Hand Side Two (Feed Acreage Allotable) 1COST	2COST	3COST	4COST
Prince Edward Island	--		--	--	--		--	--
Nova Scotia	3066983		1961801	1030873	3061973		2105611	1241408
New Brunswick	114391		71379	932646	--		--	723081
Quebec	3372793		1254241	1551241	5498666		1725205	2592230
Ontario	3479693			2240330	468072			187912
British Columbia	3715512		2432707	4267062	2878918		2087417	3548355
Canada	13749372		5720128	10022152	11907629		5918233	8292986
Reduction in Farm Cost	10702200		3219900	6187300	7519900		2640500	3449500
Efficiency of Subsidy (per cent)	77.8		56.3	61.7	63.2		44.6	41.6
	Right Hand Side Three				Right Hand Side Four			
Prince Edward Island	--		--	--	--		--	--
Nova Scotia	5008352		1815563	1241359	5003411		1810436	1241359
New Brunswick								
Quebec	9038287		1563786	2253138	9041122		1563786	2253138
Ontario				9745				9745
British Columbia	2526013		1978895	3542157	2526013		1978895	3542157
Canada	16572652		5358244	7046399	16570546		5353117	7046399
Reduction in Farm Cost	8609400		2768800	3211500	8608800		2768800	3211700
Efficiency of Subsidy (per cent)	52.0		51.7	45.6	52.0		51.7	45.6

Source: Appendix VIII

The reduction in farm cost associated with the subsidy varies greatly according to the alternative combination used. Given existing locations and levels of resources the subsidy applied at the present level is effective in reducing farm production costs by over ten million dollars. If the subsidy applied only to movements beyond Toronto (3COST) the savings are substantially less due to the reduced level of payment. On the other hand, savings resulting from the elimination of feed grain movement costs beyond Ft. William (4COST) while larger, about six million dollars, are less than those experienced under actual levels of payment (1COST). After provincial internal adjustment in feed production (RHS02) the reduction in cost as a result of the subsidy is somewhat diminished. This reflects a lower total level of payment. Adjustment in the location of the basic herd (RHS03) has the effect of increasing the cost reduction due to the subsidy but this in turn merely reflects a higher level of payment. Removal of the export requirement for prairie feed grain has minimal additional effect in reducing production costs.

The amounts of subsidy paid by province vary greatly and reflect the feed movements which in turn are a function of the resource-cost combination applied. The solutions obtained indicate that Prince Edward Island does not participate in the subsidy. On the other hand, Nova Scotia, Quebec, and British Columbia each receive large payments. New Brunswick and Ontario benefit most under conditions of greatest restriction. After adjustment, New Brunswick does not receive any

feed freight assistance while Ontario only receives assistance where all feed movement costs beyond Ft. William are paid.

The present level of subsidy results in the largest payments in aggregate being made. Effective removal of all freight costs on feed grains beyond Ft. William would necessitate payment of a substantially lower sum inferring that the subsidy at the present level overcompensates for feed movement costs. Reduction in the subsidy level by an amount equivalent to that presently applying to movements between Ft. William and Toronto would further reduce the total payment required.

It is interesting to note that after adjustment has taken place (RHS04) that payments under present levels of subsidy are made on movements to Nova Scotia, Quebec and British Columbia only, with more than half the total accruing to Quebec. In fact, these three provinces receive the major share of the payment regardless of the level of subsidy applied. Distribution of payment on this basis bears little relation to accepted criteria of "need". If the objective of the subsidy is to aid depressed areas, it is a very inequitable as well as inefficient tool.

The reduction in on-farm costs of production associated with the subsidy will not necessarily directly benefit the farm proprietors. The lower costs will be reflected in lower prices for the products produced, given pure competition at the farm level. On the other hand, the subsidy encourages the development of production in areas where this would not otherwise occur. As a result of this development certain

benefits may accrue to the region as a whole and particularly to supporting industries. Consumers will ultimately benefit but the extent to which they will do so will depend upon the degree of competition between the providers of marketing services. The maximum benefit would be the total reduction in cost at the farm level but in actual practice this will tend to be diminished. In other words, the efficiency of the subsidy as a cost reducing medium will be even lower at the consumer than at the farm level. In consequence, a search should be made for a more effective means of reducing these costs.

Production Limiting Factors

Factors which are fully utilized in production may be identified by their associated marginal costs or in linear programming terminology, their shadow or implicit prices. Identification of such factors provides a guide to policies to adopt to increase output should this be the desired goal.

The effect of progressively removing restrictions upon production factors becomes very evident in the analysis. Proper allocation of acreage between feed crops results in a substantial reduction in the limitations upon local feed supply. The subsequent determination where basic herds are allocated in an optimum manner removes the limitations originating from this source. On the other hand, effective removal of upper limits upon feed grain use on the prairies did little to modify the remaining factors in limited supply.

Right Hand Side One

The current situation described by Right Hand Side One shows that the local production of wheat is fully utilized in all but the prairie provinces under all cost conditions. The same situation prevails for locally produced feed grain in Nova Scotia and New Brunswick at all cost levels. The supply of pasture is fully utilized in Nova Scotia, New Brunswick, Quebec, Ontario and Manitoba regardless of the cost conditions imposed by the model. Deficiencies in corn supply are noted in Ontario and Manitoba with fodder corn also being deficient in the former province. The grain crop aftermath is insufficient to meet the demand in Saskatchewan and Alberta. However, the size of the respective basic herds appears as the principal limiting factor in many provinces. The cattle herd is limiting in Prince Edward Island, New Brunswick, Ontario and Saskatchewan at each of the cost levels. The hog herd is limiting in Prince Edward Island, Ontario, Manitoba, Saskatchewan and Alberta at all levels of cost with that in Nova Scotia being limiting at all except cost condition two. The poultry herd is limiting in all provinces except Alberta and British Columbia under all cost conditions while the turkey herd is similarly restricting in all except British Columbia, as shown in Table 33.

In the short run, relaxation of any of the restrictions which are effective will lower the total costs of producing the required products, providing this expansion of resource supply can be achieved on the basis of current costs. Opportunities for expanded wheat production,

TABLE 33

FACTORS LIMITING PRODUCTION IN A PARTICULAR PROVINCE UNDER ALTERNATE RESOURCE AND COST COMBINATIONS*

Province	Limiting Factors	Resource Restrictions RHS01 Cost Conditions 1	2	3	4	RHS02 Cost Conditions 1	2	3	4	RHS03 Cost Conditions 1	2	3	4	RHS04 Cost Conditions 1	2	3	4
Prince Edward Island	Local wheat	+	+	+	+	+	+	+	+								
	Feed grain acreage**		+												+		
	Pasture					+		+	+	+	+	+	+	+	+	+	+
	Basic cattle herd	+	+	+	+	+	+	+	+								
	Cattle slaughtering capacity	+	+	+	+	+	+	+	+		+				+	+	+
	Basic hog herd	+	+	+	+		+	+	+								
	Basic poultry herd	+	+	+	+	+	+	+	+								
	Basic turkey herd	+	+	+	+	+	+	+	+								
Nova Scotia	Local wheat	+	+	+	+	+	+	+	+	+	+	+	+				
	Feed grain acreage	+		+													
	Pasture	+	+	+	+	+	+	+	+	+	+	+	+				
	Cattle slaughtering capacity									+							
	Basic hog herd	+		+	+	+	+	+	+								
	Hog slaughtering capacity									+	+	+	+	+	+	+	+
	Basic poultry herd	+	+	+	+	+	+	+	+								
	Basic turkey herd	+	+	+	+	+	+	+	+								
New Brunswick	Local wheat	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Feed grain acreage																
	Pasture	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Basic cattle herd	+	+	+	+	+											
	Basic hog herd						+										
	Basic poultry herd	+	+	+	+	+	+	+	+								
	Basic turkey herd	+	+	+	+	+	+	+	+								

* + denotes limitation present. **where oats, barley, mixed grain or hay become limiting.

Source: Appendix VIII

TABLE 33 (continued)

Province	Limiting Factors	Resource Restrictions RHS01 Cost Conditions 1	2	3	4	RHS02 Cost Conditions 1	2	3	4	RHS03 Cost Conditions 1	2	3	4	RHS04 Cost Conditions 1	2	3	4
Quebec	Local wheat	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Pasture	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Basic poultry herd	+	+	+	+	+	+	+	+								
	Basic turkey herd	+	+	+	+	+	+	+	+								
Ontario	Local wheat	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Corn	+	+	+	+					+	+	+	+	+	+	+	+
	Fodder corn	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Pasture	+	+	+	+												
	Basic cattle herd		+														
	Basic hog herd	+	+	+	+		+										
	Basic poultry herd	+	+	+	+	+	+	+	+								
	Basic turkey herd	+	+	+	+	+	+	+	+								
Manitoba	Corn	+	+	+	+												
	Pasture	+	+	+	+	+	+	+	+	+	+	+	+				
	Cattle slaughter capacity									+	+	+	+	+	+	+	+
	Basic hog herd	+	+	+	+	+	+	+	+								
	Basic poultry herd	+	+	+	+	+	+	+	+								
	Basic turkey herd	+	+	+	+	+	+	+	+								
Saskatchewan	Feed grain acres	+	+	+	+	+	+	+	+	+	+	+	+				
	Pasture													+	+	+	+
	Basic cattle herd	+	+	+	+	+	+	+	+								
	Cattle slaughter capacity	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Basic hog herd	+	+	+	+												
	Basic poultry herd	+	+	+	+	+	+	+	+								
	Basic turkey herd	+	+	+	+	+	+	+	+								

TABLE 33 (continued)

Province	Limiting Factors	Resource Restrictions RHSO1 Cost Conditions 1	2	3	4	RHSO2 Cost Conditions 1	2	3	4	RHSO3 Cost Conditions 1	2	3	4	RHSO4 Cost Conditions 1	2	3	4
Alberta	Feed grain acres	+	+	+	+												
	Pasture									+	+	+	+	+	+	+	+
	Basic cattle herd					+	+	+	+								
	Cattle slaughter capacity					+	+	+	+	+	+	+	+	+	+	+	+
	Basic hog herd	+	+	+	+												
	Basic turkey herd	+	+	+	+	+	+	+	+								
British Columbia	Local wheat production	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grain Under Subsidy	Wheat	+	+	+	+	+		+	+					+			
	Oats	+	+	+	+	+			+					+			
	Barley	+	+	+	+									+			
	Corn	+	+	+	+												
	Rye	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Screenings			+	+	+		+	+		+	+	+			+	+

given present technology, are limited in the subsidy provinces. Likewise, corn production in Manitoba and Ontario is restricted to those sections having favourable soil and climate conditions. Possibilities exist for expansion in the production of this crop as a result of the progressive development of more hardy and higher yielding hybrids. Increases in cattle slaughter capacity in Saskatchewan and Prince Edward Island can only be recommended if sufficient volume is available to obtain economies of scale. Distribution of the acreage available for feed grain and hay production in accord with minimum over all production cost has considerable merit in as much as this can be accomplished with minimal disturbance in intra-province farm management practices. Adjustment in this respect is subsequently examined under resource restriction level two, RHS02. The effects of basic herd adjustment will be left to the discussion of right hand side three. All subsidy feeds except millfeeds and screenings were fully utilized under all price conditions. Millfeeds were not limiting under any cost alternative whereas screenings became so under cost conditions three and four.

Right Hand Side Two

Local wheat production remained fully utilized under all cost conditions. On the other hand, the acreage available for feed grain production was limiting only in Saskatchewan. A similar situation existed for corn which was now only partly utilized in either Ontario

or Manitoba. A change occurred in pasture which now became limiting under cost conditions one, three and four in Prince Edward Island while the previous situation continued in other areas. The basic cattle herd remained limiting in Prince Edward Island and became limiting in Alberta under all cost conditions. On the other hand, it was no longer limiting in Ontario and remained so only under cost condition one in New Brunswick. Full employment of the basic cattle herd in Alberta caused slaughtering capacity in that province to become limiting. The basic hog herd was limiting under all cost conditions in Nova Scotia and Manitoba, while in Prince Edward Island this was true for cost conditions two, three, and four and in New Brunswick only under condition two. The previous situation continued with respect to the basic poultry and turkey herds. The size of the respective basic herds became a limiting factor where local feed supplies became less critical. The adjustment in the allocation of available acreage to the different feeds also resulted in a decline in the use of feed under subsidy. Available barley, millfeeds and corn were not fully utilized. This situation existed for oats under cost conditions two, three and four; for wheat under condition two; and for screenings under condition two.

Right Hand Side Three

Under this restriction combination the respective basic herds within the provinces were aggregated for Canada and then allowed to be distributed among the provinces on the basis of overall minimum pro-

duction cost. This represents what may be classed a long run adjustment in accord with minimizing overall production costs, the length of time elapsing reflecting the length of the reproductive cycle of the particular class of livestock. Such an adjustment should be fostered by the nation even though provincial policies may be adverse. The effect of this improved allocation indicates those areas in which further adjustment may be desirable.

Local wheat production was restricting in Nova Scotia, New Brunswick, Quebec, Ontario and British Columbia under all cost conditions. Pasture became restricting in Alberta on a similar basis. Feed grain acres remained restricting in Saskatchewan. Both corn and fodder corn production were deficient in Ontario. A deficiency in cattle slaughtering capacity appeared in Prince Edward Island under cost condition two, in Nova Scotia under cost condition one and in Manitoba under all cost conditions while slaughtering capacity in Alberta and Saskatchewan was also fully utilized. Hog slaughtering capacity in Alberta and Saskatchewan remained fully utilized while hog slaughtering capacity in Nova Scotia was deficient under all cost conditions. Subsidy feeds were used less as a source of nutrients than before; wheat and oats being fully utilized only under cost condition one, screenings under condition one, three and four and rye under all cost conditions.

Right Hand Side Four

The elimination of the export requirements for feed grain from

the prairies had the effect of increasing the acreage available for local feed production. This represented a late stage in the progress of desirable adjustment, effective restrictions remaining were relatively few. Local wheat production was limiting in New Brunswick, Quebec, Ontario and British Columbia under all cost conditions. Available feed grain acreage was limiting only in Prince Edward Island under cost condition two. Pasture was deficient in Prince Edward Island, New Brunswick, Quebec, Saskatchewan and Alberta under all cost conditions. Corn and fodder corn production remained deficient in Ontario. Cattle slaughtering capacity was fully utilized in Prince Edward Island under cost conditions two, three and four and under all cost conditions in Saskatchewan and Alberta. Wheat, oats and barley under subsidy were used up to current levels under cost condition one only whereas screenings were so used under conditions one, three and four, and rye under all cost conditions.

Evaluation

The model does not perfectly reflect the real world situation. Some distortions arise from within the model itself due to the limitations imposed. On the other hand, failure of the solutions reached to coincide with the observed situation cannot be altogether assessed against the limitations of the model. The solutions reached are "optimal" and there is no reason to believe that the actual situation will entirely conform to such an ideal. In any case, an adjustment process is involved. A time lag is inherent in any adjustment

process, particularly so in such an activity as the production of livestock. Adjustment may be impeded by the resistance of producers to change, the profound lack of knowledge of the prevailing production and marketing situation, the personal preferences of individuals, policies imposed by governments, and the lack of adequate incentives as well as by biological factors. The analysis should therefore not be rejected because of the apparent failure to correspond exactly with the real world situation. In fact, the solutions reached appear agreeably consistent with actual conditions. An indication of this consistency may be observed in the ordering of costs of producing the desired end products by province as illustrated in the shadow price data subsequently presented in Table 61 on page 273.

Changes in the level of resources restriction under alternative cost conditions serve to identify the appropriate direction for production adjustment over time. Assuming that the prices placed upon resources are equivalent to their opportunity cost and that changes in levels of those restricting can be accomplished at present costs, supply being infinitely elastic, alleviation of the impediments to achieving minimum cost is justified. The reduction in total cost can be ascertained by referring to Appendix VIII. It is evident that considerable adjustment is required in order to achieve minimum costs. With proper allocation of the acreage available for local feed production accompanied by the optimum location of the basic herds the impact of the feed subsidy upon production patterns diminishes. The

implications of this phenomenon will be considered under the discussion on production activities.

CHAPTER VII

THE ANALYSIS (B)

An examination of the levels of the various activities in the optimum solutions serves to clarify the locational effects of the subsidy under alternative resource and cost combinations. These combinations have been described previously and therefore will only be referred to here. The activities may be classified into five groups: those pertaining to cattle, hogs, poultry, turkeys, and feed movements, respectively. The groups are in order of declining complexity and will be considered individually in the ensuing analysis. On the other hand, the interrelationships existing between the groups must be recognized since changes in the level of one activity affect the levels of other activities.

Cattle

Consideration of the cattle activities will follow a production-marketing sequence beginning with the basic herd and following through the gestation and later feeding process culminating in the slaughter animal with the associated production of meat. Interregional movements of both the intermediate products, feeder and finished animals, and the final product meat will be described.

Size of the Basic Cattle Herd

The size of the existing basic herd was found at an early stage

of the analysis to be much larger than was necessary to produce the desired end product - meat. Slaughter of animals at less than the mature stage, 1,000 pounds, occurred only to satisfy the demand for veal. The high cost of the calf relative to the value of the animal fed at subsequent stages had the effect of rendering immature slaughter uneconomic. The effect of this on a cattle production program can hardly be overestimated. Slaughter of cattle at heavier weights reduces the pressure on forage supplies with which the cow-calf operation is so closely linked since a smaller basic herd is required to produce an equivalent volume of meat. The diseconomies attached to the present slaughter pattern are all too obvious. The opportunity costs of slaughter at the intermediate stages of maturity are high. While sale at lighter weights may have merit in terms of the organization of individual farms, slaughter of these animals should be deferred to allow feeding to maturity if efficiency on a national basis in terms of production cost is to be obtained.

It will be recalled that the restriction placed at the outset upon the size of the basic cattle herd represented the existing cow-bull to calf numerical relationship on a national basis applied to the individual provinces. Since the optimal solutions indicated that the existing slaughter pattern was at variance with minimum cost, the basic herd restriction was never effective on a national basis even though when applied to particular provinces it became so. The existing basic herd of approximately 5,617,000 head was found to be over one million head

in excess of the number actually required or in other words was only eighty-two per cent utilized. The output of beef from the present basic herd could be increased by almost one-fifth by merely feeding to heavier weights.

The relaxation of the basic herd restriction which occurred as a result of slaughter at maturity allowed the program to bring about, in effect, at an early stage a relative redistribution of basic herds between provinces. While the basic herd restriction remained effective in certain provinces yet relatively greater production of meat from those provinces was possible than was actually experienced. In terms of the program which was designed to measure the effects of the subsidy such a situation was considered to merely represent the inefficiencies within present production practices and therefore could not be assessed in any way against the subsidy.

Examination of Table 34 will allow the effects of various restriction-cost combinations upon the location of the basic cattle herd to be ascertained. Two general comments appear pertinent. With progressive relaxation of the restrictions imposed on the model - a sequence tending toward optimum production efficiency, basic herd numbers increased sharply in Alberta and significantly in Saskatchewan while minor increases occurred in Prince Edward Island and Quebec. On a similar basis, a substantial decline in numbers occurred in Ontario accompanied by a moderate decline in Manitoba. Little change occurred in Nova Scotia or New Brunswick while in British Columbia the basic

TABLE 34

SIZE OF BASIC CATTLE HERD UTILIZED UNDER ALTERNATIVE RESOURCE RESTRICTIONS AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	43.98	43.98	43.98	43.98	43.98	43.98	43.98	43.98
N.S.	56.86	65.47	56.86	65.47	56.77	65.47	56.86	65.34
N.B.	75.71	75.71	75.71	71.43	75.71	67.17	75.65	67.17
Que.	895.71	891.46	895.71	891.38	902.86	902.72	902.85	902.85
Ont.	1359.60	1362.43	1359.60	1361.03	951.80	951.77	951.77	951.77
Man.	440.36	440.36	440.36	440.36	386.30	386.30	386.30	386.30
Sask.	961.87	961.87	961.87	961.87	961.87	961.87	961.87	961.87
Alta.	771.48	764.28	771.48	770.05	1226.29	1226.29	1226.29	1226.29
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	55.27	53.24	55.18	55.18	55.18	53.95	55.18	55.18
N.S.	56.77	65.47	56.86	56.86	56.86	65.47	56.86	56.86
N.B.	62.17	65.73	67.17	67.17	67.17	65.02	67.17	67.17
Que.	925.00	922.57	927.81	927.81	925.99	923.56	928.80	928.80
Ont.	808.02	808.02	808.02	808.02	765.26	765.26	765.26	765.26
Man.	381.13	376.88	376.88	376.88	381.13	376.88	376.88	376.88
Sask.	1006.44	1007.89	1007.89	1007.89	1048.21	1049.65	1049.65	1049.65
Alta.	1305.78	1305.78	1305.78	1305.78	1305.78	1305.78	1305.78	1305.78
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

herd (for beef) was non-existent. As noted earlier this may be partially accounted for by the use of "average" relationships, forage production on the average being higher in cost on a nutrient basis in the latter province than elsewhere.

Changing subsidy levels had minimal effect on basic herd location. There was a slight tendency for the herd size to decline in receiving provinces with the subsidy removed but this situation was by no means consistent. For other provinces subsidy levels had no apparent effect. This situation reflects in part the close tie between the cow-calf enterprise and forage production.

Location of the basic cattle herd is therefore predicated upon other factors than the subsidy level. Mere rearrangement of existing acreages devoted to feed production among the respective feeds on the basis of least cost brought about substantial increases in basic herd numbers in Alberta with comparable declines in Ontario. Distribution of herd sizes on the basis of minimizing production cost accentuated this effect. The conclusion may therefore be reached that substantial adjustment is required in the location of the basic herd within Canada if minimum costs are to be achieved in beef production. In addition, there is little indication that a subsidy on grain movement such as is now applied will be an effective means of encouraging this adjustment.

Cattle Feeding Activities

The levels of cattle feeding activities within a particular

province are shown in Tables 35-39 inclusive. Table 35 indicates the number of calves dropped from the females in the basic herd and consequently directly reflects the size of the basic herd. The following table shows the calves in the next stage of development. Differentials in relative numbers on a provincial basis as compared to the previous table reflect the movement of calves in the 200 pound weight group for export.

The first major change in numbers fed as compared to numbers dropped on a provincial basis is indicated in Table 37. Slaughter for veal purposes was assumed to occur at 400 pounds and therefore this group has been removed. In addition, a substantial number have moved into export. Significant differences in numbers fed occurred under the respective restriction levels. Efficient allocation of feed grain acreage among the respective feeds resulted in substantially larger numbers of animals being fed in Prince Edward Island, Manitoba and Alberta. On the other hand, a decline of approximately fifty-five per cent occurred in Ontario. Allocation of the basic herd between the provinces resulted in a subsequent large increase in the level of feeding operations in New Brunswick, Ontario and Manitoba accompanied by declines in Prince Edward Island, Quebec, Saskatchewan and Alberta. Removal of the export requirement for feed grains had negligible effect on this feeding operation. While changes in numbers do occur as a result of applying the subsidy at different levels, the direction of change is not consistent and the changes on a provincial basis are

TABLE 35

CALVES DROPPED BY PROVINCE UNDER ALTERNATIVE RESOURCE RESTRICTION AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	32.76	32.76	32.76	32.76	32.76	32.76	32.76	32.76
N.S.	42.35	48.77	42.35	48.77	42.28	48.77	42.35	48.67
N.B.	56.39	56.39	56.39	53.20	56.39	50.03	56.34	50.03
Que.	667.15	663.99	667.15	663.92	672.48	672.37	672.47	672.47
Ont.	1012.67	1014.78	1012.67	1013.74	708.93	708.91	708.91	708.91
Man.	327.99	327.99	327.99	327.99	287.73	287.73	287.73	287.73
Sask.	716.43	716.43	716.43	716.43	716.43	716.43	716.43	716.43
Alta.	574.62	569.26	574.62	573.56	913.38	913.38	913.38	913.38
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	41.16	39.65	41.10	41.10	41.10	40.18	41.10	41.10
N.S.	42.28	48.77	42.35	42.35	42.35	48.77	42.35	42.35
N.B.	50.03	48.96	50.03	50.03	50.03	48.43	50.03	50.03
Que.	688.96	687.16	691.06	691.06	689.70	687.89	691.80	691.80
Ont.	601.84	601.84	601.84	601.84	569.99	569.99	569.99	569.99
Man.	283.88	280.71	280.71	280.71	283.88	280.71	280.71	280.71
Sask.	749.63	750.70	750.70	750.70	780.74	781.81	781.81	781.81
Alta.	972.58	972.58	972.58	972.58	972.58	972.58	972.58	972.58
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 36

CATTLE FED (200-400#) BY PROVINCE UNDER
ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	32.59	32.59	32.59	32.59	32.59	32.59	32.59	32.59
N.S.	42.14	48.52	42.14	48.52	42.07	48.52	42.14	48.42
N.B.	56.11	56.11	56.11	52.93	56.11	49.78	56.06	49.78
Que.	663.81	660.67	663.81	660.61	669.11	669.01	669.11	669.11
Ont.	1007.61	1009.70	1007.61	1008.67	705.38	705.36	705.36	705.36
Man.	326.35	326.35	326.35	326.35	286.29	286.29	286.29	286.29
Sask.	676.92	676.92	676.92	676.92	712.85	712.85	712.85	712.85
Alta.	571.75	566.64	571.75	570.69	872.88	872.88	872.88	872.88
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	40.96	39.46	40.89	40.89	40.89	39.98	30.89	40.89
N.S.	42.07	48.52	42.14	42.14	42.14	48.52	42.14	42.14
N.B.	49.78	48.72	49.78	49.78	49.78	48.19	49.78	49.78
Que.	685.52	683.72	687.60	687.60	686.25	684.45	688.34	688.34
Ont.	598.83	598.83	598.83	598.83	567.14	567.14	567.14	567.14
Man.	282.46	279.31	279.31	279.31	282.46	279.31	279.31	279.31
Sask.	745.88	746.95	746.95	746.95	776.84	777.90	777.90	777.90
Alta.	931.79	931.79	931.79	931.79	931.79	931.79	931.79	931.79
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 37

CATTLE FED (400-600#) BY PROVINCE UNDER
ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	32.43	40.57	32.43	32.43	64.64	64.75	64.75	64.75
N.S.	57.31	24.37	57.31	24.37	57.66	24.37	57.31	24.88
N.B.	16.85	16.85	16.85	32.24	16.85	49.53	17.09	49.53
Que.	464.88	481.11	464.88	481.43	437.53	438.05	437.55	437.55
Ont.	887.66	876.83	887.66	882.19	498.18	498.16	498.16	498.16
Man.	378.43	378.43	378.43	378.43	585.24	585.24	585.24	585.24
Sask.	370.65	395.37	370.65	377.18	363.98	363.98	363.98	363.98
Alta.	441.63	436.32	441.63	440.57	625.78	625.78	625.78	625.78
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	21.57	29.33	21.92	21.92	21.92	26.61	21.92	21.92
N.S.	57.66	24.37	57.31	57.31	57.31	24.37	57.31	57.31
N.B.	49.53	55.01	49.53	49.53	49.53	57.73	49.53	49.53
Que.	352.84	362.13	342.09	342.09	349.06	358.35	338.30	338.30
Ont.	794.44	794.44	794.44	794.44	798.22	798.22	798.22	798.22
Man.	605.00	621.27	621.27	621.27	605.00	621.27	621.27	621.27
Sask.	292.78	287.26	287.26	287.26	292.78	287.26	287.26	287.26
Alta.	476.04	476.04	476.04	476.04	476.04	476.04	476.04	476.04
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 38

CATTLE FED (600-800#) BY PROVINCE UNDER
ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	32.27	40.36	32.27	32.27	64.32	64.42	64.42	64.42
N.S.	57.03	24.25	57.03	24.25	57.37	24.25	57.03	24.75
N.B.	16.77	16.77	16.77	33.08	16.77	49.28	17.00	49.28
Que.	462.56	478.71	462.56	479.02	435.34	435.86	435.36	435.36
Ont.	883.23	872.44	883.23	877.78	495.69	495.67	495.67	495.67
Man.	376.54	376.54	376.54	376.54	582.32	582.32	582.32	582.32
Sask.	238.40	263.00	238.40	244.90	231.76	231.76	231.76	231.76
Alta.	439.42	434.14	439.42	438.37	622.65	622.65	622.65	622.65
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	21.46	29.18	21.81	21.81	21.81	26.48	21.81	21.81
N.S.	57.37	24.25	57.03	57.03	57.03	24.25	57.03	57.03
N.B.	49.28	54.74	49.28	49.28	49.28	57.44	49.28	49.28
Que.	351.08	360.32	340.38	340.38	347.31	356.56	336.61	336.61
Ont.	790.47	790.47	790.47	790.47	794.23	794.23	794.23	794.23
Man.	601.98	618.17	618.17	618.17	601.98	618.17	618.17	618.17
Sask.	207.30	201.81	201.81	201.81	207.30	201.81	201.81	201.81
Alta.	427.27	427.27	427.27	427.27	427.27	427.27	427.27	427.27
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 39

CATTLE FED (800-1000#) BY PROVINCE UNDER
ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	32.11	40.16	32.11	32.11	63.99	64.10	64.10	64.10
N.S.	56.73	24.13	56.73	24.13	57.09	24.13	56.74	24.63
N.B.	16.68	16.68	16.68	32.91	16.68	49.04	16.92	49.04
Que.	460.24	476.31	460.24	476.63	433.16	433.68	433.18	433.18
Ont.	878.81	868.08	878.81	873.39	493.21	493.19	493.19	493.19
Man.	374.66	374.66	374.66	374.66	579.40	579.40	579.40	579.40
Sask.	204.40	228.87	204.40	210.87	197.79	197.79	197.79	197.79
Alta.	437.22	431.97	437.22	436.18	619.53	619.53	619.53	619.53
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	21.35	29.04	21.70	21.70	21.70	26.35	21.70	21.70
N.S.	57.09	24.13	56.74	56.74	56.74	24.13	56.74	56.74
N.B.	49.04	54.46	49.04	49.04	49.04	57.16	49.04	49.04
Que.	349.32	358.52	338.68	338.68	345.58	354.77	334.93	334.93
Ont.	786.52	786.52	786.52	786.52	790.26	790.26	790.26	790.26
Man.	598.97	615.08	615.08	598.97	615.08	615.08	615.08	615.08
Sask.	173.45	167.99	167.99	167.99	173.45	167.99	167.99	167.99
Alta.	425.13	425.13	425.13	425.13	425.13	425.13	425.13	425.13
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

relatively minor.

Table 38 is a reflection of the previous one except in so far as export commitments are satisfied. No movement of animals of this class occurred between provinces. In fact, interprovincial movements of animals occurred only at 400 pound and 1,000 pound weights showing that it was more economic to move grain rather than live animals except where necessary to circumvent the capacity limitations of local packing plants. No consistent relationship, on a provincial basis is evident between numbers fed and the level of subsidy imposed. Table 39 which refers to the final weight group fed is an extension of the previous table except for the movement to export. The comments with regard to that table consequently apply.

Rations

The basic cattle herd was fed ration type one which involved the use of pasture entirely during the summer and roughage only during the winter. The alternative rations provided for the use of hay and silage, respectively, supplemented with grain in the winter months and pasture during the summer period. The complete roughage ration proved to be most economic for use in feeding the basic herd. On the other hand, the feeding regime which provided for a 50:50 concentrate-roughage ratio was adopted for feeding animals between 400 and 1,000 pounds in all provinces. Rations with 70:30 and 30:70 ratios were provided as alternatives but were not used.

Interregional Movements of Live Cattle

The interregional movements of feeder cattle and finished animals, respectively, are shown in Tables 40 and 41. In accord with the model modification described elsewhere no movement of 200 pound calves occurred except for export. These calves originated in Saskatchewan under "actual" conditions as incorporated into the model but any relaxation in restrictions resulted in the source of supply shifting to Alberta. Subsidy levels were without effect upon the region of this export movement. On the other hand, substantial interprovincial movements of 400 pound calves occurred. Minor movements, though proportionately large, take place among the Maritime provinces and Quebec, with direction and volume dependent upon the resource-cost combination imposed. Other movements, however, deserve more attention. Under existing conditions, Saskatchewan provides Manitoba with a substantial volume of 400 pound feeders as well as providing the required exports. Efficient use of the feed grain acreage results in larger shipments to Manitoba accompanied by a decline in movement to export, the bulk of which now arises in Alberta. Effective removal of the basic herd restriction results in an increase in the volume of the Saskatchewan to Manitoba movement with Alberta providing the entire export requirement. Saskatchewan also shipped over eighty thousand head to Ontario which also received a somewhat larger number from Quebec. Elimination of the feed grain export requirement caused a minor shift in that an increase in movement of about thirty-five thousand head occurred between

TABLE 40

INTERREGIONAL MOVEMENTS OF FEEDER CATTLE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Movement From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
200 lb. calves								
Sask. to								
Export	35.93	35.93	35.93	35.93	--	--	--	--
Alta. to								
Export	--	--	--	--	35.93	35.93	35.93	35.93
Total	35.93	35.93	35.93	35.93	35.93	35.93	35.93	35.93
400 lb. calves								
P.E.I. to								
N.S.	--	--	--	--	--	--	--	--
N.B.	--	--	--	--	--	--	--	--
N.B. to								
P.E.I.	--	8.14	--	--	19.55	--	19.27	--
N.S.	15.39	--	15.39	--	--	--	--	--
Que. to								
P.E.I.	--	--	--	--	12.66	32.32	13.05	32.32
N.S.	--	--	--	--	15.80	--	15.39	--
Ont.	--	--	--	--	--	--	--	--
Sask. to								
Ont.	--	--	--	--	--	--	--	--
Man.	172.48	147.76	172.48	165.95	330.38	330.38	330.38	330.38
Export	130.40	130.40	130.40	130.40	14.92	14.92	14.92	14.92
Alta. to								
Export	--	--	--	--	115.48	115.48	115.48	115.48
Total	318.27	286.30	318.27	296.35	508.79	483.10	518.49	623.50

Source: Appendix VIII

TABLE 40 (continued)

Movement From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
600 lb. feeders								
Sask. to Export	130.40	130.40	130.40	130.40	130.40	130.40	130.40	130.40
Alta. to Export	--	--	--	--	--	--	--	--
Total	130.40	130.40	130.40	130.40	130.40	130.40	130.40	130.40
800 lb. feeders								
Sask. to Export	32.81	32.81	32.81	32.81	32.81	32.81	32.81	32.81
Total	32.81	32.81	32.81	32.81	32.81	32.81	32.81	32.81

Source: Appendix VIII

TABLE 40 (continued)

Movement From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
200 lb. calves								
Sask. to								
Export	--	--	--	--	--	--	--	--
Alta. to								
Export	35.93	35.93	35.93	35.93	35.93	35.93	35.93	35.93
Total	35.93	35.93	35.93	35.93	35.93	35.93	35.93	35.93
400 lb. calves								
P.E.I. to								
N.S.	15.80	--	15.39	15.39	15.39	--	15.39	15.39
N.B.	--	6.54	--	--	--	9.79	--	--
N.B. to								
P.E.I.	--	--	--	--	--	--	--	--
N.S.	--	--	--	--	--	--	--	--
Que. to								
P.E.I.	--	--	--	--	--	--	--	--
N.S.	--	--	--	--	--	--	--	--
Ont.	113.43	115.66	115.66	115.66	117.94	120.18	120.18	120.18
Sask. to								
Ont.	85.18	82.94	82.94	82.94	115.98	113.74	113.74	113.74
Man.	339.98	343.36	343.36	343.36	339.98	343.36	343.36	343.36
Export	--	--	--	--	--	--	--	--
Alta. to								
Export	130.40	130.40	130.40	130.40	130.40	130.40	130.40	130.40
Total	684.79	678.90	687.75	687.75	719.69	717.47	723.07	723.07

TABLE 40 (continued)

Movement From	Right Hand Side Three (Basic Herd Allotable) 1COST	2COST	3COST	4COST	Right Hand Side Four (No Oats and Barley Exports) 1COST	2COST	3COST	4COST
600 lb. feeders								
Sask. to Export	84.01	84.01	84.01	84.01	84.01	84.01	84.01	84.01
Alta. to Export	46.39	46.39	46.39	46.39	46.39	46.39	46.39	46.39
Total	130.40	130.40	130.40	130.40	130.40	130.40	130.40	130.40
800 lb. feeders								
Sask. to Export	32.81	32.81	32.81	32.81	32.81	32.81	32.81	32.81
Total	32.81	32.81	32.81	32.81	32.81	32.81	32.81	32.81

TABLE 41

INTERREGIONAL MOVEMENTS OF FINISHED CATTLE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Movement From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to								
N.S.	--	--	--	--	--	--	--	--
N.B.	2.35	10.36	2.35	2.35	--	34.18	34.18	34.18
Sask. to Man.	6.58	30.93	6.58	13.01	34.07	--	--	--
Total	8.96	41.29	8.93	15.36	34.07	34.18	34.18	34.18

Movement From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to								
N.S.	--	2.68	--	--	--	--	--	--
N.B.	--	--	--	--	--	--	--	--
Sask. to Man.	--	--	--	--	--	--	--	--
Total	--	2.68	--	--	--	--	--	--

Source: Appendix VIII

Saskatchewan and Ontario and a considerably smaller increase occurred between Quebec and Ontario. Total interregional movement was affected by the level of subsidy with a depression in movement occurring under the maximum restrictions, the "actual" situation, with the subsidy removed. However, while the change involves about thirty thousand head, in terms of total movement a decline of only approximately ten per cent is indicated.

Attention should also be drawn to the progressive decline in the effect of the subsidy upon gross interregional movement as the resource combinations become less restrictive. For example, interregional movement of 400 pound feeders more than doubles as the restrictions are relaxed while the depression in movement associated with the removal of the subsidy almost disappears. This suggests that after adjustment has taken place in the location of cattle production the effect of the subsidy will be minimal even though such adjustment is impeded by the subsidy in the interim period.

Exports of 600 pound feeders originate in Saskatchewan until the basic herd restriction is not effective, after which part of the requirements are met by Alberta. Under all conditions, the exports of 800 pound feeders are derived from Saskatchewan. It should also be noted that the subsidy level has no effect upon the origin of these export shipments.

Interregional movements of finished cattle are relatively insignificant. Such movements arise from the shipping province being

deficient in slaughter capacity. Consequently, under the most limiting resource condition the greatest volume of movement occurs between Saskatchewan and Manitoba. Under the least limiting restriction, movement is non-existent. In any event, the maximum slaughter movement never exceeds forty-two thousand head.

Slaughter

The location of slaughter coincides in most instances with that of production due to the lower cost of movement of meat relative to that of the intermediate products. Exceptions appear due to slaughtering capacity being a limiting factor in particular provinces under certain conditions. This is shown in Tables 42 and 43.

Large quantities of calves are slaughtered in Quebec and Alberta under all conditions while slaughter in Ontario and Manitoba is highly dependent on the resource restrictions imposed. The volume of slaughter in Quebec was influenced to a minor degree by such restrictions whereas that in Alberta increased substantially as greater adjustment occurred. Since the total number of calves slaughtered remained constant, increases in these two provinces were largely offset by declines in slaughter in Ontario and Manitoba. While the level of the subsidy had an apparent minor effect upon the level of slaughter in certain provinces under the most restrictive condition, this effect was not consistent in direction. With greater adjustment which followed relaxation of the resource restrictions the differential effects of a change in the

TABLE 42

CALF SLAUGHTER BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	--	--	--	--	--	--	--	--
N.S.	--	23.91	--	23.91	--	23.91	--	23.31
N.B.	23.59	30.84	23.59	19.43	19.43	--	19.43	--
Que.	195.61	176.25	195.61	175.87	199.78	195.30	199.78	195.90
Ont.	114.90	127.83	114.90	121.44	203.67	203.67	203.67	203.67
Man.	118.77	94.05	118.77	112.24	30.00	30.00	30.00	30.00
Sask.	--	--	--	--	--	--	--	--
Alta.	127.26	127.26	127.26	127.26	127.26	127.26	127.26	127.26
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	3.39	3.39	3.39	3.39	3.39	3.39	3.39	3.39
N.S.	--	23.91	--	--	--	23.91	--	--
N.B.	--	--	--	--	--	--	--	--
Que.	215.51	202.51	226.41	226.41	215.82	202.51	226.41	226.41
Ont.	--	--	--	--	--	--	--	--
Man.	16.03	--	--	--	16.03	--	--	--
Sask.	24.21	29.65	29.65	29.65	24.21	29.65	29.65	29.65
Alta.	320.69	320.69	320.69	320.69	320.69	320.69	320.69	320.69
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 43

SLAUGHTER OF FINISHED CATTLE BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	29.60	29.60	29.60	29.60	29.60	29.60	29.60	29.60
N.S.	56.46	24.01	56.46	24.01	56.80	24.01	56.46	24.51
N.B.	18.95	26.96	18.95	35.09	50.68	82.97	51.02	82.97
Que.	457.94	473.93	457.94	474.25	431.00	431.51	431.02	431.02
Ont.	874.41	863.74	874.41	869.02	490.74	490.73	490.73	490.73
Man.	379.36	403.71	379.36	385.80	576.51	576.51	576.51	576.51
Sask.	196.80	196.80	196.80	196.80	196.80	196.80	196.80	196.80
Alta.	435.04	429.81	435.04	434.00	616.44	616.44	616.44	616.44
B. C.	--	--	--	--	--	--	--	--

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	21.25	26.21	21.59	21.59	21.59	26.21	21.59	21.59
N.S.	56.80	26.69	56.46	56.46	56.46	24.01	56.46	56.46
N.B.	48.79	54.19	48.79	48.79	48.79	56.87	48.79	48.79
Que.	347.58	356.73	336.98	336.98	343.85	353.00	333.26	333.26
Ont.	782.58	782.58	782.58	782.58	786.31	786.31	786.31	786.31
Man.	595.97	612.00	612.00	612.00	595.97	612.00	612.00	612.00
Sask.	172.59	167.15	167.15	167.15	172.59	167.15	167.15	167.15
Alta.	423.01	423.01	423.01	423.01	423.01	423.01	423.01	423.01
B. C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

level of subsidy diminished.

Slaughter of finished cattle occurred in all provinces. Substantial shifts in slaughter location occurred under progressive relaxation of the restrictions. This situation reflected, in part, the location of production. The level of slaughter declined in Quebec and rose substantially in Manitoba. A substantial shift away from slaughter in Ontario and to slaughter in Alberta occurred under the feed acreage adjustment only. Shifts experienced by other provinces were relatively minor. A slaughter depressing effect in Nova Scotia was observed following removal of the subsidy whereas the level of slaughter increased in New Brunswick under this condition. On the whole, the level of subsidy appeared to have a negligible effect on the location of slaughter.

Interregional Movements of Veal and Beef

Interregional movements of veal and beef occur due to differences in the volume of meat obtained from slaughter and total consumption on a provincial basis. The interregional movements of veal and beef are recorded in Tables 44 and 45, respectively.

Movements of veal between provinces are substantial in terms of total consumption in a few cases. The total veal requirement of British Columbia is satisfied by Alberta under all conditions. Following relaxation of the basic herd restriction Alberta also provided practically all the Ontario requirement, any deficiency being made up

TABLE 44

INTERREGIONAL MOVEMENT OF VEAL UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(million pounds)

From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
N.B. to								
P.E.I.	--	.70	--	--	--	--	--	--
N.S.	.86	--	.86	--	--	--	--	--
Ont.	--	1.67	--	--	--	--	--	--
Que. to								
P.E.I.	.70	--	.70	.70	.70	.70	.70	.70
N.S.	4.10	--	4.10	--	4.96	4.03	4.96	.12
N.B.	--	--	--	--	--	--	--	4.03
Ont.	--	.78	--	--	--	--	--	--
Man. to								
Ont.	18.43	13.30	18.43	17.07	--	--	--	--
Alta. to								
Ont.	--	--	--	--	--	--	--	--
Man.	--	--	--	--	--	--	--	--
Sask.	6.15	6.15	6.15	6.15	6.15	6.15	6.15	6.15
B. C.	11.08	11.08	11.08	11.08	11.08	11.08	11.08	11.08

Source: Appendix VIII

TABLE 44 (continued)

From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
N.B. to								
P.E.I.	--	--	--	--	--		--	--
N.S.	--	--	--	--	--		--	
Ont.	--	--	--	--			--	
Que. to								
P.E.I.	--	--	--	--				--
N.S.	4.96	--	4.96	4.96	[illegible]			4.96
N.B.	4.03	4.03	4.03	4.03	[illegible]		[illegible]	4.03
Ont.	--	2.20	2.20	2.20	--	[illegible]	[illegible]	2.20
Man. to								
Ont.	--	--	--	--				
Alta. to								
Ont.	42.28	40.08	40.08		42.28	40.08	40.08	40.08
Man.	2.90	6.23	6.23	[illegible]	2.90	6.23	6.23	6.23
Sask.	1.13	--	--	--	1.13	--	--	--
B. C.	11.08	11.08	11.08	11.08	11.08	11.08	11.08	11.08

by Quebec. Movements between other provinces except from Manitoba to Ontario under the most restrictive condition were relatively minor or non-existent. There is some evidence that removal of the subsidy was associated with a depression in interprovincial movement but the total effect was small.

Substantial movements of beef occurred between provinces. The major surplus provinces were Manitoba and Alberta. Alberta provided the total requirement of British Columbia and following redistribution of the feed grain acreage part of that of Ontario though under further restriction relaxation this latter movement ceased. Manitoba provided a major share of the total Quebec requirement, this share tending to increase as greater adjustment took place in the industry. Substantial shipments also occurred from Manitoba to Ontario. Beef imports were distributed between Nova Scotia and New Brunswick, the former being the major recipient, according to the restriction and cost combination imposed. Movements between other provinces were small. In the aggregate, the effect of the level of the subsidy upon total movement was small, notwithstanding appreciable shifts important to certain provinces which occurred according to the resource and cost combination applied. The general direction of movement of beef, on the other hand, coincides with that experienced in the real world.

Hogs

Fewer activities are involved in the production of pork in comparison to beef. Hogs are normally fed out within the area of

farrowing. Consequently, no interregional movements of unfinished animals occur. Therefore, a discussion of the activities associated with satisfaction of the provincial requirements for pork is limited to a consideration of the size of the basic herd, the number of market hogs fed, the rations used, the interregional movements of slaughter hogs, the location of slaughter, and finally, the interregional movements of pork.

Size of the Basic Herd

The size of the basic herd necessary to produce the indicated output of market hogs by province was determined initially by relating the number of hogs less than six months of age to the average litter size, assuming two litters per year. Litter size was found to differ between provinces. The total number of hogs utilized in the basic herd therefore varies according to the distribution of the herd within Canada. This becomes evident upon examination of Table 45. A substantial portion of the basic herd presently utilized went unused regardless of the resource and cost combination imposed. Under the most restrictive condition, the level of subsidy had relatively little effect upon the size of the basic herd utilized. A larger herd was utilized where no subsidy was given, reflecting increased production of hogs in regions where litters were relatively smaller in size on the average. Progressive relaxation of the restrictions rendered negligible the effect of the level of subsidy upon the size of the basic herd.

TABLE 45

INTERREGIONAL MOVEMENTS OF BEEF UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(million pounds)

From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to								
N.S.	--	7.38	--	7.38	--	7.12	--	7.12
N.B.	7.75	.37	7.75	.37	7.75	.62	7.75	.62
Man. to								
N.S.	--	--	--	--	--	--	--	--
N.B.	16.64	29.33	16.64	25.11	--	--	--	--
Que.	108.54	102.96	108.54	100.62	164.23	163.97	164.23	164.23
Ont.	4.24	9.78	4.24	7.04	67.51	67.78	67.52	67.52
Sask. to								
Que.	35.47	35.47	35.47	35.47	--	--	--	--
Ont.	--	--	--	--	35.47	35.47	35.47	35.47
Alta. to								
N.S.	--	--	--	--	--	.26	--	--
Que.	6.24	3.53	6.24	5.70	--	--	--	--
Ont.	--	--	--	--	100.39	100.13	100.39	100.39
B. C.	120.08	120.08	120.08	120.08	120.08	120.08	120.08	120.08
Imports to								
N.S.	24.47	33.93	24.47	33.93	24.29	33.93	24.47	33.93
N.B.	9.46	--	9.46	--	9.64	--	9.46	--

Source: Appendix VIII

TABLE 45 (continued)

From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to								
N.S	--	5.99	--	--	--	5.99	--	--
N.B.	3.41	--	3.59	3.59	3.59	--	3.59	3.59
Man. to								
N.S.	--	--	--	--	--	1.39	--	--
N.B.	5.31	15.56	5.31	5.31	5.31	14.17	5.31	5.31
Que.	184.63	182.70	192.95	192.95	186.57	184.64	194.88	194.88
Ont.	51.90	51.90	51.90	51.90	49.97	49.97	49.97	49.97
Sask. to								
Que.	22.90	20.08	20.08	20.08	20.08	20.08	20.08	20.08
Ont.	--	--	--	--	--	--	--	--
Alta. to								
N.S.	--	--	--	--	--	--	--	--
Que.	--	--	--	--	--	--	--	--
Ont.	--	--	--	--	--	--	--	--
B. C.	120.08	120.08	120.08	120.08	120.08	120.08	120.08	120.08
Imports to								
N.S.	24.29	33.93	24.47	24.47	24.47	33.93	24.47	24.47
N.B.	9.64	--	9.46	9.46	9.46	--	9.46	9.46

TABLE 46

SIZE OF THE BASIC HOG HERD UTILIZED BY PROVINCE
UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	6.07	6.07	6.07	6.07	.20	6.07	6.07	6.07
N.S.	5.74	24.04	5.74	5.74	5.74	5.74	5.74	5.74
N.B.	--	--	--	1.54	.55	4.98	5.49	5.49
Que.	12.84	17.27	12.84	11.37	114.02	56.38	105.43	105.71
Ont.	208.54	208.54	208.54	208.54	159.54	208.54	162.22	162.22
Man.	36.83	36.83	36.83	36.83	36.83	36.83	36.83	36.83
Sask.	37.37	37.37	37.37	37.37	23.12	23.12	23.12	23.12
Alta.	111.58	111.58	111.58	111.58	69.06	69.36	69.36	69.07
B. C.	--	--	--	--	3.74	3.74	3.74	3.74

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	--	25.14	13.85	13.85	--	25.64	13.85	13.85
N.S.	25.32	--	12.17	12.17	25.32	--	12.17	12.17
N.B.	--	--	--	--	--	--	--	--
Que.	39.85	--	--	--	39.85	--	--	--
Ont.	146.14	147.67	146.14	146.14	146.14	147.17	146.14	146.14
Man.	107.53	149.54	149.54	149.54	107.53	149.54	149.54	149.54
Sask.	23.12	23.12	23.12	23.12	23.12	23.12	23.12	23.12
Alta.	33.35	33.05	33.05	33.05	33.35	33.05	33.05	33.05
B. C.	38.31	38.31	38.31	38.31	38.31	38.31	38.31	38.31

Source: Appendix VIII

Notwithstanding the minor effect of changing restrictions and subsidy levels upon the number of hogs utilized in the basic herd, substantial changes occurred in the location of these animals. Improved allocation of available acres for feed production resulted in a considerable decline in the size of the herd in Ontario except when no subsidy on feed movement was given. In the latter situation Ontario appeared as a more efficient producer of hogs than Quebec where numbers were reduced - the aggregate number kept in the central provinces remaining fairly constant regardless of the cost condition imposed. Fewer hogs were kept in Saskatchewan and Alberta whereas a larger number were located in New Brunswick and Quebec. Distribution of the basic herd within Canada on the basis of minimum cost resulted in a further decline in numbers in Ontario and Alberta with increases in Manitoba and, collectively, in the Maritimes. In the latter region the level of subsidy brought about changes between the provinces. Manitoba and Ontario became the principal hog producing provinces. Changes in the level of subsidy had little effect upon the location outside of the Maritimes except for a shift between Quebec and Manitoba. Movement away from the present subsidy level resulted in Quebec going out of hog production, there being no basic herd kept in that province under those conditions. Conversely, greater numbers were kept in Manitoba. Elimination of the export requirement for feed grain had no effect upon the location of the basic herd.

Market Hogs

The number of market hogs fed by province directly reflects the size of the basic herd and the average number of pigs per litter. Therefore, with adjustment allowed to proceed Ontario and Manitoba became the dominant hog feeding provinces, accounting for approximately two-thirds of the total number of hogs. The indicated distribution of hogs among provinces differs from that presently experienced. This relocation may be partially explained by the dependence of hog production upon the grain input. Hogs have a higher feed conversion ratio than cattle with the result that differentials in rates between the raw material and finished product assume a less dominant role as determiners of the location of production.

Hog Rations

In general, a ration in which barley was the principal constituent was used for both the basic herd and market hogs. In no instance was the ration having corn as the main ingredient used. In the Maritimes a ration containing a substantial proportion of wheat was utilized as an alternative for or in addition to the barley ration, depending upon the subsidy level imposed. In terms of the total volume of feed consumed, however, the shifts between the two rations were of little importance.

Interregional Movements of Finished Hogs

Under the most restrictive condition a substantial volume of hogs moved between provinces. These movements occurred between Prince Edward

TABLE 47

MARKET HOGS FED BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	91.66	91.66	91.66	3.02	91.66	91.66	91.66	91.66
N.S.	91.27	22.62	91.27	91.27	91.27	91.27	91.27	91.27
N.B.	--	--	--	22.80	8.12	73.70	8.12	8.12
Que.	199.08	267.73	199.08	176.28	1767.31	873.89	1634.24	1638.45
Ont.	3128.10	3128.10	3128.10	3128.10	2393.11	3128.10	2433.33	2433.33
Man.	545.08	545.08	545.08	545.08	545.08	545.08	545.08	545.08
Sask.	515.71	515.71	515.71	515.71	319.08	319.08	319.08	319.08
Alta.	1606.75	1606.75	1606.75	1606.75	994.55	998.77	998.77	994.55
B. C.	--	--	--	--	56.10	56.10	56.10	56.10

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	--	379.61	209.07	209.07	--	387.12	209.07	209.07
N.S.	402.54	--	193.47	193.47	402.54	--	193.47	193.47
N.B.	--	--	--	--	--	--	--	--
Que.	617.62	--	--	--	617.62	--	--	--
Ont.	2192.16	2215.08	2192.16	2192.16	2192.16	2207.57	2192.16	2192.16
Man.	1591.38	2213.22	2213.22	2213.22	1591.38	2213.22	2213.22	2213.22
Sask.	319.08	319.08	319.08	319,08	319.08	319.08	319.08	319.08
Alta.	480.18	475.97	475.97	475.97	480.18	475.97	475.97	475.97
B. C.	574.69	574.69	574.69	574.69	574.69	574.69	574.69	574.69

Source: Appendix VIII

Island and Nova Scotia, Ontario and Quebec, and from Alberta for export to the United States. The level of subsidy affected the volume of movement between Ontario and Quebec with the movement being reduced upon removal of the subsidy. Proper allocation of acreage among the respective feeds resulted in an overall reduction in interregional movement except where no subsidy was paid under which circumstance the movement increased. Under the present level of subsidy movement virtually ceased except to export which originated in Manitoba. Removal of the subsidy caused almost three quarters of a million head to move from Ontario to Quebec. This movement ceased when the feed subsidy applied beyond Ontario and upon elimination of all costs of grain movement. Movements between Prince Edward Island and Nova Scotia were equal under all subsidy conditions except when applied at the present level. Optimum distribution of the basic herd between provinces resulted in substantial movements within the Maritimes while shipments for export made up the balance of the movement. The movements within the Maritimes were greatly affected by the level of subsidy imposed. With the subsidy applied at the current levels the movement occurred between Nova Scotia and New Brunswick. After removal of the subsidy movement occurred from Prince Edward Island to New Brunswick and Nova Scotia. The total volume of movement increased also. Application of the feed subsidy beyond Toronto caused the total movement to revert to the level experienced under the subsidy at current levels. However, the movement was then restricted to that from Prince Edward Island to New Brunswick.

TABLE 48

INTERREGIONAL MOVEMENTS OF FINISHED HOGS UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Movement From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to N.S.	89.82	89.82	89.82	89.82	2.96	89.82	89.82	89.82
N.B.	--	--	--	--	--	--	--	--
N.S. to N.B.	--	--	--	--	--	--	--	--
Ont. to Que.	672.92	605.64	672.92	695.27	--	745.15	--	--
Man. to Export	--	--	--	--	4.13	--	--	4.13
Alta. to Export	4.13	4.13	4.13	4.13	--	4.13	4.13	--

Source: Appendix VIII

TABLE 48 (continued)

Movement From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to								
N.S.	--	189.60	--	--	--	189.60	--	--
N.B.	--	182.42	204.89	204.89	--	189.78	204.89	204.89
N.S. to								
N.B.	204.89	--	--	--	204.89	--	--	--
Ont. to								
Que.	--	--	--	--	--	--	--	--
Man. to								
Export	--	4.13	4.13	4.13	--	4.13	4.13	4.13
Alt. to								
Export	4.13	--	--	--	4.13	--	--	--

Elimination of the export requirement for feed grain had no additional effect upon movement except to slightly increase the volume between Prince Edward Island and New Brunswick.

Hog Slaughter

Indicated slaughter capacity for hogs was more than adequate in all provinces except Nova Scotia and only became restricting in that province following the optimum allocation of the basic herd between provinces. Thus the impetus for interregional movement of slaughter hogs arose from the freight differentials existing between finished hogs and pork. The excess hog slaughter capacity becomes evident in Table 49 which shows the level of slaughter by province under the alternative restriction and cost combinations imposed.

Local hog slaughter reflects local production plus the inward movements of finished animals. Since the latter are not a factor except between Ontario and Quebec and within the Maritimes, the volume of slaughter approximates that of production on a provincial basis. Thus after adjustment, Manitoba and Ontario account for two-thirds of the total slaughter, the volume in both provinces increasing when the subsidy was removed. Elimination of the subsidy resulted in Quebec going out of hog slaughter with this volume being taken up by Manitoba. In addition, the volume of slaughter in New Brunswick decreased slightly. The situation prevailing before adjustment was much different. Under the most restrictive condition Alberta and Ontario were dominant in hog slaughter while substantial numbers were slaughtered in Quebec, Manitoba,

TABLE 49

HOG SLAUGHTER BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand head)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	--	--	--	--	--	--	--	--
N.S.	179.26	111.99	179.26	179.26	92.40	179.26	179.26	179.26
N.B.	--	--	--	22.35	7.96	72.23	7.96	7.96
Que.	868.02	868.02	868.02	868.02	1731.97	1601.56	1601.56	1605.69
Ont.	2392.62	2459.89	2392.62	2370.27	2345.24	2320.39	2384.66	2384.66
Man.	534.18	534.18	534.18	534.18	530.05	534.18	534.18	530.05
Sask.	505.39	505.39	505.39	505.39	312.70	312.70	312.70	312.70
Alta.	1570.49	1570.49	1570.49	1570.49	974.66	974.66	974.66	974.66
B. C.	--	--	--	--	54.98	54.98	54.98	54.98

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	--	--	--	--	--	--	--	--
N.S.	189.60	189.60	189.60	189.60	189.60	189.60	189.60	189.60
N.B.	204.89	182.42	204.89	204.89	204.89	189.78	204.89	204.89
Que.	605.27	--	--	--	605.27	--	--	--
Ont.	2148.31	2170.78	2148.31	2148.31	2148.31	2163.42	2148.31	2148.31
Man.	1559.55	2164.82	2164.82	2164.82	1559.55	2164.82	2164.82	2164.82
Sask.	312.70	312.70	312.70	312.70	312.70	312.70	312.70	312.70
Alta.	466.45	466.45	466.45	466.45	466.45	466.45	466.45	466.45
B. C.	563.19	563.19	563.19	563.19	563.19	563.19	563.19	563.19

Source: Appendix VIII

Saskatchewan and New Brunswick. When the feed acreage was realloted slaughter declined in Alberta and Saskatchewan, changed little in the Maritimes and Manitoba but increased in Quebec and British Columbia. Optimum distribution of the basic herd brought about a substantial decline in the level of slaughter in Quebec and Alberta, offset by an increase in that located in Manitoba, British Columbia, Nova Scotia and New Brunswick. A slight decline in the level of slaughter also occurred in Ontario. The rate of subsidy did not affect the level of slaughter in provinces west of Manitoba.

In comparison to that of cattle, hog production within provinces was more affected by the degree of restriction imposed. On the other hand except for Manitoba and Quebec the level of subsidy had little effect upon the location of hog slaughter after adjustment took place. It can therefore be said that the subsidy at current levels applied in a long run situation favours the latter province at the expense of the former. This situation was not true, however, when the subsidy was applied at other levels.

Interregional Movement of Pork

The interregional movement of pork under the various resource cost combinations is shown in Table 50. Where the greatest degree of restriction was imposed upon resources used, Ontario shipped pork to each of the Maritime provinces while Manitoba, Saskatchewan and Alberta shipped pork to Quebec, Alberta also shipping to British Columbia. Pork imports moved to Nova Scotia. Movements from provinces other than

TABLE 50

INTERREGIONAL MOVEMENT OF PORK UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(millions of pounds)

From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Ont. to								
P.E.I.	5.36	5.36	5.36	5.36	--	5.36	5.36	5.36
N.S.	.56	10.65	.56	.56	--	.56	.56	.56
N.B.	30.73	30.73	30.73	27.38	29.54	19.90	29.54	29.54
Man. to								
P.E.I.	--	--	--	--	5.36	--	--	--
N.S.	--	--	--	--	13.59	--	--	--
Que.	32.67	32.67	32.67	32.67	13.11	32.67	32.67	32.05
Sask. to								
Que.	28.90	28.90	28.90	28.90	--	--	--	--
Alta. to								
Que.	81.13	81.13	81.13	81.13	--	--	--	--
B.C.	84.48	84.48	84.48	84.48	76.23	76.23	76.23	76.23
Imports to								
P.E.I.	--	--	--	--	--	--	--	--
N.S.	10.38	10.38	10.38	10.38	10.38	10.38	10.38	10.38

Source: Appendix VIII

TABLE 50 (continued)

From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Ont. to								
P.E.I.	--	--	--	--	--	--	--	--
N.S.	--	--	--	--	--	--	--	--
N.B.	--	3.37	--	--	--	2.27	--	--
Man. to								
P.E.I.	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36
N.S.	--	--	--	--	--	--	--	--
Que.	182.11	272.90	272.90	272.90	182.11	272.90	272.90	272.90
Sask. to								
Que.	--	--	--	--	--	--	--	--
Alta. to								
Que.	--	--	--	--	--	--	--	--
B.C.	--	--	--	--	--	--	--	--
Imports to								
P.E.I.	.99	.99	.99	.99	.99	.99	.99	.99
N.S.	9.39	9.39	9.39	9.39	9.39	9.39	9.39	9.39

Ontario were unaffected by the level of subsidy imposed. In the case of the latter, upon removal of the subsidy movement to Nova Scotia increased. On the other hand, elimination of feed grain movement costs to subsidy provinces resulted in a reduction in the quantity shipped to New Brunswick. Distribution of feed acreage among the respective crops substantially reduced interregional movement in aggregate. The volume of pork shipped from Ontario to New Brunswick was reduced. Under the present level of subsidy, the movement to other Maritime provinces was eliminated, supplies being shipped to these provinces by Manitoba with a subsequent decline in the quantity shipped from that province to Quebec. Saskatchewan no longer shipped outside the province. Removal of the subsidy reduced the level of Ontario shipments to New Brunswick, yet restored movement to Prince Edward Island and Nova Scotia. Manitoba shipped only to Quebec while Alberta shipped only to British Columbia. Application of the subsidy at other levels resulted in increased movement from Ontario to New Brunswick but had no appreciable effect elsewhere. Reallocation of the basic herd resulted in practically all the movement originating in Manitoba with Prince Edward Island and Quebec being the receiving provinces. At the present level of subsidy shipments to Quebec were lower than those which prevailed at the alternative levels. Removal of the subsidy resulted in a small movement from Ontario to New Brunswick. Imports moved to Prince Edward Island and Nova Scotia. Elimination of the feed grain export requirement had no effect on movement except to reduce that from Ontario to New Brunswick

when no subsidy was paid. In general, the level of subsidy served to influence movements more within the area to which it applied rather than to bring about major changes in movement between Western and Eastern Canada, the notable exception being that between Manitoba and Quebec.

Poultry

The production of eggs and poultry meat involved, in terms of the model, fewer activities than the production of beef. Eggs are a quasi-intermediate product since they are produced directly for human consumption as well as for hatching purposes. Three feeding regimes were made available to feed the basic herd while only one was provided for broilers and for capons, respectively. A discussion of the effects of the subsidy upon poultry production can therefore be restricted to the size of the basic herd utilized[84], the output of poultry meat, the interregional movement of eggs and the interregional movement of poultry meat.

Size of the Basic Herd

The number of birds that were kept for egg production purposes by province was taken as the average number of layers kept for the

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[84]The term "basic herd" is used here to describe what would normally be considered the basic "flock". The former term is used to maintain uniformity of description.

1962-63 period plus an appropriate number of roosters to maintain fertility for the necessary production of hatching eggs. Output of eggs per hen varied by province reflecting varying levels of efficiency in utilizing the basic herd. In all cases, the total size of the basic herd was in excess of requirements in aggregate, Table 51. Where maximum restriction was placed upon resources the level of subsidy had no effect on the size of the herd utilized in the respective provinces. Allocation of feed grain acreage on an economic basis had no effect upon the numbers utilized except in Nova Scotia, Alberta and British Columbia, regardless of the level of subsidy imposed. In all cases, the changes were small. Nova Scotia utilized a few additional birds at all levels of subsidy. In Alberta, application of the subsidy at the actual level caused a decline in the size of the herd utilized while the reverse was true in the case of British Columbia. When the subsidy was applied at the actual level paid, less that applying to movement from Ft. William to Toronto, a larger number were utilized in Alberta than before with a lesser number utilized in British Columbia. Elimination of all costs of feed grain movement resulted in the utilization of the largest number of basic herd units in British Columbia with the smallest number being used in Alberta under all subsidy levels. On the other hand, where no subsidy was given, the same size of basic herd was used after allocation of the feed acreage as applied before. Allocation of the basic herd on the basis of minimum cost brought about substantial shifts in its location. Substantial increases in the size of the basic

TABLE 51

SIZE OF BASIC POULTRY HERD UTILIZED BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(ten thousand birds)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	27.25	27.25	27.25	27.25	27.25	27.25	27.25	27.25
N.S.	109.40	109.40	109.40	109.40	110.18	110.18	110.18	110.18
N.B.	58.04	58.04	58.04	58.04	58.04	58.04	58.04	58.04
Que.	426.74	426.74	426.74	426.74	426.74	426.74	426.74	426.74
Ont.	1036.44	1036.44	1036.44	1036.44	1036.44	1036.44	1036.44	1036.44
Man.	238.22	238.22	238.22	238.22	238.22	238.22	238.22	238.22
Sask.	205.91	205.91	205.91	205.91	205.91	205.91	205.91	205.91
Alta.	232.04	232.04	232.04	232.04	225.67	232.04	227.58	221.16
B.C.	218.25	218.25	218.25	218.25	224.02	218.25	222.29	228.11

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	13.59	13.48	13.59	13.48	13.59	13.48	13.48	13.48
N.S.	102.65	100.84	101.92	101.92	102.65	100.94	101.92	101.92
N.B.	84.12	83.63	84.12	83.63	84.12	83.63	84.12	83.63
Que.	770.49	770.49	770.49	770.49	770.49	770.49	770.49	770.49
Ont.	862.09	863.38	862.82	862.31	862.09	863.28	862.82	862.31
Man.	137.56	137.56	137.56	137.56	137.56	137.56	137.56	137.56
Sask.	146.26	146.26	146.26	146.26	146.26	146.26	146.26	146.26
Alta.	216.44	217.63	216.44	208.38	216.44	217.63	216.54	208.38
B.C.	219.73	219.73	219.73	228.11	219.73	219.73	219.73	228.11

Source: Appendix VIII

herd utilized occurred in New Brunswick and Quebec. Substantial declines occurred in Prince Edward Island, Ontario, Manitoba, and Saskatchewan. Elsewhere only minor changes prevailed. It is worthy of note that the decline in Ontario was offset by an increase of similar size in Quebec. The level of subsidy had minimal if any effect on the size of herd except in Alberta and British Columbia. Elimination of the cost of feed grain movement increased the level of utilization in the latter province while decreasing it in the former. Elimination of the export requirement for feed grain had no additional effect on the size of herd utilized.

In summary, the level of subsidy applied had little effect upon the size of basic herd utilized. On the other hand, the relaxation of restrictions to allow adjustment of the herd size between provinces brought about substantial shifts in location. This situation reflected the footloose character of the poultry industry. Failure of the indicated desirable adjustment to occur stems in part from the unprogressive producers in certain areas as illustrated by the present differential in average size of operations between Ontario and Quebec.

Output of Poultry Meat

Capons were not used as a source of poultry meat in any province. In all cases, broilers were a lower cost source of meat. However, the output of broilers varied greatly between provinces, Table 52.

Under the most restrictive condition, negligible if any difference occurred in the level of output of the respective provinces when the

TABLE 52

OUTPUT OF BROILERS BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(ten thousand birds)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	89.00	89.00	89.00	89.00	89.00	89.00	89.00	89.00
N.S.	628.46	628.46	628.46	628.46	628.46	628.46	628.46	628.46
N.B.	--	--	--	--	--	--	--	--
Que.	1251.27	--	1251.27	1250.60	--	--	--	--
Ont.	7529.86	9845.71	7529.86	7529.86	10245.40	10245.40	10245.40	10245.40
Man.	788.50	788.50	788.50	788.50	788.50	788.50	788.50	788.50
Sask.	779.30	779.30	779.30	779.30	779.30	779.30	779.30	779.30
Alta.	4030.34	2965.75	4030.34	4031.00	1744.66	2566.06	1990.29	1162.48
B.C.	--	--	--	--	821.40	--	575.77	1403.58

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	89.00	75.48	89.00	75.48	89.00	75.48	75.48	75.48
N.S.	733.23	475.06	628.46	628.46	733.23	488.59	628.46	628.46
N.B.	66.67	--	66.67	--	66.67	--	66.67	--
Que.	4534.17	4534.17	4534.17	4534.17	4534.17	4534.17	4534.17	4534.17
Ont.	5693.19	5878.15	5797.96	5724.76	5693.19	5864.63	5797.96	5724.76
Man.	788.50	788.50	788.50	788.50	788.50	788.50	788.50	788.50
Sask.	779.30	779.30	779.30	779.30	779.30	779.30	779.30	779.30
Alta.	2202.00	2355.39	2202.00	1162.48	2202.00	2355.39	2215.53	1162.48
B.C.	210.67	210.67	210.67	1403.58	210.67	210.67	210.67	1403.58

Source: Appendix VIII

subsidy was applied at either of the three levels greater than zero. On the other hand, with the subsidy removed, substantial changes occurred in the level of output of Quebec, Ontario and Alberta. Quebec ceased to be a producer and the output from Alberta declined, these losses of production being offset by a corresponding increase in Ontario, the share of Canadian output of the latter province increasing from about one-half to almost two-thirds. New Brunswick and British Columbia did not produce any broilers under this restriction level.

Allocation of feed grain acreage to achieve minimum costs of production had no effect on the level of output of Prince Edward Island, Nova Scotia, Manitoba and Saskatchewan while Quebec ceased to produce, this situation prevailing at all levels of subsidy. The output of Ontario increased but was not affected by the level of subsidy. The remaining output required to meet consumption requirements was divided between Alberta and British Columbia with the level of subsidy greatly affecting the relative division. In this situation the footloose character of the broiler industry became apparent.

Location of the basic herd to minimize production costs had a profound effect on the levels of output by the respective provinces. Quebec became a major producer while New Brunswick produced under two levels of subsidy. The contribution by Ontario was substantially reduced while British Columbia produced at all levels of subsidy. The level of subsidy applied greatly affected the volume of output of the respective provinces. The dependence of the Maritime provinces upon

the subsidy for maintenance of the broiler industry became obvious with its elimination being associated with a substantial decline in total output from that region. The level of subsidy had no effect upon the output of Quebec, Manitoba and Saskatchewan. Removal of the subsidy brought forth increases in Ontario and Alberta. Elimination of feed movement costs had the effect of reducing by almost one-half the output from the latter province, with a more than offsetting increase occurring in British Columbia. Removal of the export requirement for feed grain brought forth no further change in the level of output of any province regardless of the level of subsidy imposed.

The output of broilers on the whole, as would be expected, was highly dependent upon the cost of feed supplies. This became particularly evident under optimum allocation of the basic herd though it could also be observed under the other levels of restriction imposed.

Interregional Movements of Eggs

There is a tendency in the central provinces to discriminate against western eggs. This is exhibited in existing price differentials which are not in accord with actual movement costs. The discrimination is explained on the basis of quality deterioration during transit, a condition which has yet to be formally substantiated. Comparison of egg quality between eggs from Eastern and Western Canada at the consumer level indicates that if anything the quality of local eggs in the former area is lower than in the latter on a grade basis. The differential

must therefore be partially accounted for on the basis of market imperfections based primarily on lack of knowledge. The movement of eggs between regions was assessed a very high rate, nevertheless, and this is reflected in the area price differentials established for eggs under the conditions of greatest restriction.[85] After relaxation of the restrictions upon resources these differentials dropped to levels comparable with the actual costs of movement.

Under the most restrictive condition, Quebec and New Brunswick were the provinces deficit in eggs, Table 53. Eggs were supplied to the latter province by Prince Edward Island, Nova Scotia and Ontario as well as by imports. Quebec, with a major deficit, received eggs from Ontario, Manitoba, Saskatchewan and Alberta, notwithstanding the high movement charge assessed. Where no subsidy was applied, total movement was depressed slightly with an increase in the movement from Alberta to Quebec being offset by a greater decrease in the movement from Ontario. Payment of the subsidy at the various levels had no effect upon the volume of movement between the provinces.

Relaxation of the restrictions to allow allocation of feed grain acreage between the various crops removed the differential in aggregate movement between conditions of no subsidy and subsidy. However, there were changes in movement between provinces. Movement

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[85] See Table 61 where the "shadow prices" are given for the various products under alternative resource and cost conditions.

TABLE 53

INTERREGIONAL MOVEMENT OF EGGS UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(Million dozen)

From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to								
N.B.	1.67	1.67	1.67	1.67	--	--	--	--
Que.	--	--	--	--	1.67	1.67	1.67	1.67
N.S. to								
N.B.	1.27	1.27	1.27	1.27	1.27	1.27	1.27	1.27
Ont. to								
N.B.	.78	.78	.78	.78	2.45	2.45	2.45	2.45
Que.	26.92	24.16	26.92	26.92	22.02	22.02	22.02	22.02
Man. to								
Que.	15.88	15.88	15.88	15.88	15.88	15.88	15.88	15.88
Sask. to								
Que.	8.75	8.75	8.75	8.75	8.75	8.75	8.75	8.75
Alta. to								
Que.	.22	1.49	.22	.22	1.96	1.96	1.96	1.96
Imports to								
P.E.I.	--	--	--	--	--	--	--	--
N.B.	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75

Source: Appendix VIII

TABLE 53 (continued)

From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I. to								
N.B.	--	--	--	--	--	--	--	--
Que.	--	--	--	--	--	--	--	--
N.S. to								
N.B.	--	--	--	--	--	--	--	--
Ont. to								
N.B.	--	--	--	--	--	--	--	--
Que.	--	--	--	--	--	--	--	--
Man. to								
Que.	--	--	--	--	--	--	--	--
Sask. to								
Que.	--	--	--	--	--	--	--	--
Alta. to								
Que.	--	--	--	--	--	--	--	--
Imports to								
P.E.I.	4.75	4.75	4.75	4.75	4.75	4.75	4.75	4.75
N.B.	--	--	--	--	--	--	--	--

from Ontario was reduced with an increased movement to New Brunswick being more than offset by the reduction in movement to Quebec. The movement from Alberta to Quebec increased. Further relaxation of the restrictions eliminated all movement between provinces, while imports then moved to Prince Edward Island.

Interregional Movements of Poultry Meat

The level of subsidy significantly affected the movement of poultry meat between provinces according to the level of restriction applied, Table 54. Ontario and Alberta were the principal shippers, accompanied on an intermittent basis by Nova Scotia.. In the most restrictive case, Ontario shipped to New Brunswick and Quebec while Alberta shipped to Quebec and British Columbia. New Brunswick also received part of its supply from imports. In contrast to the situations where the subsidy was applied during which no differences in movement existed, elimination of the subsidy reduced movement from Alberta to Quebec but greatly enhanced that from Ontario to the latter province indicating that in the absence of the subsidy that it is relatively more advantageous for Ontario to use Western grain for the production of poultry meat rather than for other products.

Allocation of feed grain acreage to achieve minimum production costs had the effect of increasing the volume of movement from Ontario to Quebec, while eliminating that from Alberta to the latter province. The movement from Alberta to British Columbia was affected by the level

TABLE 54

INTERREGIONAL MOVEMENTS OF POULTRY MEAT UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(million pounds)

Movement From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
N.S. to								
N.B.	--	--	--	--	--	--	--	--
Ont. to								
P.E.I.	--	--	--	--	--	--	--	--
N.B.	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Que.	50.92	115.77	50.92	50.92	126.96	126.96	126.96	126.96
Alta. to								
Que.	41.00	11.19	41.00	41.02	--	--	--	--
B.C.	39.30	39.30	39.30	39.30	16.30	39.30	23.18	--
Imports to								
P.E.I.	--	--	--	--	--	--	--	--
N.S.	--	--	--	--	--	--	--	--
N.B.	4.30	4.30	4.30	4.30	4.30	4.30	4.30	4.30
B.C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 54 (continued)

Movement From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
N.S. to								
N.B.	2.93	--	--	--	2.93	--	--	--
Ont. to								
P.E.I.	--	.38	--	--	--	--	--	--
N.B.	9.50	14.30	12.43	10.38	9.50	14.30	12.43	10.38
Que.	--	--	--	--	--	--	--	--
Alta. to								
Que.	--	--	--	--	--	--	--	--
B.C.	29.11	33.40	29.11	--	29.11	33.40	29.49	--
Imports to								
P.E.I.	--	--	--	.38	--	.38	.38	.38
N.S.	--	4.30	--	--	--	3.92	3.92	3.92
N.B.	--	--	--	3.92	--	--	--	--
B.C.	4.30	--	4.30	--	4.30	--	--	--

of subsidy, the same volume being moved as before if no subsidy was paid whereas the volume of movement was altered otherwise. Imports became distributed among the Maritime provinces and British Columbia according to the level of subsidy imposed. The same pattern of movement in general prevailed, with a few very minor modifications, when the export requirement for feed grain was waived.

The movement of poultry meat in aggregate was considerably greater where no subsidy was given on feed movement than where such was imposed. Total movement declined as the restrictions on resources were relaxed. Initially, movement in comparison to national consumption assumed substantial proportions but subsequently became less impressive.

Turkeys

The production of turkeys in comparison to the other forms of livestock previously considered is relatively small. On the other hand, within certain provinces a significant contribution is made to total farm output. This industry is now in the process of specialization and expansion. Turkeys were therefore included in the analysis.

Size of Basic Herd

The level of subsidy paid on feed grain movement was found to have no effect upon basic herd numbers within the respective provinces either under the most restrictive conditions or where the feed grain acreage was allotable, Table 55. The same situation did not prevail when the basic herd was relocated on the basis of minimum final product costs.

Under this condition, basic herd size was increased by about one-half in Quebec and by over four times in Ontario to that which previously existed. These increases were approximately offset by declines in the western provinces particularly in Manitoba, Saskatchewan and British Columbia. In other words, the central provinces have an economic advantage in the production of turkeys in comparison to other regions. Minor but nonetheless important shifts occurred within the Maritimes. In the latter region, location on a provincial basis was affected by the level of subsidy imposed but not in a consistent direction. More turkeys were kept in Ontario when no subsidy was given than otherwise, while elimination of feed movement costs shifted a substantial portion of Alberta's birds into British Columbia. Removal of the export requirement for feed grain had no additional effect upon the location of the basic herd.

Output of Turkeys

Two alternatives were provided in the model for satisfaction of the turkey meat requirement. Turkey could be obtained either by raising birds to maturity or by finishing them as broilers. Broilers were not used as a source of meat in any of the solutions obtained. This reflects the importance of expenditures for poults in relation to those incurred for other aspects of production.

Since the output of mature turkeys per basic herd unit was not assumed to be related to location, the output of mature birds directly

TABLE 55

SIZE OF BASIC TURKEY HERD UTILIZED BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand birds)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	1.48	1.48	1.48	1.48	1.48	1.48	1.48	1.48
N.S.	7.40	7.40	7.40	7.40	7.40	7.40	7.40	7.40
N.B.	3.62	3.62	3.62	3.62	3.62	3.62	3.62	3.62
Que.	107.98	107.98	107.98	107.98	107.98	107.98	107.98	107.98
Ont.	43.71	43.71	43.71	43.71	43.71	43.71	43.71	43.71
Man.	108.84	108.84	108.84	108.84	108.84	108.84	108.84	108.84
Sask.	84.51	84.51	84.51	84.51	84.51	84.51	84.51	84.51
Alta.	92.73	92.73	92.73	92.73	92.73	92.73	92.73	92.73
B.C.	49.91	49.91	49.91	49.91	49.91	49.91	49.91	49.91

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	2.02	3.05	2.02	3.05	2.02	3.05	3.05	3.05
N.S.	21.59	--	17.47	3.05	21.59	--	16.44	3.05
N.B.	--	5.08	--	5.08	--	5.08	--	5.08
Que.	155.43	155.43	155.43	155.43	155.43	155.43	155.43	155.43
Ont.	183.54	194.91	183.54	191.86	183.54	194.91	183.54	191.86
Man.	27.03	27.03	27.03	27.03	27.03	27.03	27.03	27.03
Sask.	26.71	26.71	26.71	26.71	26.71	26.71	26.71	26.71
Alta.	83.85	87.97	87.97	39.85	83.85	87.97	87.97	39.85
B.C.	--	--	--	48.12	--	--	--	48.12

Source: Appendix VIII

reflects the location of the basic herd, Table 56. In consequence, the discussion pertaining to the herd is also applicable to the output of mature birds.

Interregional Movement of Turkey

Total movement of turkey under the two most restrictive resource combinations was not affected by the level of subsidy paid, Table 57. There were, however, minor shifts in the source of supply of the deficit provinces when the available feed acreage was distributed. Nova Scotia, Manitoba, Saskatchewan, Alberta and British Columbia were surplus producing provinces. Quebec, Ontario and New Brunswick being in a deficit position received most of their additional requirements from Saskatchewan, Manitoba and Alberta, and imports, respectively. Relocation of the basic herd brought about a substantial decline in total movement. In addition, the level of subsidy then became a matter of some import. The principal movement took place between Alberta and British Columbia with this movement being eliminated when all costs of feed movement were removed. Deficits in Prince Edward Island and Nova Scotia were made up by shipments from Nova Scotia and Ontario and also by imports. While movement shifts among the Maritime provinces were small they were important from the standpoint of the local industry.

Movement of Feed Grain into the Subsidy Provinces

It will be recalled that one of the major arguments used in support of the subsidy was that the demand for prairie feed grain in

TABLE 56

OUTPUT OF MATURE TURKEYS BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(thousand birds)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	32.29	32.29	32.29	32.29	32.29	32.29	32.29	32.29
N.S.	161.44	161.44	161.44	161.44	161.44	161.44	161.44	161.44
N.B.	78.97	78.97	78.97	78.97	78.97	78.97	78.97	78.97
Que.	2355.69	2355.69	2355.69	2355.69	2355.69	2355.69	2355.69	2355.69
Ont.	953.58	953.58	953.58	953.58	953.58	953.58	953.58	953.58
Man.	2374.45	2374.45	2374.45	2374.45	2374.45	2374.45	2374.45	2374.45
Sask.	1843.67	1843.67	1843.67	1843.67	1843.67	1843.67	1843.67	1843.67
Alta.	2023.00	2023.00	2023.00	2023.00	2023.00	2023.00	2023.00	2023.00
B.C.	1088.78	1088.78	1088.78	1088.78	1088.78	1088.78	1088.78	1088.78

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
P.E.I.	44.10	66.56	44.10	66.56	44.10	66.56	66.56	66.56
N.S.	470.90	--	381.21	66.56	470.90	--	358.75	66.56
N.B.	--	110.73	--	110.73	--	110.73	--	110.73
Que.	3390.94	3390.94	3390.94	3390.94	3390.94	3390.94	3390.94	3390.94
Ont.	4004.06	4252.09	4004.06	4185.53	4004.06	4252.09	4004.06	4185.53
Man.	589.69	589.69	589.69	589.69	589.69	589.69	589.69	589.69
Sask.	582.81	582.81	582.81	582.81	582.81	582.81	582.81	582.81
Alta.	1829.38	1919.06	1919.06	869.38	1829.38	1919.06	1919.06	869.38
B.C.	--	--	--	1049.69	--	--	--	1049.69

Source: Appendix VIII

TABLE 57

INTERREGIONAL MOVEMENT OF TURKEY UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(million pounds)

From	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
N.S. to								
P.E.I.	.44	.44	.44	.44	--	--	--	--
N.B.	.78	.78	.78	.78	1.21	1.21	1.21	1.21
Ont. to								
N.B.	--	--	--	--	--	--	--	--
Man. to								
Ont.	22.85	22.85	22.85	22.85	22.85	22.85	22.85	22.85
Sask. to								
N.B.	1.95	1.95	1.95	1.95	--	--	--	--
Que.	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.25
Ont.	.93	.93	.93	.93	2.89	2.89	2.89	2.89
Alta. to								
N.B.	--	--	--	--	1.45	1.45	1.45	1.45
Ont.	14.77	14.77	14.77	14.77	13.31	13.31	13.31	13.31
B.C.	--	--	--	--	--	--	--	--
B.C. to								
N.B.	--	--	--	--	.50	.50	.50	.50
Ont.	.50	.50	.50	.50	--	--	--	--
Imports to								
P.E.I.	--	--	--	--	.44	.44	.44	.44
N.S.	--	--	--	--	--	--	--	--
N.B.	1.15	1.15	1.15	1.15	.71	.71	.71	.71
B.C.	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 57 (continued)

From	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
N.S. to								
P.E.I.	.29	--	.29	--	.29	--	--	--
N.B.	4.89	--	3.74	--	4.89	--	3.74	--
Ont. to								
N.B.	--	3.17	--	2.32	--	3.17	--	2.32
Man. to								
Ont.	--	--	--	--	--	--	--	--
Sask. to								
N.B.	--	--	--	--	--	--	--	--
Que.	--	--	--	--	--	--	--	--
Ont.	--	--	--	--	--	--	--	--
Alta. to								
N.B.	--	--	--	--	--	--	--	--
Ont.	--	--	--	--	--	--	--	--
B.C.	12.29	13.44	13.44	--	12.29	13.44	13.44	--
B.C. to								
N.B.	--	--	--	--	--	--	--	--
Ont.	--	--	--	--	--	--	--	--
Imports to								
P.E.I.	--	--	--	--	--	--	--	--
N.S.	--	.85	--	--	--	.85	--	--
N.B.	--	.30	1.15	1.15	--	.30	1.15	1.15
B.C.	1.15	--	--	--	1.15	--	--	--

the provinces requiring outside supplies is increased due to payment of the subsidy. The movements of the respective feed grains as shown in Table 58 are therefore of considerable interest.

Under Right Hand Side One, a situation representing levels of resources actually in use in 1962-63, all available feed sources except screenings were fully utilized regardless of the level of subsidy paid. The movement of screenings was reduced but not eliminated when the subsidy was removed. Allocation of feed grain acreage to minimize final product production costs brought about a substantial decline in total movement. This decline was of the nature of about one-third where the subsidy was paid and one-half where it was not available. Barley movements were most severely affected, being eliminated entirely when a subsidy was not available. Wheat and oat movements were reduced when no subsidy was paid whereas screenings movements were eliminated. For these three feeds, the level of the subsidy where paid had little if any effect on movement. Imports of American corn were reduced with the greatest reduction occurring when the subsidy was applied at the actual levels prevailing in 1962-63.

Redistribution of the respective basic herds among the provinces brought about substantial changes in the level of feed movement. The level of subsidy then became a matter of greater importance. Where the subsidy was applied at actual levels, all outside feed sources except American corn were fully utilized. Where the subsidy was available in effect only on movements beyond Ontario, barley movement was eliminated

TABLE 58

MOVEMENT OF FEED FROM OUTSIDE SOURCES INTO SUBSIDY PROVINCES UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(million therms)

Source	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Prairies								
Wheat	1058.53	1058.53	1058.53	1058.53	1058.53	793.70	1058.53	1058.53
Oats	1352.49	1352.49	1352.49	1352.49	1352.49	967.83	1271.71	1321.35
Barley	1770.22	1770.22	1770.22	1770.22	407.96	--	193.70	207.04
Rye	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42
Screenings	199.84	96.69	199.84	199.84	199.84	--	199.84	199.84
Corn	343.23	343.23	343.23	343.23	343.23	343.23	343.23	343.23
Total Prairies	4729.73	4626.58	4729.73	4729.73	3367.47	2110.18	3072.43	3135.41
United States								
Corn	2595.56	2595.56	2595.56	2595.56	1796.48	1997.95	1996.37	1996.37
Total Movement	7325.29	7222.14	7325.29	7325.29	5163.95	4108.13	5068.80	5131.78

Source	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Prairies								
Wheat	1058.53	773.02	858.54	1019.31	1058.53	773.02	857.08	1019.31
Oats	1352.49	946.55	1038.59	1024.29	1352.49	946.65	1038.28	1024.29
Barley	1770.22	--	--	--	1770.22	--	--	--
Rye	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42
Screenings	199.84	--	199.84	199.84	199.84	--	199.84	199.84
Corn	343.23	343.23	343.23	343.23	343.23	343.23	343.23	343.23
Total Prairies	4729.73	2068.22	2445.62	2592.09	4729.73	2068.32	2443.85	2592.09
United States								
Corn	1731.15	1760.24	1697.48	1697.48	1719.30	1748.39	1685.63	1685.63
Total Movement	6460.88	3828.46	4143.10	4289.57	6449.03	3816.71	4129.48	4277.72

Source: Appendix VIII

with that of oats and wheat substantially reduced. American corn was little affected. Where the subsidy was applied at a level sufficient to completely offset feed movement costs, a further reduction in oat movements occurred but this was more than offset by an increase in that of wheat, while barley went unutilized. No change was indicated in American corn. Where the export requirement for feed grain was waived there was no further effect upon feed grain movement.

Examination of the data in Table 58 therefore reveals that the level of subsidy is not of any great importance in determining feed movements until adjustments are made in the use of other resources. After such are made, the level of subsidy is a major determiner of volume. The level of subsidy actually paid appears as one which maximizes movement and therefore the demand for prairie feed. This is not surprising under conditions of greatest resource restriction since present allocation of resources is based on this level of payment. After adjustment in resource use the large volume of feed movement associated with the subsidy applied at this level requires further explanation. This particular level of subsidy is apparently especially favorable to movements of barley into Quebec in concert with the other production costs experienced.

Receipts of Feeds by Province

The receipts of the individual feeds by province are recorded in Table 59. This distribution provides an indication of the location of

TABLE 59

RECEIPTS OF SPECIFIC FEEDS BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(million therms)

Receiving Province	Right Hand Side One (Existing Conditions) 1COST	2COST	3COST	4COST	Right Hand Side Two (Feed Acreage Allotable) 1COST	2COST	3COST	4COST
Nova Scotia								
Wheat	246.01	324.58	246.01	246.01	99.18	99.18	108.99	99.18
Oats	141.33	--	141.33	141.33	150.96	150.96	155.68	150.96
Barley	26.68	--	26.68	26.68	407.96	--	193.70	207.04
Screenings	199.84	96.69	199.84	78.44	--	--	199.84	98.27
Total	613.86	421.27	613.86	429.96	658.10	250.14	658.21	555.45
New Brunswick								
Wheat	21.26	16.02	21.26	30.70	--	--	--	--
Rye	5.42	5.42	5.42	5.42	--	--	--	--
Screenings	--	--	--	121.40	--	--	--	101.57
Total	26.68	21.44	26.68	157.58	--	--	--	101.57
Quebec								
Wheat	743.22	419.78	743.22	442.83	529.32	353.20	546.53	466.45
Oats	--	--	--	--	1201.53	816.87	1116.02	1170.39
Barley	567.40	735.41	567.40	792.92	--	--	--	--
Rye	--	--	--	--	5.42	5.42	5.42	5.42
Screenings	--	--	--	--	199.84	--	--	--
Total	1310.62	1155.19	1310.62	1235.75	1936.11	1175.49	1667.97	1642.26
Ontario								
Wheat	--	250.11	--	--	293.28	293.28	293.28	293.28
Oats	849.35	990.67	849.35	1074.86	--	--	--	--
Ontario								
Barley	1176.15	1034.81	1176.15	950.63	--	--	--	--
Total	2025.50	2275.59	2025.50	2025.48	293.28	293.28	293.28	293.28
B.C.								
Wheat	48.05	48.05	48.05	338.93	136.76	48.05	110.23	199.63
Oats	361.81	361.81	361.81	136.30	--	--	--	--
Corn (Man.)	343.23	343.23	343.23	343.23	343.23	343.23	343.23	343.23
Total	753.09	753.09	753.09	818.47	479.99	391.28	453.46	542.86

Source: Appendix VIII

TABLE 59 (continued)

Receiving Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Nova Scotia								
Wheat	213.48	48.91	159.22	118.99	213.48	50.37	157.75	118.99
Oats	267.14	104.20	196.24	181.94	267.14	104.30	195.93	181.94
Barley	344.64	--	--	--	343.55	--	--	--
Screenings	199.84	--	199.84	199.84	199.84	--	199.84	199.84
Total	1025.10	153.11	555.30	500.77	1024.01	154.67	553.52	500.77
New Brunswick								
Wheat	--	--	--	--	--	--	--	--
Rye	--	--	--	--	--	--	--	--
Screenings	--	--	--	--	--	--	--	--
Total	--	--	--	--	--	--	--	--
Quebec								
Wheat	845.05	688.01	688.01	688.01	845.05	688.01	688.01	688.01
Oats	1085.35	842.35	842.35	842.35	1085.35	842.35	842.35	842.35
Barley	1425.59	--	--	--	1426.67	--	--	--
Rye	5.42	5.42	5.42	5.42	5.42	5.42	5.42	5.42
Screenings	--	--	--	--	--	--	--	--
Total	3361.41	1535.78	1535.78	1535.78	3362.49	1535.78	1535.78	1535.78
Ontario								
Wheat	--	36.10	11.32	15.21	--	34.64	11.32	15.21
Oats	--	--	--	--	--	--	--	--
Barley	--	--	--	--	--	--	--	--
Total	--	36.10	11.32	15.21	--	34.64	11.32	15.21
B.C.								
Wheat	--	--	--	197.09	--	--	--	197.09
Oats	--	--	--	--	--	--	--	--
Corn(Man.)	343.23	343.23	343.23	343.23	343.23	343.23	343.23	343.33
Total	343.23	343.23	343.23	540.32	343.23	343.23	343.23	540.32

Source: Appendix VIII

the beneficiaries of the major share of the payments. In addition, the proportion of the total movement made up by the individual feeds reflects the type of production activity emphasized within a particular province.

Under the most restricting resource condition imposed, a representation of the conditions prevailing during 1962-63, Ontario received the largest shipments of grain under all subsidy levels. Where the subsidy did not apply, movement into this province increased. The other beneficiaries in order were Quebec, British Columbia, Nova Scotia and New Brunswick. Movements into Nova Scotia and Quebec were depressed following removal of the subsidy. Payment of the subsidy only on movements beyond Ontario brought no change in the distribution compared to where the actual rates applied. On the other other hand, where feed movement costs were eliminated, movement to New Brunswick and British Columbia increased whereas that to Quebec decreased. Prince Edward Island received no feed at all under subsidy.

Progressive relaxation of the restrictions upon resources brought about concentration of feed receipts among Quebec, Nova Scotia and British Columbia. Volume received by Ontario became minimal whereas movement into New Brunswick ceased. The volume received by Nova Scotia became highly dependent on the level of subsidy paid, the actual level being most advantageous, with the receipts being greatly reduced when the subsidy was no longer available. Quebec also found the actual level of subsidy particularly attractive with other levels bringing forth no additional movement to that existing without the subsidy. British

Columbia utilized Manitoba corn and this was supplemented with wheat when no feed grain movement costs applied.

The distribution of the corn receipts from the United States are shown in Table 60. Quebec was the principal recipient in all cases though Nova Scotia, New Brunswick and Ontario also participated according to the level of subsidy payment under the most restrictive resource condition. Subsequent adjustment in resource use limited receipts to Quebec with these greatest where the subsidy did not apply.

The feed movements indicate that Nova Scotia, Quebec and British Columbia remain dependent upon prairie feeds even after adjustment in resource use. Removal of the subsidy is felt most severely by Nova Scotia. On the other hand, Ontario and British Columbia are affected little and the remaining two provinces, Prince Edward Island and New Brunswick, do not participate at all.

Prices of Final Products

The shadow prices for meat and eggs by province are shown in Table 61. A comparison of these shadow prices serves to indicate the differences in costs at the farm level prevailing under the various resource and cost combinations considered.

The desirability of adjustment in resource use becomes apparent. Significant savings in production cost would accrue to such adjustment. On the other hand, the minor if any differences in costs of production shown between conditions of subsidy payment and non-payment bring up the

TABLE 60

DISTRIBUTION OF CORN IMPORTS UNDER ALTERNATIVE RESOURCE AND COST COMBINATIONS
(million therms)

Receiving Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Nova Scotia	--	--	--	18.25	--	--	--	--
New Brunswick	52.93	52.93	52.93	--	--	--	--	--
Quebec	1744.13	1794.96	1744.13	1795.96	1453.25	1654.72	1654.14	1653.14
Ontario	455.26	404.44	455.26	438.12	--	--	--	--

Receiving Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Nova Scotia	--	--	--	--	--	--	--	--
New Brunswick	--	--	--	--	--	--	--	--
Quebec	1387.92	1412.00	1354.24	1354.24	1376.07	1405.15	1342.40	1342.40
Ontario	--	--	--	--	--	--	--	--

Source: Appendix VIII

TABLE 61

SHADOW PRICES FOR MEAT AND EGGS BY PROVINCE UNDER ALTERNATIVE RESOURCE AND COST CONDITIONS*
(meat cents per pound, eggs cents per dozen)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Prince Edward Island								
Beef	51.88	51.88	51.88	51.88	47.26	47.66	47.41	47.60
Veal	85.85	84.62	85.85	85.85	77.31	77.31	77.31	77.31
Pork	24.59	24.87	24.59	24.59	22.91	23.39	23.06	23.06
Poultry	29.54	29.66	29.54	29.54	29.17	29.29	29.29	29.29
Eggs	58.33	58.33	58.33	58.33	58.59	58.59	58.59	58.59
Turkey	40.99	41.68	40.99	40.23	39.67	40.30	39.67	39.09
Nova Scotia								
Beef	53.05	53.05	53.05	53.05	48.42	48.83	48.58	48.77
Veal	85.90	84.20	85.90	85.34	77.36	77.14	77.36	77.36
Pork	24.60	24.88	24.60	24.60	22.91	23.41	23.07	23.07
Poultry	29.17	30.29	29.17	29.72	28.74	29.93	28.74	29.36
Eggs	59.25	59.25	59.25	59.25	59.25	59.25	59.25	59.25
Turkey	39.82	40.51	39.82	39.06	38.49	39.13	38.49	37.91

*The shadow prices can be interpreted in an economic sense as a set of marginal values since a change in the shadow price is the change in the objective function per unit increase in the corresponding right hand side constant, assuming that a change in basis is not required to maintain feasibility.

Source: Appendix VIII

TABLE 61 (continued)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
New Brunswick								
Beef	53.05	53.05	53.05	53.05	48.42	48.83	48.58	48.77
Veal	84.73	83.46	84.73	85.33	76.96	77.15	76.96	77.15
Pork	24.33	24.61	24.33	24.33	22.80	23.13	22.80	29.65
Poultry	30.24	30.24	30.24	30.24	29.78	29.88	29.78	29.65
Eggs	82.79	82.79	82.79	82.79	82.79	82.79	82.79	82.79
Turkey	40.99	41.68	40.99	40.23	39.67	40.30	39.67	39.09
Quebec								
Beef	52.23	52.23	52.23	52.23	47.94	47.94	47.94	47.94
Veal	84.43	83.87	84.43	84.43	75.88	75.88	75.88	75.88
Pork	23.96	24.25	23.96	23.96	22.02	22.77	22.27	22.11
Poultry	30.01	30.01	30.01	30.01	29.55	29.65	29.55	29.42
Eggs	81.84	81.84	81.84	81.84	81.84	81.84	81.84	81.84
Turkey	40.27	40.96	40.27	39.51	38.95	39.58	38.95	38.37
Ontario								
Beef	52.23	52.23	52.23	52.23	47.94	47.94	47.94	47.94
Veal	84.97	84.97	84.97	84.97	76.49	76.49	76.49	76.49
Pork	22.82	23.10	22.82	22.82	21.29	21.62	21.29	21.29
Poultry	28.91	28.91	28.91	28.91	28.45	28.55	28.45	28.32
Eggs	58.84	58.84	58.84	58.84	58.84	58.84	58.84	58.84
Turkey	40.27	40.96	40.27	39.51	38.95	39.58	38.95	38.37
Manitoba								
Beef	50.46	50.46	50.46	50.46	46.17	46.17	46.17	46.17
Veal	83.20	83.20	83.20	83.20	75.90	75.90	75.90	75.90
Pork	22.19	22.48	22.19	22.19	20.25	21.00	20.50	20.34
Poultry	28.66	28.66	28.66	28.66	28.66	28.66	28.66	28.66
Eggs	56.09	56.09	56.09	56.09	56.09	56.09	56.09	56.09
Turkey	38.84	39.53	38.84	38.08	37.52	38.15	37.52	36.94

TABLE 61 (continued)

Province	Right Hand Side One (Existing Conditions)				Right Hand Side Two (Feed Acreage Allotable)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Saskatchewan								
Beef	49.80	49.80	49.80	49.80	45.51	45.51	45.51	45.51
Veal	83.09	83.09	83.09	83.09	75.91	75.91	75.91	75.91
Pork	21.53	21.82	21.53	21.53	20.39	20.39	20.39	20.39
Poultry	28.14	28.14	28.14	28.14	28.14	28.14	28.14	28.14
Eggs	46.73	46.73	46.73	46.73	46.73	46.73	46.73	46.73
Turkey	38.32	39.01	38.32	37.56	37.00	37.63	37.00	36.42
Alberta								
Beef	49.30	49.30	49.30	49.30	45.01	45.01	45.01	45.01
Veal	82.09	82.09	82.09	82.09	74.91	74.91	74.91	74.91
Pork	21.03	21.32	21.03	21.03	20.35	20.35	20.35	20.35
Poultry	27.54	27.54	27.54	27.54	27.54	27.54	27.54	27.54
Eggs	37.36	37.36	37.36	37.36	37.36	37.36	37.36	37.36
Turkey	37.80	38.49	37.80	37.04	36.48	37.11	36.48	35.90
British Columbia								
Beef	50.65	50.65	50.65	50.65	46.36	46.36	46.36	46.36
Veal	83.44	83.44	83.44	83.44	76.26	76.26	76.26	76.26
Pork	22.38	22.67	22.38	22.38	21.70	21.70	21.70	21.70
Poultry	28.89	28.89	28.89	28.89	28.89	28.89	28.89	28.45
Eggs	39.42	40.31	39.42	38.58	34.78	34.78	34.78	34.78
Turkey	37.25	37.94	37.25	36.49	35.87	36.51	35.87	35.29

TABLE 61 (continued)

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Prince Edward Island								
Beef	46.99	47.06	46.09	46.99	46.99	47.06	46.99	46.99
Veal	75.23	75.41	75.24	75.24	75.24	75.40	75.24	75.24
Pork	23.04	28.95	22.90	22.90	23.04	22.90	22.90	22.90
Poultry	28.61	28.96	28.87	28.58	28.61	29.01	28.89	28.58
Eggs	40.37	40.45	40.37	40.37	40.37	40.45	40.37	40.37
Turkey	35.12	35.58	35.46	35.09	35.12	35.66	35.49	35.09
Nova Scotia								
Beef	48.16	48.23	48.16	48.16	48.16	48.23	48.16	46.99
Veal	76.12	75.91	76.12	76.12	76.12	75.90	76.12	75.24
Pork	23.04	22.90	22.90	22.90	23.04	22.90	22.90	22.90
Poultry	27.58	29.01	27.84	28.34	27.59	29.01	27.84	28.34
Eggs	35.42	37.51	35.54	35.93	35.42	37.51	35.54	35.93
Turkey	33.95	35.78	34.30	35.01	33.95	35.78	34.30	35.01
New Brunswick								
Beef	48.16	48.16	48.16	48.16	48.16	48.16	48.16	48.16
Veal	75.91	75.91	75.91	75.91	75.91	75.91	75.91	75.91
Pork	22.45	22.80	22.73	22.73	22.45	22.80	22.73	22.73
Poultry	28.76	28.83	28.83	28.58	28.76	28.83	28.83	28.58
Eggs	38.37	38.37	38.37	38.37	38.37	38.37	38.37	38.37
Turkey	35.12	35.78	35.47	35.45	35.12	35.78	35.47	35.45
Quebec								
Beef	47.34	47.34	47.34	47.34	47.34	47.34	47.34	47.34
Veal	74.64	74.64	74.64	74.64	74.64	74.64	74.64	74.64
Pork	22.15	22.01	22.01	22.01	22.15	22.01	22.01	22.01
Poultry	27.52	28.17	27.77	27.70	27.52	28.17	27.77	27.70

TABLE 61 (continued)

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Quebec								
Eggs	36.93	37.75	37.06	36.62	36.93	37.75	37.06	36.62
Turkey	34.43	35.37	34.77	34.62	34.43	35.37	34.77	34.62
Ontario								
Beef	47.34	47.34	47.34	47.34	47.34	47.34	47.34	47.34
Veal	75.51	75.74	75.74	75.74	75.51	75.74	75.74	75.74
Pork	21.29	21.29	21.29	21.29	21.29	21.29	21.29	21.29
Poultry	27.43	27.50	27.50	27.25	27.43	27.50	27.50	27.25
Eggs	34.14	34.14	34.14	34.14	34.14	34.14	34.14	34.14
Turkey	34.35	34.45	34.45	34.12	34.35	34.45	34.45	34.12
Manitoba								
Beef	45.57	45.57	45.57	45.57	45.57	45.57	45.57	45.57
Veal	74.25	74.48	74.48	74.48	74.25	74.48	74.48	74.48
Pork	20.38	20.24	20.24	20.24	20.38	20.24	20.24	20.24
Poultry	27.82	27.82	27.82	27.82	27.82	27.82	27.82	27.82
Eggs	36.48	36.22	36.22	36.22	36.48	36.22	36.22	36.22
Turkey	34.54	34.50	34.50	34.50	34.54	34.50	34.50	34.50
Saskatchewan								
Beef	44.91	44.91	44.91	44.91	44.91	44.91	44.91	44.91
Veal	73.58	73.58	73.58	73.58	73.58	73.58	73.58	73.58
Pork	21.17	21.17	21.17	21.17	20.37	20.37	20.37	20.37
Poultry	27.81	27.81	27.81	27.81	27.81	27.81	27.81	27.81
Eggs	38.97	38.97	38.97	38.97	38.97	38.97	38.97	38.97
Turkey	34.34	34.34	34.34	34.34	34.34	34.34	34.34	34.34

TABLE 61 (continued)

Province	Right Hand Side Three (Basic Herd Allotable)				Right Hand Side Four (No Oats and Barley Exports)			
	1COST	2COST	3COST	4COST	1COST	2COST	3COST	4COST
Alberta								
Beef	44.63	44.72	44.72	44.72	44.63	44.72	44.72	44.72
Veal	72.58	72.81	72.81	72.81	72.58	72.81	72.81	72.81
Pork	20.35	20.35	20.35	20.35	20.35	20.35	20.35	20.35
Poultry	27.54	27.54	27.54	27.54	27.54	27.54	27.54	27.54
Eggs	37.36	37.36	37.36	37.36	37.36	37.36	37.36	37.36
Turkey	34.10	34.10	34.10	34.10	34.10	34.10	34.10	34.10
British Columbia								
Beef	45.98	46.07	46.07	46.07	45.98	46.07	46.07	46.07
Veal	73.93	74.16	74.16	74.16	73.93	74.16	74.16	74.16
Pork	20.36	20.36	20.36	20.36	20.36	20.36	20.36	20.36
Poultry	28.89	28.89	28.89	28.43	28.89	28.89	28.89	28.43
Eggs	34.78	34.78	34.78	34.78	34.78	34.78	34.78	34.78
Turkey	35.45	35.45	35.45	35.27	35.45	35.45	35.45	35.27

question as to whether or not consumers will benefit from payment given existing imperfections in marketing beyond the farm level. The price differentials therefore only indicate the maximum benefits possible rather than those which would be attained.

CHAPTER VIII

EVALUATION AND CONCLUSIONS

The primary objectives of the study were to determine the effects of the feed freight subsidy upon the total costs of production, the location of production and the movement of the respective products between the provinces. Three alternative techniques were considered as means to reach these objectives; evaluation in terms of comparison with a theoretical model, determination of elasticities of demand and supply by provinces, and the use of a spatial equilibrium model to determine empirically the effect of the subsidy upon specified activities. The decision was made to follow the spatial equilibrium approach since this held forth the prospect of leading to the most fruitful analysis.

A review of the applicable theory led to the development of certain hypotheses pertaining to the effect of the subsidy upon the functioning of the feed - livestock economy. The hypotheses may be stated as follows:

1. By subsidizing the transportation of feed grain between certain areas, the volume of movement of this raw material has increased whereas that of more processed products has declined.

2. A new spatial equilibrium in livestock production, not in accord with comparative advantage, has developed.

3. The total cost incurred in satisfying the given consumer demand for animal products has increased.

Before embarking on the analysis three basic assumptions were made:

1. Economic welfare can be maximized by obtaining the desired product at minimum cost.

2. Producers are rational in that they seek to maximize their net returns.

3. Consumers do not differentiate between products from different regions.

Linear programming was the technique adopted in order to reach a solution. This provided empirical results and furthermore allowed examination of the effects of the subsidy within a more comprehensive partial equilibrium framework than would be possible by other means, given the time and other resource restrictions imposed upon the study.

Shortcomings of the Technique Adopted

The assumption is made in linear programming of constant returns to scale. This involves the use of fixed coefficients. While modifications of procedure are available to allow incorporation of changes in size of production unit into the model, these require knowledge of how the coefficients and costs change with size. At the present time, the paucity of information precludes such incorporation. This is unfortunate since observation indicates that economies of size do exist with the result that where such are ignored a lack of realism is built in.

The model was designed to incorporate the greatest possible

degree of realism into the analysis within the external limitations placed upon the study. Four alternative levels of resource restrictions were provided, as well as four different levels of activity costs which reflected changes in the level of feed subsidy. Alternative production techniques, which allowed substitution of feeding regimes, were provided for the respective animals used in the production of the desired products. Interaction between regions in the production of the various intermediate and final products was consequently incorporated into the model. This allowed the effect of the subsidy to be analyzed under more realistic conditions than those pervading previous studies.

Specification of the production coefficients and the resource levels presented difficulties. Not only was the amount of data available on a provincial basis limited but the accuracy of some of this data was open to question. However, the procedure followed was to use such data as was available and to compare or supplement this with the results published from controlled experiments. Provinces were used as regions for the purposes of the study since data applying to more limited areas were not available. Intra-provincial differences were consequently not considered and in one particular instance imparted a significant degree of inconsistency into the analysis. On the other hand, the data limitations would apply regardless of the technique adopted so therefore the linear programming approach cannot be rejected on this account.

The complexity of the model, involving as it did 489 restrictions and 1730 activities, taxed the operational capacity of the IBM 7040

computer that was available. As a result, total computation time was in excess of fifty hours since certain options of the linear programming system could not be used. While computer equipment limitations can be overcome, those arising from available time and funds nevertheless remain. The degree of realism incorporated into a linear programming spatial equilibrium analysis therefore becomes a function of the time and funds available.

Data limitations and the partial equilibrium nature of the analysis preclude the solutions reached from being entirely accurate. The output provided by the computer therefore contains built in error. In interpreting the results this factor must be recognized. On the other hand, the analysis has considerable merit. It considers the effect of the subsidy in an environment further along toward general equilibrium than any analysis undertaken to date. The answers obtained while not entirely accurate do indicate the relative effects of the subsidy upon production costs by province and upon movement of the products considered. The objectives of the study were consequently considered to have been attained.

Summary of Results

The results obtained from the analysis served to affirm the hypotheses made at the outset of the study. The volume of feed grain transported between regions increased when the subsidy applied. Livestock were certainly not being produced in accord with natural

comparative advantage when the subsidy was applied. In addition, since part of the subsidy was used to overcome inefficiencies which were associated with its application, the total cost to the consumer of satisfying the demands for animal products was increased. The public at large, in effect, paid for these inefficiencies through the medium of taxes.

While the hypotheses were upheld by the results of the analysis, cognizance should be made of certain features of the feed-livestock economy which became apparent. Substantial savings would accrue if livestock production was carried on in the respective provinces at the optimum levels. The optimum solutions obtained indicated that not only was the acreage devoted to feed grain improperly distributed among the respective feeds but the distribution of the numbers of the respective classes of animals was not in accord with the achievement of minimum costs of production of the desired products. The export of feed grain during the year under review, 1962-63, had little effect upon production costs. Adjustment within the livestock industry would result in a substantial decline in costs and this would be reflected at the consumer level. The savings attached to such adjustment would be much greater than the changes in cost which are associated with manipulation of subsidy levels.

The analysis indicated that the level of subsidy became an increasingly important factor in the determination of location as the grain equivalent in terms of the final product increased. Thus the location of production of poultry and hogs was more affected by the

level of subsidy than that of beef cattle. The latter was forage and particularly pasture oriented. This suggests that the opposition to the subsidy in Western Canada should come from the producers of hogs and poultry rather than from the producers of cattle.

Adjustment in livestock production would tend to reduce in most cases the amount of subsidy that would be paid. However, the existing level of subsidy tends to result in maximum payment which is partially a reflection of the orientation of production which has developed under the subsidy.

Nova Scotia, Quebec, and British Columbia were the provinces which received most of the monetary benefits associated with the subsidy. Other provinces received comparatively little or no benefits depending upon the resource-cost combination imposed. In other words, the subsidy allowed production to be carried on in these provinces at artificially enhanced levels. The receipts of grain producers in the provinces to which the subsidy did not apply were increased in that imports of American corn were reduced as a result of the subsidy.

Effectiveness of the Subsidy in Accomplishing the Desired Ends

The failure of the Government to specify the current purpose for paying the subsidy renders any objective evaluation as to its effectiveness difficult. If the objective is to reduce the cost of the respective end products to the consumer, the subsidy is an inefficient means since part of the payment is required to be used to overcome the inefficiency which stems from its use. If the purpose is to subsidize producers, its

application to restricted areas is at variance with achievement of economic justice. In any case, the prevalence of pure competition at the farm level precludes any significant benefits from the subsidy being retained by the producer recipients. If the purpose is to transfer federal funds into depressed areas, the subsidy is not efficient since the payments made are not based on accepted criteria of need. The subsidy therefore is neither an efficient or effective means of reaching any of these objectives. Unless the purpose of the subsidy is to accomplish ends which are presently obscured, there is no economic justification for its continuance.

The Adjustment Problem

The analysis indicated that adjustment within the feed-livestock economy would reduce production costs of the desired end products more than any manipulation of the level of feed freight subsidy. The failure to adjust may be due to several factors. Farmers may not be interested in maximizing their net returns. In addition, there may be a lack of knowledge by farmers of the production techniques necessary to achieve minimum costs. Another factor is that adjustment is impeded as a result of the subsidy.

The effect of these factors must be overcome to obtain the desired adjustment. If farmers are not interested in maximizing their net returns, the remedy is to increase competition between them. They should be made aware of the penalty attached to their actions and this suggests that research be undertaken to posit the amount of income that

would be obtained from the foregone alternative sources. Lack of knowledge may be overcome by a more aggressive extension program supported by data from current research. The analysis indicated that adjustment was being impeded by the subsidy since it fostered production in uneconomic areas. This lends additional support in favour of the elimination of the subsidy.

Alternatives to the Subsidy

The first alternative to the subsidy is its removal as a Government policy. Since the present production pattern reflects conditions prevailing under the subsidy no doubt the subsequent adjustment would be painful. The pain could be alleviated by the substitution of direct payments on an interim basis whose purpose would be to bring about the desired changes. Additional funds should be devoted to research to find alternatives to the uneconomic livestock production encouraged by the subsidy. Use of the approximately twenty million dollars annually paid currently on the subsidy, for research, for improved extension facilities and for interim payments to overcome the pain of adjustment would be very advantageous to the country as a whole since greater economic efficiency would result.

Suggestions for Further Research

This study merely serves to adapt the linear programming technique as a means to determine objectively the effect of the subsidy on the location of livestock production. It cannot be considered as an

all inclusive study and therefore has definite limitations in explaining the current situation existing in the feed-livestock economy. Linear programming appears as a useful tool to assist in such an analysis but one of the problems associated with its use is the inadequacy of existing data. Before further studies are undertaken an attempt should therefore be made to enhance both the quality and the quantity of data so that greater refinement is possible in the coefficients used. This will allow a more comprehensive study to be undertaken wherein provinces are subdivided into production areas, additional alternative methods of production are made available, and economies of scale are incorporated into the model. Specification of the respective demand curves by area will render possible the use of one of the recently developed linear programming aligorithms whereby the objective function and restraints vector are modified by an iterative technique to allow the equilibration of demand and supply.

Other related studies should also be undertaken. The effect of external economies upon costs as production becomes more concentrated should be ascertained. In addition an assessment of the real costs of movement of the various products is advisable since the question arises as to whether existing competitive rates do in fact reflect such costs. In the interests of the nation, the effect of the subsidy upon the gross national product should be determined. These suggestions do not constitute an all inclusive list and are merely presented to indicate some of the ramifications of the subsidy that deserve study.

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APPENDIX

APPENDIX I (a)

REGULATIONS RESPECTING ASSISTANCE ON WESTERN FEED GRAINS SHIPPED INTO EASTERN CANADA AND BRITISH COLUMBIA

(Effective April 20, 1967)

1. These Regulations may be cited as the Feed Grain Assistance Regulations.

2. In these Regulations,

(a) "livestock" means horses, cattle, sheep, goats, swine, foxes, mink, rabbits and poultry;

(b) "No. 1 Feed Screenings" and "Sample Feed Grain" have the same meaning as in the Canada Grain Regulations;

(c) "Prairie Region" means the provinces of Manitoba, Saskatchewan and Alberta and that part of British Columbia known as the Peace River District;

(d) "Western Canada" means all that part of Canada that is not in Eastern Canada; and

(e) "wholesaler" means a person or firm who, in selling a product eligible for transportation assistance, reduces the price of the product by the amount of assistance that may be paid under these Regulations prior to obtaining the assistance.

3. (1) The Board may pay assistance in the appropriate amount set out in the Schedule in respect of transportation expenses incurred on

(a) wheat, oats, barley and rye grown in Western Canada and shipped to a destination in Eastern Canada;

(b) No. 1 Feed Screenings and Sample Feed Grain produced in Western Canada and shipped to a destination in Eastern Canada;

(c) wheat bran, wheat shorts and wheat middlings produced in Western Canada and shipped to a destination in Eastern Canada or produced in Eastern Canada from wheat grown in Western Canada;

(d) wheat, oats, barley, rye and corn grown in the Prairie Region and shipped to a destination in British Columbia;

(e) No. 1 Feed Screenings and Sample Feed Grain produced in the Prairie Region and shipped to a destination in British Columbia; and

(f) wheat bran, wheat shorts and wheat middlings produced in the Prairie Region and shipped to a destination in British Columbia or produced in British Columbia from wheat grown in the Prairie Region.

(2) The Board may pay assistance in respect of storage expenses on wheat, oats and barley grown in Western Canada and stored in Eastern Canada where the grain is initially stored in a vessel approved by the Board as a place of storage necessary to supplement licensed elevator storage, in the amount of $2\frac{1}{2}$ cents per bushel for the total period that the grain is stored in Eastern Canada.

4. (1) The Board shall not pay assistance in respect of transportation

(a) where the grain, screenings or grain product is transported by truck from Western Canada into Eastern Canada, from Western Canada into British Columbia or from any place of shipment in British Columbia to a destination in that province; or

(b) where the grain, screenings or grain product is transported by truck from a place of shipment in Eastern Canada to a destination in Eastern Canada that has a higher rate of assistance than that of the place of shipment unless the owner of the truck is the wholesaler of the shipment or

(i) is licensed as a common carrier,
(ii) has furnished the Board with an undertaking in accordance with section 5, and
(iii) has complied with that undertaking.

(2) The Board shall not pay assistance in respect of transportation where

(a) it is satisfied that the produce shipped was not for feed for livestock in Eastern Canada or British Columbia; or

(b) it is not satisfied that the sale price to the buyers of the product has been reduced by the amount of the assistance that may be paid under these Regulations.

5. The undertaking of a trucker shall be in a form satisfactory to the Board and shall include an undertaking by the trucker to

(a) provide the Board with all tariffs set out by his firm on grain, screenings and grain products;

(b) issue bills of lading on all shipments eligible for assistance under these Regulations setting out the actual destination or destinations of all of the shipments;

(c) charge a rate on the movement of grain, screenings and grain products in accordance with the current tariff he has provided to the Board; and

(d) in any case where his truck license permits the transport between any two points of a product for more than one shipper, make available to all shippers and consignees at those points the lowest rate he charges between those points for grain, screenings or grain products shipped in the same quantity per individual shipment.

6. In determining the amount of assistance payable on a shipment made by railway car to a destination

(a) the rail point nearest the actual destination is deemed to be the destination; and

(b) that rail point is deemed to be situate in the country or locality in which it is shown as being situate in

(i) the Gazeteer of Canada, in the case of a destination in the Province of Ontario, New Brunswick or Nova Scotia; or

(ii) the Canadian Guide, published by the International Railway Publishing Company Limited, in the case of a destination in the Province of Quebec.

APPENDIX I (b)

THE CANADIAN WHEAT BOARD INSTRUCTIONS
TO THE TRADE SHIPPERS AND EXPORTERS

NO. 8

Crop Year 1966-67

TO ALL SHIPPERS AND EXPORTERS (Including Mills who are also Shippers) Eastern Division:

Gentlemen:

Re: Sales of Wheat ex Lakehead for Feeding Purposes

These Instructions cancel and replace Instructions to the Trade, Shippers and Exporters No. 8, issued September 10, 1965, for the Crop Year 1965-66.

Effective immediately, the Board will, on application, give consideration to the sale of wheat in store Fort William/Port Arthur to shippers on a provisional price basis for re-sale for feeding purposes. The Board reserves the right to consider each application on its merit, to accept or reject any application and to limit the volume of such transactions with any shipper.

Sales of wheat for feeding purposes on a provisional price basis will only be made to shippers who have entered into a provisional sales agreement with the Board.

The basis on which the sale of wheat for feeding purposes under this arrangement will be made is as follows:

1. The provisional price per bushel for No. 4 Manitoba Northern and No. 5 Wheat will be The Canadian Wheat Board's initial payment price to producers for such grades basis in store Fort William/Port Arthur. All sales of No. 4 Manitoba Northern on this basis are for feeding purposes only. The provisional price for feeding grades of wheat other than No. 4 Manitoba Northern and No. 5 Wheat will be based on the Board's selling spread for the grade concerned in relation to its selling price for No. 5 Wheat at the time.

2. In the case of sample lots of wheat which include two or more grades, an average provisional price will be computed at the Board's selling spreads for the grades concerned in relation to No. 5 Wheat at the time.

3. All Sales from stocks of wheat carried on a provisional price basis must be reported to the Board prior to the first market close thereafter. The reports must show the details of stocks (Lake Vessel and Port) to be applied, the purchaser's name, date of sale, bushels and grade.

   Stocks of wheat carried on a provisional price basis may not be shipped from licensed Eastern Terminals in which they are stored until a sale has been made and reported to the Board. All unsold stocks carried on a provisional basis by the shipper on April 15th, 1967 must be purchased by the shipper from the Board at the price prevailing at the close of the market on that date.

   In respect to sales booked in any one day, the confirmation will be submitted to the Winnipeg offices of the agents on the following morning, at which time settlement must be made with the Board for the difference between the provisional price for No. 4 Manitoba Northern or No. 5 Wheat, whichever is applicable, and the Board's selling price for these grades at the time of final booking.

   Provisional sales of wheat for feeding purposes may be made by shippers to their customers, providing they have first entered into a provisional sales agreement with the Board.

4. The quantity originally loaded at Lakehead and invoiced provisionally to the shipper will be the quantity against which final sales will be applied. All shortages must be booked with the Board basis the selling price in effect for either No. 4 Manitoba Northern or No. 5 Wheat, whichever is applicable, on the date of unload.

5. All storage, interest, insurance and forwarding charges, etc., from in store Lakehead position are to be for the shipper's account from agreed date of delivery of the grain at the Lakehead.

Instructions to the Trade, Shippers and Exporters No. 8

October 11, 1966.

6. Wheat for feeding purposes purchased from the Board on a provisional price basis must be kept fully insured by the shipper until such time as final booking and settlement is made with the Board, with loss payable firstly to the Board as its interest may appear.

7. Unless otherwise agreed with the Board, wheat for feeding purposes purchased on a provisional price basis may only be shipped for unload and storage in a licensed Eastern Terminal.

8. If the Board is satisfied that the shipper has made a sale and has not reported it for booking with the Board prior to the period described above, then the Board may discontinue its agreement with the particular shipper concerned.

9. A statement of all unsold stocks carried on a provisional price basis must be submitted to the Board at each month-end, setting out the position, grade and quantity. This statement must be certified by a responsible official of the Company or by the Company's auditors.

10. The provisions contained in this circular apply only to stocks of wheat for feeding purposes purchased from the Board under its provisional sales agreement.

Yours very truly,

THE CANADIAN WHEAT BOARD

Approved for the Board by

W. C. McNamara
Chief Commissioner.

Reference:
F. T. Rowan

October 11, 1966.

APPENDIX I (c)

THE CANADIAN WHEAT BOARD INSTRUCTIONS
TO THE TRADE SHIPPERS AND EXPORTERS

NO. 9

Crop Year 1966-67

TO ALL SHIPPERS AND EXPORTERS (including Mills who are also Shippers) Eastern Division:

Gentlemen:

Re: Sales of Oats or Barley ex Lakehead

These instructions cancel and replace Instructions to the Trade, Shippers and Exporters No. 9, Crop Year 1965-66, dated September 10th, 1965.

Effective immediately the Board will on application give consideration to the sale of oats or barley in store Fort William/Port Arthur to shippers on a provisional price basis for sale in Eastern Canada. The Board reserves the right to consider each application on its merit, to accept or reject any application and to limit the volume of such transactions with any shipper.

Sales of oats or barley on a provisional price basis will only be made to shippers who have entered into a provisional sales agreement with the Board.

The basis on which the sale of oats or barley under this arrangement will be made is as follows:

1. The provisional price per bushel for No. 1 Feed Oats and No. 1 Feed Barley will be the Canadian Wheat Board's initial payment price to producers for No. 1 Feed Oats or No. 1 Feed Barley in store Fort William/Port Arthur. The provisional price for grades of oats other than No. 1 Feed Oats will be based on the Board's selling spread for the grade concerned in relation to its selling price for No. 1 Feed Oats at that time the provisional price for grades; of barley other than No. 1 Feed Barley will be based on the Board's selling spread for the grade concerned in relation to its selling price for No. 1 Feed Barley at that time.

Instructions to Shippers and Exporters No. 9 (continued)

2. In the case of sample lots of oats or barley which include two or more grades, an average provisional price will be computed at the Board's selling spreads for the grades concerned in relation to No. 1 Feed Oats or No. 1 Feed Barley at that time.

3. All bookings with the Board at the provisional price will be on a flat basis.

4. Stocks of oats and barley carried on a provisional price basis may not be shipped from licensed eastern terminals in which they are stored until a sale has been made and reported to the Board. All unsold stocks carried on a provisional basis by the shipper on April 15, 1967, must be purchased by the shipper from the Board at the prices prevailing at the close of the market on that date.

5. All sales from stocks of oats or barley carried on a provisional price basis must be reported to the Board immediately. The reports must show the details of stocks (Lake Vessel and Port) to be applied, the purchaser's name, date and time of sale, bushels and grade.

   (In respect to sales booked in any one day, the confirmations will be submitted to the Winnipeg offices of the Agents on the following morning, at which time settlement must be made with the Board for the difference in price between the Board's provisional price for No. 1 Feed Oats or No. 1 Feed Barley at the time of provisional purchase and the Board's selling price for No. 1 Feed Oats or No. 1 Feed Barley at the time of final booking.)

   Provisional sales of oats and barley may be made by shippers to their customers providing they have first entered into a provisional sales agreement with the Board.

6. The quantity originally loaded at Lakehead and invoiced provisionally to the shipper will be the quantity against which final sales will be applied. All shortages must be booked with the Board basis the selling price in effect for No. 1 Feed Oats or No. 1 Feed Barley on the date of unload.

7. All storage, interest, insurance and forwarding charges, etc., from in store Lakehead position are to be for the shippers' account from agreed date of delivery of the grain at the Lakehead.

Instructions to Shippers and Exporters No. 9 (continued)

8. Oats or barley purchased from the Board on a provisional price basis must be kept fully insured by the shipper until such time as final booking and settlement is made with the Board, with loss payable firstly to the Board as its interest may appear.

9. Unless otherwise agreed with the Board oats or barley purchased on a provisional price basis may only be shipped for unload and storage in a licensed eastern terminal.

10. If the Board is satisfied that the shipper has made a sale and has not reported it for booking with the Board prior to the period described above, then the Board may discontinue its agreement with the particular shipper concerned.

11. A statement of all unsold stocks of oats or barley carried on a provisional price basis must be submitted to the Board at each month-end, setting out the position, grade and quantity. This statement must be certified by a responsible official of the Company or by the Company's auditors.

12. The provisions contained in this circular apply only to stocks of oats or barley purchased from the Board under its provisional sales agreement.

Yours very truly,

THE CANADIAN WHEAT BOARD

Approved for the Board by

G. N. Vogel
Commissioner.

Reference:
W. H. Cockburn
A. J. Murray

October 12, 1966.

APPENDIX I (d)

Ottawa, February 28, 1962.

P.C. 1958 - 1628 (AS AMENDED)

ORDER-IN-COUNCIL P.C. 1958-1628, DATED THE 27th DAY OF NOVEMBER 1958 AND EFFECTIVE THE 1st DAY OF DECEMBER 1958, AS AMENDED BY ORDER-IN-COUNCIL P.C. 1959-61, DATED THE 22nd DAY OF JANUARY 1959, EFFECTIVE THAT DAY, AS AMENDED BY ORDER-IN-COUNCIL P.C. 1959-984 DATED THE 30th DAY OF JULY 1959 AND EFFECTIVE AUGUST 1st, 1959, AS AMENDED BY ORDER-IN-COUNCIL P.C. 1960-564 DATED THE 29th DAY OF APRIL, EFFECTIVE MAY 9th, 1960, AS AMENDED BY ORDER-IN-COUNCIL P.C. 1960-596, DATED THE 3rd DAY OF MAY 1960, AND EFFECTIVE MAY 9th, 1960, AS AMENDED BY ORDER-IN-COUNCIL P.C. 1960-1040 DATED THE 30th DAY OF JULY AND EFFECTIVE AUGUST 8th, 1960, AS AMENDED BY ORDER-IN-COUNCIL P.C. 1960-1657 DATED THE 8th DAY OF DECEMBER AND EFFECTIVE DECEMBER 12th 1960 AS AMENDED BY ORDER-IN-COUNCIL 1961-1084 DATED THE 24th DAY OF JULY 1961 AND EFFECTIVE THE 1st DAY OF AUGUST 1961, AS AMENDED BY ORDER-IN-COUNCIL P.C. 1961-1385 DATED THE 28th DAY OF SEPTEMBER 1961 AND EFFECTIVE THAT DAY.

REGULATIONS RESPECTING THE PAYMENT OF FREIGHT ASSISTANCE ON WESTERN GRAINS AND MILLFEEDS SHIPPED INTO EASTERN CANADA AND BRITISH COLUMBIA

EASTERN CANADA

1. The Minister of Agriculture is authorized to pay freight assistance on:

   (a) Western wheat, oats, barley, rye, wheat bran, wheat shorts, wheat middlings, No. 1 feed screenings, and No. 2 feed screenings, shipped or transported by rail or boat from

Fort Churchill, Manitoba; Port Arthur, Fort William or Armstrong, Ontario; to destinations in Canada east thereof, and distributed for use exclusively as feed in Canada for Canadian livestock or poultry;

(b) Wheat bran, wheat shorts, and wheat middlings milled in Western Canada, or milled in Eastern Canada from Western wheat shipped or transported from Fort Churchill, Manitoba; Port Arthur, Fort William or Armstrong, Ontario; to port elevators or flour mills in Canada east thereof, when such bran, shorts, or middlings are distributed from the manufacturing mill for use exclusively as feed in Canada for Canadian livestock or poultry;

2. (1) The payment of freight assistance authorized pursuant to Section 1 shall be as follows:

(a) On shipments to Ontario:

(i) to destinations in Thunder Bay Country, the actual carlot rail freight charges but not exceeding $7.00 per ton;

(ii) to destinations in the counties of Algoma, Cochrane, Sudbury, Manitoulin, Temiskaming, and Nipissing, $7.00 per ton, and,

(iii) to other destinations, $5.00 per ton.

(b) On all shipments to Quebec or Newfoundland, and on shipments by rail from Western Canada, Ontario or Quebec,

to New Brunswick, Nova Scotia or Prince Edward Island:

(i) To Three Rivers and to destinations in the Montreal freight rate zone, $5.00 per ton,

(ii) to destinations in the Counties of Abitibi Ouest, Rouyn-Noranda, Temiscamingue, Abitibi Est, Roberval, Lake St. John and Chicoutini, in the Province of Quebec, $7.00 per ton, plus the per ton charges calculated in accordance with subsection (2);

(iii) to destinations beyond the Montreal freight rate zone not specified in sub-paragraphs (i) and (ii), which have a through carlot rail freight rate from Fort William or a combination rate at time of shipment composed of the rate from Fort William to the Montreal freight rate zone, plus the lowest local rate from a point in the Montreal freight rate zone to destination, less than 96 cents per hundredweight, $5.00 per ton, plus the per ton charges calculated in accordance with sub-section (2);

(iv) to destinations on the lines of the Quebec Central Railway Company, except Daaquam and Lac Frontiere, $5.00 per ton plus the per ton charges calculated in accordance with sub-section (2); and

(v) to other destinations, $7.00 per ton plus the per ton charges calculated in accordance with sub-section (2);

(c) On all shipments by boat from Ontario or Quebec to destinations in New Brunswick, Nova Scotia or Prince Edward Island, $11.00 per ton.

(2) The per ton charges referred to in paragraph (b) of subsection 1 shall be based on the lower of the following:

(a) The remainder of the through carlot rail freight rate from Fort William to destination in excess of the through carlot freight rate to the Montreal freight rate zone; or

(b) the lowest local carlot freight rate from Montreal, Quebec City, or Three Rivers to destination.

BRITISH COLUMBIA

3. The Minister of Agriculture is authorized to pay freight assistance on:

(a) Western wheat, oats, barley, rye, corn, No. 1 feed screenings, and No. 2 feed screenings, wheat bran, wheat shorts and wheat middlings, shipped from points of origin in the Provinces of Alberta, Saskatchewan, Manitoba, and that part of British Columbia known as "The Peace River District", to destinations in British Columbia and distributed for use exclusively as feed in British Columbia for Canadian livestock or poultry;

(b) wheat bran, wheat shorts and wheat middlings milled in British Columbia from Western wheat, shipped from points

of origin as designated in paragraph (a) and distributed as designated in paragraph (a);

4. The payment of freight assistance authorized pursuant to Section 3 shall be as follows:

   (a) on rail shipments, $5.00 per ton less than the lowest of the carlot short line rail freight charges through Canada from Calgary, Edmonton or the point of origin.

   (b) on combined rail and coastal water shipments, the freight assistance designated in paragraph (a) plus the coastal water carlot shipping charges, provided that if the final destination is served by rail, the freight assistance shall be based on the through rail rate.

5. On all grains and feeds shipped and distributed in accordance with the provisions of this order, evidence satisfactory to the Minister must be produced to show that the sale price to consumers of such products has been reduced by and takes into account the payment of freight assistance as herein prescribed.

APPENDIX II

VOLUME OF FEED RECEIVED UNDER SUBSIDY BY PRINCE EDWARD ISLAND, 1941-66
(tons)

YEARS	WHEAT	OATS	BARLEY	RYE	FEED CORN	SCREENINGS	MILLFEEDS	ALL FEEDS	AVERAGE SUBSIDY PER TON ($)
1941-42	4,599	1,548	3,315	28	--	89	5,830	15,409	$ 8.20
1942-43	11,796	6,660	9,941	108	--	160	12,237	40,902	8.20
1943-44	16,940	7,353	13,822	13	--	72	14,682	52,882	8.20
1944-45	12,227	4,135	9,905	--	--	216	11,884	38,367	8.20
1945-46	15,769	9,918	13,145	--	--	131	15,125	54,088	8.20
1946-47	13,704	11,896	14,515	--	--	583	17,169	57,867	8.20
1947-48	10,905	8,811	14,914	--	--	221	14,333	49,184	8.72
1948-49	3,960	5,627	13,969	--	--	646	9,759	33,961	10.28
1949-50	4,795	6,470	11,964	--	--	1,396	11,012	35,637	10.71
1950-51	7,004	4,501	8,221	--	--	885	10,295	30,906	11.41
1951-52	7,897	5,338	9,799	--	--	717	7,751	31,502	12.20
1952-53	6,858	7,045	7,958	--	--	860	7,460	30,181	14.62
1953-54	3,756	2,995	4,184	22	--	377	4,665	15,999	13.30
1954-55	5,127	4,468	7,603	15	--	602	7,264	25,079	13.30
1955-56	8,277	5,214	8,810	45	--	1,255	7,507	31,108	13.30
1956-57	7,156	2,213	6,509	--	--	445	6,345	22,668	13.77
1957-58	5,387	2,569	6,771	--	--	847	6,878	22,452	14.60
1958-59	6,686	2,914	9,279	--	--	1,778	7,409	28,066	17.06
1959-60	6,365	3,566	10,504	--	--	1,354	8,747	30,536	15.74
1960-61	6,326	2,584	10,380	--	--	1,161	9,722	30,173	14.93
1961-62	3,970	1,204	7,404	--	--	994	9,061	22,633	13.97
1962-63	3,010	2,018	5,435	--	--	1,044	7,659	19,166	14.39
1963-64	5,026.5	3,992.4	8,270.0	--	--	1,620.1	9,691.5	28,600.5	14.21
1964-65	3,964.2	2,245.5	7,545.7	--	--	1,413.4	7,977.7	23,146.5	14.80
1965-66	8,738.2	5,144.4	12,008.1	--	--	1,620.4	11,062.2	38,573.3	14.98
TOTAL (to 66)	190,242.9	120,429.3	236,170.8	231	--	20,486.9	241,525.4	809,086.3	$11.61
% of Total 1941-66	23.51%	14.88%	29.18%	.01%		2.53%	29.85%		

VOLUME OF SPECIFIC FEEDS RECEIVED UNDER SUBSIDY BY NOVA SCOTIA, 1941-66
(tons)

YEARS	WHEAT	OATS	BARLEY	RYE	FEED CORN	SCREENINGS	MILLFEEDS	ALL FEEDS	AVERAGE SUBSIDY PER TON ($)
1941-42	12,840	14,243	16,662	336	--	600	31,552	76,233	$ 8.10
1942-43	29,376	23,127	30,910	547	--	801	51,332	136,093	8.10
1943-44	43,436	33,129	40,033	45	--	450	54,174	171,267	8.10
1944-45	33,916	32,836	33,837	2	--	687	58,347	159,625	8.10
1945-46	31,696	42,758	37,900	--	--	1,222	58,210	171,786	8.10
1946-47	29,448	51,097	45,463	--	--	2,333	60,862	189,203	8.10
1947-48	24,750	43,597	37,479	--	--	1,248	54,410	161,484	8.67
1948-49	10,490	39,756	37,900	--	--	2,189	43,826	134,161	9.98
1949-50	9,841	38,600	26,576	22	--	4,777	43,855	123,671	10.72
1950-51	21,333	33,493	24,712	10	--	4,668	43,553	127,769	11.41
1951-52	25,334	37,060	28,665	--	--	3,481	39,541	134,081	12.19
1952-53	25,421	41,221	23,190	--	--	3,990	37,564	131,386	12.50
1953-54	22,147	39,824	23,630	200	--	3,416	32,848	122,065	13.30
1954-55	25,459	38,423	26,875	172	--	3,710	34,045	128,684	13.30
1955-56	28,491	37,202	27,068	88	--	4,745	34,237	131,831	13.30
1956-57	34,077	33,942	26,745	--	--	4,202	33,077	132,043	13.81
1957-58	33,109	35,915	24,326	--	--	3,622	30,578	127,550	14.60
1958-59	47,438	31,379	26,865	--	--	5,209	30,828	141,719	17.10
1959-60	45,950	28,241	31,343	--	--	5,335	33,819	144,688	15.71
1960-61	45,173	24,289	33,287	--	--	7,066	39,248	149,063	14.92
1961-62	33,636	19,780	26,195	110	--	7,540	36,920	124,181	14.41
1962-63	23,431	24,582	20,576	--	--	7,822	32,328	108,739	14.17
1963-64	52,471.1	25,080.3	28,137.5	--	--	8,025.0	32,183.3	145,897.2	13.35
1964-65	38,601.8	22,768.3	29,475.3	--	--	12,484.7	33,903.2	137,233.3	12.40
1965-66	62,952.0	25,496.3	30,834.5	415.6	--	6,261.3	35,704.6	161,664.3	12.94
TOTAL (to 66)	790,816.9	817,838.9	738,684.3	1,947.6	--	105,884.0	1,016,945.1	3,472,116.8	$11.78
% of Total 1941-66	22.77%	23.55%	21.27%	.05%	--	3.04%	29.28%		

VOLUME OF SPECIFIC FEEDS RECEIVED UNDER SUBSIDY BY NEW BRUNSWICK, 1941-66
(tons)

YEARS	WHEAT	OATS	BARLEY	RYE	FEED CORN	SCREENINGS	MILLFEEDS	ALL FEEDS	AVERAGE SUBSIDY PER TON ($)
1941-42	11,765	13,314	7,709	211	--	712	29,976	63,687	$ 7.50
1942-43	20,360	19,039	18,119	760	--	1,417	46,148	105,843	7.50
1943-44	26,128	29,284	31,836	16	--	856	48,132	136,252	7.50
1944-45	26,497	29,782	32,363	4	--	2,529	50,828	142,003	7.50
1945-46	27,894	37,784	35,978	--	--	2,942	55,768	160,366	7.50
1946-47	25,421	49,919	41,728	--	--	3,747	61,219	182,034	7.50
1947-48	22,072	40,917	37,078	--	--	1,956	50,369	152,392	7.88
1948-49	7,621	23,427	28,212	--	--	1,891	36,837	97,988	9.39
1949-50	7,339	21,851	19,350	23	--	3,555	36,852	88,970	9.86
1950-51	13,731	18,632	15,964	--	--	3,279	36,424	88,030	10.50
1951-52	17,579	21,943	19,856	--	--	2,951	34,957	97,286	11.29
1952-53	15,674	27,765	16,743	--	--	3,639	33,870	97,691	11.77
1953-54	12,755	20,837	14,284	115	--	3,070	29,322	80,383	12.20
1954-55	14,770	20,486	17,560	120	--	2,631	29,940	85,507	12.20
1955-56	16,572	23,855	17,451	40	--	3,284	29,015	90,217	12.20
1956-57	16,086	17,055	15,407	--	--	2,417	26,857	77,822	12.65
1957-58	17,841	16,533	15,958	--	--	2,077	25,527	77,936	13.40
1958-59	22,000	18,537	18,721	--	--	2,678	28,717	90,653	15.65
1959-60	20,383	18,375	20,105	--	--	2,948	32,185	93,996	13.71
1960-61	16,389	11,581	20,669	--	--	5,209	33,432	87,280	13.47
1961-62	11,756	10,925	16,373	165	--	5,032	33,578	77,829	13.79
1962-63	9,991	14,106	13,132	40	--	5,929	28,334	71,532	13.58
1963-64	16,281.2	15,518.8	17,225.5	--	--	6,084.8	30,012.6	85,122.9	13.25
1964-65	12,775.1	14,832.5	15,460.5	--	--	6,882.9	28,202.9	78,153.5	13.87
1965-66	20,097.8	14,877.6	14,870.3	--	--	4,806.0	28,169.8	82,821.5	14.34
TOTAL (to 66)	429,778.1	551,175.9	522,152.3	1,494.0	--	82,522.3	904,672.3	2,491,794.9	$10.30
% of Total 1941-66	17.24%	22.11%	20.95%	.05%	--	3.31%	36.30%		

VOLUME OF SPECIFIC FEEDS RECEIVED UNDER SUBSIDY BY QUEBEC 1941-66
(tons)

YEARS	WHEAT	OATS	BARLEY	RYE	FEED CORN	SCREENINGS	MILLFEEDS	ALL FEEDS	AVERAGE SUBSIDY PER TON ($)
1941-42	104,482	88,596	92,704	1,051	--	19,629	219,185	525,647	$4.50
1942-43	183,206	121,849	163,343	3,793	--	16,532	314,597	803,320	5.34
1943-44	251,287	237,604	350,304	2,612	--	11,201	283,148	1,136,156	5.34
1944-45	248,825	253,081	321,375	258	--	23,893	300,675	1,148,107	5.34
1945-46	255,175	289,379	346,569	32	--	17,970	316,620	1,225,745	5.34
1946-47	239,772	386,884	431,212	--	--	26,808	343,079	1,427,755	5.32
1947-48	204,579	353,537	382,954	--	--	13,782	299,340	1,254,192	5.55
1948-49	97,814	286,892	332,970	--	--	24,222	246,859	988,757	6.58
1949-50	104,546	328,196	245,562	890	--	41,720	260,585	981,499	7.28
1950-51	154,586	227,963	210,882	376	--	32,965	269,321	896,093	7.60
1951-52	185,520	265,527	271,707	--	--	31,364	255,137	1,009,255	8.03
1952-53	156,364	301,499	204,035	--	--	40,895	250,678	953,471	8.38
1953-54	143,907	257,059	230,695	2,471	--	33,480	220,406	888,018	8.36
1954-55	155,514	278,829	291,174	6,177	--	29,647	257,095	1,018,436	7.68
1955-56	208,380	297,522	279,892	6,301	--	36,303	271,897	1,100,295	6.95
1956-57	194,426	235,805	263,742	40	--	31,848	251,548	977,409	7.47
1957-58	199,428	229,836	280,172	567	--	34,040	278,587	1,022,630	8.01
1958-59	239,017	291,790	355,790	2,018	--	36,751	292,797	1,218,163	8.61
1959-60	201,803	244,703	331,798	166	--	24,682	280,742	1,083,894	8.36
1960-61	182,800	199,281	305,019	--	--	31,278	285,491	1,003,869	7.81
1961-62	139,332	185,051	277,701	2,626	--	28,012	267,167	899,889	8.03
1962-63	132,242	230,686	278,355	1,233	--	32,692	240,968	916,176	8.13
1963-64	179,987.4	285,856.1	348,987.5	676.0	--	39,049.4	275,462.4	1,130,017.8	7.91
1964-65	165,564.8	275,823.7	329,420.8	1,344.8	--	35,080.4	245,002.7	1,052,237.2	7.87
1965-66	217,605.6	315,720.2	339,975.4	5,797.2	--	26,648.7	262,247.2	1,167,994.3	7.87
TOTAL (to 66)	4,546,161.8	6,468,969.0	7,266,338.7	38,429.0	--	720,492.5	6,788,634.3	25,829,025.3	$7.12
% of Total 1941-66	17.60%	25.04%	28.13%	.14%	--	2.78%	26.28%		

VOLUME OF SPECIFIC FEEDS RECEIVED UNDER SUBSIDY BY ONTARIO, 1941-66
(tons)

YEARS	WHEAT	OATS	BARLEY	RYE	FEED CORN	SCREENINGS	MILLFEEDS	ALL FEEDS	AVERAGE SUBSIDY PER TON ($)
1941-42	223,257	138,368	123,640	15,307	--	36,462	123,742	660,776	$4.50
1942-43	255,520	174,462	169,340	11,087	--	22,749	203,743	836,901	4.50
1943-44	422,826	523,986	442,637	3,869	--	31,461	244,763	1,669,542	4.50
1944-45	347,542	350,172	307,592	262	--	39,090	235,247	1,279,905	4.50
1945-46	359,463	442,039	389,883	36	--	35,372	265,590	1,492,383	4.50
1946-47	316,691	573,141	374,409	--	--	33,921	311,827	1,609,989	4.50
1947-48	277,849	488,329	394,796	--	--	27,323	263,393	1,451,690	4.78
1948-49	113,373	377,023	320,700	--	--	23,764	199,352	1,034,212	5.50
1949-50	95,339	418,538	202,225	237	--	37,457	187,051	940,847	5.59
1950-51	143,135	241,381	147,017	390	--	23,397	171,700	727,020	5.71
1951-52	196,093	299,863	206,642	20	--	24,046	156,379	883,043	5.71
1952-53	162,809	372,028	150,824	43	--	41,984	147,421	875,109	5.70
1953-54	143,554	326,741	176,182	1,851	--	33,165	133,058	814,551	5.63
1954-55	141,122	303,455	176,104	2,615	--	28,839	143,284	795,419	5.09
1955-56	225,650	357,499	201,808	3,476	--	49,757	153,162	991,352	4.50
1956-57	263,341	371,233	254,728	1,187	--	63,046	160,076	1,113,611	4.70
1957-58	271,244	309,351	268,802	433	--	47,408	170,045	1,067,283	5.00
1958-59	302,883	245,978	300,670	540	--	31,743	160,780	1,042,594	4.98
1959-60	243,995	225,808	326,895	46	--	33,101	165,865	995,710	5.02
1960-61	228,212	265,469	373,341	--	--	40,425	176,908	1,084,355	5.00
1961-62	124,451	101,515	179,068	600	--	18,921	148,695	573,250	5.12
1962-63	105,006	162,060	190,734	486	--	27,516	130,074	615,876	5.11
1963-64	134,184.2	222,080.8	323,367.7	340.1	--	45,725.6	167,040.1	892,738.5	5.07
1964-65	94,857.1	207,656.4	231,520.1	3,613.7	--	60,015.0	141,480.0	739,142.3	5.10
1965-66	126,619.4	218,911.1	209,568.3	13,970.6	--	49,994.2	149,952.3	769,015.9	5.08
TOTAL (to 66)	5,319,015.7	7,717,087.3	6,442,493.1	60,409.4	--	906,681.8	4,510,627.4	24,956,314.7	$4.95
% of Total 1941-66	21.31%	30.92%	25.81%	.24%		3.63%	18.07%		

VOLUME OF FEED RECEIVED UNDER SUBSIDY BY BRITISH COLUMBIA, 1941-66
(tons)

YEARS	WHEAT	OATS	BARLEY	RYE	FEED CORN	SCREENINGS	MILLFEEDS	ALL FEEDS	AVERAGE SUBSIDY PER TON ($)
1941-42	49,257	20,084	9,501	13	6,723	1,012	23,234	109,824	$6.41
1942-43	70,662	31,008	20,719	--	4,868	3,342	44,179	174,778	6.41
1943-44	113,606	51,413	32,851	--	4,175	1,568	64,692	268,305	6.41
1944-45	112,279	56,161	29,127	1	4,523	1,889	62,331	266,311	6.41
1945-46	120,504	66,745	29,927	--	5,159	2,714	70,632	295,681	6.41
1946-47	139,208	78,443	39,986	--	6,403	3,191	77,951	345,182	6.42
1947-48	126,012	67,510	34,423	--	5,825	2,668	67,044	303,482	6.47
1948-49	81,332	71,984	33,594	--	6,226	3,208	53,171	249,515	6.52
1949-50	69,881	63,554	22,797	--	6,755	7,018	46,659	216,664	6.28
1950-51	77,085	56,104	19,817	--	5,303	7,061	49,841	215,211	6.36
1951-52	85,149	62,159	24,964	--	4,591	6,877	52,072	235,812	7.42
1952-53	77,128	59,737	20,700	--	5,862	5,354	50,148	218,929	8.87
1953-54	77,249	63,042	25,472	--	7,550	5,122	48,811	227,246	10.71
1954-55	83,047	58,402	29,647	--	4,614	3,388	49,824	228,922	8.66
1955-56	80,120	52,271	32,019	121	3,094	2,817	43,075	213,517	5.94
1956-57	88,001	39,421	32,792	5	2,653	1,963	38,091	202,926	6.76
1957-58	83,158	36,437	31,392	--	2,657	4,356	38,371	196,371	7.76
1958-59	87,259	46,459	40,308	5	1,877	10,186	44,720	230,814	8.80
1959-60	84,383	44,359	50,659	--	1,807	7,055	46,298	234,561	8.35
1960-61	75,775	44,043	53,957	74	1,649	5,252	43,936	224,676	8.20
1961-62	62,643	44,983	52,752	38	1,264	2,592	46,017	210,289	8.23
1962-63	53,835	43,308	57,686	--	1,112	3,433	33,455	192,829	8.25
1963-64	49,045.1	43,503.9	67,044.2	--	813.4	6,052.6	41,706.7	208,165.9	8.23
1964-65	60,659.1	45,562.9	83,133.0	40.1	378.6	5,236.2	31,515.9	226,525.8	8.76
1965-66	69,821.3	40,191.3	90,663.9	56.0	589.5	4,515.0	32,215.8	238,052.8	8.64
TOTAL (to 66)	2,077,098.5	1,286,885.1	965,931.1	353.1	96,471.5	107,869.8	1,199,980.4	5,734,589.5	$7.48
% of Total 1941-66	36.22%	22.44%	16.84%	*	1.68%	1.88%	20.92%		

* less than 0.01%

APPENDIX III

NUMBER OF LIVESTOCK ON FARMS, PRINCE EDWARD ISLAND, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. over	Bulls 1 yr. over	Beef Cows & Heifers 2 yrs. over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & over
1941-42	45600	1550	1650	10150	2000	7350
1942-43	45050	1450	1950	10400	2150	8150
1943-44	44200	1800	2400	11700	2700	9200
1944-45	44350	1950	2700	11700	3050	10250
1945-46	43450	1900	3200	12000	2900	8950
1946-47	40300	1700	3200	11250	2700	8250
1947-48	38300	1450	3600	10550	2700	7300
1948-49	39150	1200	3150	10600	2300	6350
1949-50	40900	1400	3000	10950	3350	6900
1950-51	38800	1250	3600	11000	4550	8700
1951-52	38750	1250	4850	10800	5900	8950
1952-53	40500	1550	5500	11350	7250	11350
1953-54	42250	1700	5150	9750	6250	14400
1954-55	43000	1850	4900	9750	7750	15750
1955-56	43400	1950	5100	9500	8450	18450
1956-57	43250	1900	5200	9050	8750	19600
1957-58	42000	1450	4550	8800	8550	16400
1958-59	40250	1300	4450	7750	8150	15700
1959-60	39500	1250	4300	8150	7900	16100
1960-61	39200	1350	4800	8400	8050	19950
1961-62	38000	1300	5350	8200	9250	22150
1962-63	36500	1250	5500	8100	9000	20900

NUMBER OF LIVESTOCK ON FARMS, PRINCE EDWARD ISLAND, (continued)

Crop Years	Calves under 1 yrs.	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 mons. & over	Hogs Under 6 mons.	All Hogs
1941-42	24700	47400	93000	28000	13500	44450	57950
1942-43	25950	50050	95100	27800	13250	47600	60850
1943-44	26350	54150	98350	28300	13350	51000	64350
1944-45	27100	56750	101100	27200	11600	46050	57650
1945-46	25850	54800	98250	26300	12000	44100	56100
1946-47	23950	51050	91350	24800	11800	45700	57500
1947-48	21650	47250	85550	23500	15400	50700	66100
1948-49	22750	46350	85500	22750	15750	50350	66100
1949-50	25100	50700	91600	22350	17000	57500	74500
1950-51	24850	53950	92750	21700	15600	57550	73150
1951-52	25500	57250	96000	20100	15500	60500	76000
1952-53	28500	65500	106000	19050	13500	46000	59500
1953-54	30500	67750	110000	18000	13500	50500	64000
1954-55	31500	71500	114500	16300	11500	47500	59000
1955-56	32000	75450	118850	14800	10450	41900	52350
1956-57	33250	77750	121000	13900	10500	37000	47500
1957-58	32250	72000	114000	12400	9500	42500	52000
1958-59	30400	67750	108000	10550	11500	50500	62000
1959-60	32300	70000	109500	9200	10000	43500	53500
1960-61	33800	76350	115550	8050	10100	45350	55450
1961-62	33500	79750	117750	7300	10500	40000	50500
1962-63	35750	80500	117000	6400	11000	41500	52500

NUMBER OF LIVESTOCK ON FARMS, PRINCE EDWARD ISLAND, (continued)

Crop Years	Sheep 1 yr. & over	Lamb Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	23050	11500	34550	886500	15000	18500	11500	931500
1942-43	24900	13450	38350	862500	13500	15000	11000	902000
1943-44	27450	14500	41950	981500	11500	15500	11000	1019500
1944-45	24750	13300	38050	962000	9000	14500	13000	998500
1945-46	25750	11800	37550	937500	9500	16000	12000	975000
1946-47	20900	9800	30700	970000	11000	14500	9500	1005000
1947-48	17700	8750	26450	799500	12000	14500	9500	835500
1948-49	15350	8700	24050	839500	13500	17500	11500	882000
1949-50	15350	9500	24850	783000	14500	17000	14500	829000
1950-51	16650	9800	26450	772000	14000	18000	15500	819500
1951-52	16850	9900	26750	795000	17500	20000	14500	847000
1952-53	18100	10400	28500	705000	14000	15000	10500	744500
1953-54	17750	10550	28300	705000	15000	12500	7500	740000
1954-55	17200	10050	27250	685000	13500	11000	8000	717500
1955-56	16700	9750	26450	678500	13000	10000	8000	709500
1956-57	15000	9250	24250	651000	13000	9500	7500	681000
1957-58	14000	8250	22250	603500	12000	9500	6500	631500
1958-59	13500	7800	21300	579000	14000	9000	6000	608000
1959-60	13500	6950	20450	530500	13500	7500	6500	558000
1960-61	12000	6750	18750	448000	15000	6500	5500	475000
1961-62	10500	6500	17000	384500	10000	5500	3000	403000
1962-63	9450	5050	14500	377500	9000	4500	2350	393350

NUMBER OF LIVESTOCK ON FARMS, NOVA SCOTIA, CROP YEARS 1941-42 to 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	105550	3850	3900	21550	4050	20500	38300
1942-43	102150	3900	3200	22050	4100	19100	43250
1943-44	102550	4400	3900	25850	5000	23150	44600
1944-45	100850	4600	4600	27800	5350	23450	40650
1945-46	95750	4250	4400	27000	5250	20250	39950
1946-47	90050	3650	4100	26200	4950	16650	37750
1947-48	85300	3450	3900	23950	4950	13800	33450
1948-49	82250	3400	3600	26000	5100	11600	33900
1949-50	82550	3450	4850	23900	5550	10350	35750
1950-51	79600	2900	5950	23150	5800	10900	35900
1951-52	80000	2750	6900	20250	5850	12500	40750
1952-53	81000	3100	7500	21400	7250	16250	41500
1953-54	82250	3100	8250	21750	8400	16250	41500
1954-55	82250	3250	11500	20500	9000	16750	41750
1955-56	82400	3400	11750	19250	9050	17950	41900
1956-57	79000	3350	11500	18250	9250	15500	40150
1957-58	72500	2750	10000	15600	8400	12750	36500
1958-59	68000	2700	10500	14850	8450	12500	38000
1959-60	66000	2800	11500	14950	8700	14050	38500
1960-61	64500	2700	12950	15250	8900	15400	40650
1961-62	62150	2700	14850	15100	9300	16350	40050
1962-63	59750	2500	15850	13700	9100	15850	39750

NUMBER OF LIVESTOCK ON FARMS, NOVA SCOTIA (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	92150	197700	35900	12550	42300	54850	73950
1942-43	95600	197750	35500	14350	47300	61650	79550
1943-44	106900	209450	35550	14850	53200	68050	80750
1944-45	106450	207300	34400	13200	42700	55900	78250
1945-46	101150	196900	33700	11800	32650	44450	74550
1946-47	93300	183350	32450	13600	34400	48000	66050
1947-48	83500	168800	30700	13500	36200	49700	57200
1948-49	83600	165850	29450	12650	34050	46700	51700
1949-50	83850	166400	28250	11500	38500	50000	49300
1950-51	84600	164200	26650	10950	40850	51800	49000
1951-52	89000	169000	24600	11500	45000	56500	51600
1952-53	97000	178000	23050	10300	35700	46000	50250
1953-54	99250	181500	21300	9500	31000	40500	51500
1954-55	102750	185000	19200	9000	29500	38500	51000
1955-56	103300	185700	18200	9500	25850	35350	46450
1956-57	98000	177000	16400	9500	23000	32500	42750
1957-58	86000	158500	14300	9000	25500	34500	39350
1958-59	87000	155000	12600	12500	35000	47500	39000
1959-60	90500	156500	10650	12500	39000	51500	37500
1960-61	95850	160350	9250	11150	37300	48450	33800
1961-62	98350	160500	8300	10750	41000	51750	29500
1962-63	96750	156500	7500	10500	42000	52500	27000

NUMBER OF LIVESTOCK ON FARMS, NOVA SCOTIA (continued)

Crop Years	Lamb Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	42950	116900	1057500	13500	6000	4500	1081500
1942-43	45150	124700	1156500	11000	6000	4000	1177500
1943-44	44050	124800	1384000	10500	5000	4500	1404000
1944-45	41150	119400	1340500	14000	4500	5000	1364000
1945-46	37950	112500	1435000	15500	4000	4000	1458500
1946-47	38900	104950	1596500	20000	4000	4000	1624500
1947-48	31650	88850	1414500	26500	4000	3000	1448000
1948-49	28800	80500	1292000	30500	4500	3500	1330500
1949-50	28850	78150	1277000	28000	5000	3500	1313500
1950-51	27750	76750	1323000	28500	5000	3500	1360000
1951-52	26900	78500	1420000	29500	5000	3500	1458000
1952-53	28750	79000	1605000	32500	5000	3000	1645500
1953-54	29000	80500	1665000	33500	4500	2500	1705500
1954-55	26500	77500	1682500	31000	4000	3000	1720500
1955-56	24650	71100	1689500	40000	3500	2500	1735500
1956-57	23750	66500	1663000	48500	3000	1500	1716000
1957-58	22650	62000	1634500	61000	3500	1000	1700000
1958-59	22000	61000	1889000	51500	3500	1000	1945000
1959-60	20500	58000	1826500	36000	2000	1000	1865500
1960-61	19000	52800	1925500	40000	2000	1000	1968500
1961-62	17000	46500	1885000	34000	1500	1000	1921500
1962-63	15000	42000	2040000	45000	1500	1450	2087950

NUMBER OF LIVESTOCK ON FARMS, NEW BRUNSWICK, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	110950	5500	2000	22750	2350	6800	45700
1942-43	108900	5100	2150	22550	2250	6350	50200
1943-44	110150	5900	2900	25300	2550	6600	51300
1944-45	110800	6300	3800	25700	2700	6200	47100
1945-46	107100	5300	2900	23150	2500	4450	43300
1946-47	100900	4500	3300	21050	2450	3150	40150
1947-48	94450	4700	3300	23250	2400	2900	39350
1948-49	89500	4050	2600	23850	3050	3150	38050
1949-50	87450	3700	2350	23500	3750	3450	37900
1950-51	83650	3150	1850	20100	4250	3050	37050
1951-52	83500	3500	2500	20000	3800	4700	41500
1952-53	86000	3750	4250	21000	5250	5250	43500
1953-54	87500	4000	5500	20500	5250	5750	43500
1954-55	86750	4000	6250	18500	5500	6500	45000
1955-56	85300	4650	7450	18400	5400	7150	46450
1956-57	82000	4800	9450	17350	5600	8300	46500
1957-58	79250	4250	9400	16500	4700	7900	44500
1958-59	73350	3650	9050	15700	5100	7150	43000
1959-60	69600	3500	9650	15300	5450	7800	43200
1960-61	67300	3550	10650	14950	6050	8200	42900
1961-62	64100	3400	11600	14150	6050	8650	42050
1962-63	59500	3300	12800	13500	6500	8750	42150

NUMBER OF LIVESTOCK ON FARMS, NEW BRUNSWICK (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	85100	196050	45600	20900	57700	78600	47600
1942-43	88600	197500	47100	23800	62350	86150	52050
1943-44	94550	204700	44800	26950	66200	93150	52650
1944-45	91800	202600	44350	22050	54350	76400	50800
1945-46	81600	188700	41950	18150	46400	64550	46150
1946-47	74600	175500	39950	22150	53250	75400	40250
1947-48	75900	170350	38250	24950	54100	79050	35400
1948-49	74750	164250	36650	21800	46450	68250	30750
1949-50	74650	162100	34300	19950	61350	81300	29100
1950-51	69450	153100	31350	21050	60800	81850	28050
1951-52	75000	158500	29250	23500	61500	85000	28250
1952-53	83000	169000	27300	17000	44000	61000	28500
1953-54	84500	172000	24700	17000	47000	64000	31500
1954-55	85750	172500	21700	15750	43250	59000	32750
1955-56	89500	174800	19800	14800	40600	55400	32450
1956-57	92000	174000	17700	15000	36000	51000	32500
1957-58	87250	166500	15450	13000	39000	52000	32500
1958-59	83650	157000	13000	13000	45500	58500	32000
1959-60	84900	154500	10850	14000	40500	54500	31000
1960-61	86300	153600	9500	11300	37750	49050	27300
1961-62	85900	150000	8550	10000	36000	46000	24500
1962-63	87000	146500	7650	10000	36000	46000	21000

NUMBER OF LIVESTOCK ON FARMS, NEW BRUNSWICK (continued)

Crop Years	Lamb Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	27500	75100	1085000	38000	9000	4500	1136500
1942-43	29100	81150	1166000	34500	9000	4500	1214000
1943-44	28000	80650	1319500	33000	8500	5500	1366500
1944-45	26650	77450	1332500	33000	8000	5500	1379000
1945-46	22100	68250	1297500	27000	7000	5000	1336500
1946-47	18850	59100	1377000	27500	7000	5000	1416500
1947-48	18500	53900	1063500	26000	6500	5500	1101500
1948-49	16450	47200	1041000	29000	6500	4500	1081000
1949-50	16300	45400	992000	31500	6500	4000	1034000
1950-51	16000	44100	968000	33500	6000	4000	1011500
1951-52	16250	44500	930000	43000	5000	4000	982000
1952-53	17500	46000	870000	47500	4500	3500	925500
1953-54	18500	50000	960000	51000	4000	2500	1017500
1954-55	18500	51250	940000	45000	5000	2000	992000
1955-56	19050	51500	917500	42500	4500	2000	966500
1956-57	19500	52000	919500	46000	3500	2000	971000
1957-58	20000	52500	923000	47500	3000	2000	975500
1958-59	19000	51000	932000	45500	3000	2000	982500
1959-60	18500	49500	896000	29000	2000	2000	929000
1960-61	16150	43450	907000	32000	2000	1500	942500
1961-62	14500	39000	925000	32500	1500	1000	960000
1962-63	12250	33250	918500	22000	1550	750	942800

NUMBERS OF LIVESTOCK ON FARMS, QUEBEC, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	992300	76600	11250	182100	6250	37400	338250
1942-43	985400	75100	10300	187950	6100	33500	370000
1943-44	1012500	81000	12500	217600	7400	36250	387350
1944-45	1035200	83050	16550	225250	8400	37100	353550
1945-46	1012950	78500	14500	208600	7600	28900	321600
1946-47	1008050	79050	16550	214450	7950	28050	327150
1947-48	985700	79600	14800	232050	6400	26600	316550
1948-49	959100	67300	12800	235750	6950	25650	291950
1949-50	939500	63400	16350	224300	8500	26100	289700
1950-51	904150	55500	18400	210500	23400	26300	297200
1951-52	909500	60000	27000	200000	34500	36500	337500
1952-53	937500	70000	37500	225000	45000	45000	357500
1953-54	977500	75000	50000	222500	42500	45000	362500
1954-55	1010000	76500	62500	217500	36000	47500	380000
1955-56	1027150	77000	71800	214750	32900	48450	384050
1956-57	1039000	74000	97000	211000	34000	50000	373500
1957-58	1026000	69500	84500	204500	28500	46500	356000
1958-59	997500	65000	76500	203500	25500	44500	358500
1959-60	993000	66000	81500	208000	26000	49000	366000
1960-61	991850	65200	82750	208300	24950	52250	371800
1961-62	1014000	65500	82000	204500	24000	52500	398000
1962-63	1028500	65500	82500	199000	24500	51000	409500

NUMBER OF LIVESTOCK ON FARMS, QUEBEC (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	651850	1644150	324500	197500	588500	786000	287800
1942-43	682950	1668350	312000	231500	642000	873500	294050
1943-44	742100	1754600	317000	234000	688000	922000	319700
1944-45	723900	1759100	308000	194000	598500	792500	334050
1945-46	659700	1672650	293000	172000	541000	713000	313850
1946-47	673200	1681250	290500	201500	647000	848500	203400
1947-48	676000	1661700	288000	215000	641000	856000	249950
1948-49	640400	1599500	270500	192500	624000	816500	206050
1949-50	628350	1567850	249500	211000	738000	949000	176500
1950-51	631300	1535450	234950	241400	795750	1037150	158750
1951-52	695500	1605000	222450	286500	959000	1245500	161500
1952-53	780000	1717500	216000	240000	655000	899000	171500
1953-54	797500	1775000	194000	201500	732000	856500	171500
1954-55	820000	1830000	177500	241000	704700	973000	167000
1955-56	828950	1856100	165700	215350	625000	920050	166600
1956-57	839500	1878500	150500	197000	694500	822000	161500
1957-58	789500	1815500	137000	216000	862000	910500	146000
1958-59	773500	1771000	123000	248000	713000	1110000	131000
1959-60	796500	1789500	110500	247500	668600	960500	115500
1960-61	805250	1797100	99200	210950	706000	879550	98400
1961-62	826500	1840500	92500	225000	706000	931000	85000
1962-63	832000	1860500	86000	244000	752500	996500	76500

NUMBER OF LIVESTOCK ON FARMS, QUEBEC (continued)

Crop Years	Lambs Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	160950	448750	7900000	180500	43500	37000	8161000
1942-43	179000	473050	8140000	180000	36000	34000	8390000
1943-44	188000	507700	9680000	182500	36000	52500	9951000
1944-45	200050	534100	10160000	215000	34500	43500	10453000
1945-46	176900	490750	9070000	224500	27500	45000	9367000
1946-47	169150	452550	10025000	266500	27000	40000	10358500
1947-48	145100	395050	7900000	299500	18000	34000	8251500
1948-49	114600	320650	7780000	314000	18500	31500	8144000
1949-50	105500	282000	6975000	383500	15000	49500	7423000
1950-51	96450	255200	7425000	436500	13500	34000	7909000
1951-52	102500	264000	8129000	470500	13500	48000	8661000
1952-53	112000	283500	8110000	515000	13500	51500	8690000
1953-54	108000	279500	9112000	548000	13500	51000	9724500
1954-55	104000	271000	8479500	527500	12500	58500	9078000
1955-56	101200	267800	8886000	573500	11500	42500	9513500
1956-57	97500	259000	9355500	612500	10500	39500	10018000
1957-58	98500	244500	10026000	610000	11000	48000	10695000
1958-59	81500	212500	10452500	710000	11000	56500	11230000
1959-60	75000	190500	10162500	515000	10000	51000	10738500
1960-61	59450	157850	10952000	616000	8500	57500	11634000
1961-62	53500	138500	11800000	615000	9500	55500	12480000
1962-63	47000	123500	12427500	655000	10000	59000	13151500

NUMBER OF LIVESTOCK ON FARMS, ONTARIO, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	1110000	59000	83000	269850	98650	295000	593500
1942-43	1121500	59500	88000	272500	101000	299500	606500
1943-44	1123000	60500	91500	277700	103800	305000	611000
1944-45	1141000	60500	93500	289450	110050	317000	621500
1945-46	1120500	59000	97000	284950	109050	303000	591500
1946-47	1092500	57500	98500	279900	109100	282000	586500
1947-48	1081500	57000	100000	284800	108200	268500	581500
1948-49	1039000	55000	111500	279000	106500	247500	562500
1949-50	1012000	52500	132000	275000	107500	223000	540500
1950-51	963550	50400	164900	289400	126050	243950	562200
1951-52	972500	51000	205500	300000	148500	290000	620000
1952-53	1005000	51750	252750	305500	165000	352500	652500
1953-54	1025000	52000	275500	298500	170000	381500	692500
1954-55	1025000	52250	270250	287500	177500	405000	705000
1955-56	1020450	52350	259750	258650	181400	413650	707100
1956-57	999000	50500	267000	252500	195000	455000	724500
1957-58	984500	47500	277500	255000	180500	445000	719500
1958-59	972500	44500	284500	257000	187000	429000	734000
1959-60	968000	44500	287000	269500	195500	453000	757500
1960-61	983200	43750	307350	278150	198700	460800	794400
1961-62	977500	43000	329000	282500	213000	539500	848500
1962-63	954000	41500	347000	279500	218000	562500	870000

NUMBER OF LIVESTOCK ON FARMS, ONTARIO (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	1399000	2509000	524500	364000	1561500	1925500	338000
1942-43	1427000	2548500	416500	342500	1457500	1800000	350500
1943-44	1449500	2572500	495500	350000	1500000	1850000	354000
1944-45	1492000	2633000	475000	321000	1323000	1644000	342500
1945-46	1444500	2565000	461500	307000	1265000	1572000	312000
1946-47	1413500	2506000	432500	376000	1515000	1891000	293000
1947-48	1409000	2490500	398500	344000	1368000	1712000	263000
1948-49	1362000	2401000	366000	357000	1431000	1788000	218000
1949-50	1330500	2342500	334500	351000	1518000	1869000	202000
1950-51	1436900	2400450	281800	346300	1431450	1777750	179250
1951-52	1615000	2587500	230950	420000	1342500	1762500	182500
1952-53	1780000	2785000	207000	320000	1120000	1440000	196500
1953-54	1870000	2895000	182000	267500	1065000	1332500	196000
1954-55	1897500	2922500	158000	267500	1137500	1405000	193500
1955-56	1872900	2893350	141300	272550	1264100	1536650	188650
1956-57	1944500	2943500	128500	364500	1189500	1554000	183000
1957-58	1925000	2909500	120000	424500	1255000	1679500	186500
1958-59	1936000	2908500	103500	445000	1626500	2071500	182000
1959-60	2007000	2975000	97000	411000	1434000	1845000	173000
1960-61	2083150	3066350	90450	372750	1334400	1707150	173250
1961-62	2255500	3233000	86000	390000	1351500	1741500	170000
1962-63	2318500	3272500	83500	452500	1540000	1992500	156500

NUMBER OF LIVESTOCK ON FARMS, ONTARIO (continued)

Crop Years	Lambs Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	211500	549500	18605000	572000	282000	314000	19773000
1942-43	228500	579000	20368500	662500	278500	314500	21624000
1943-44	228000	582000	21809000	634500	272500	313000	23029000
1944-45	220000	562500	22266500	653000	270000	321500	23511000
1945-46	202500	514500	22576000	634000	261000	297500	23768500
1946-47	187500	480500	23644500	673000	232500	268500	24818500
1947-48	163500	426500	21193000	556000	181500	216500	22147000
1948-49	135000	353000	17289000	503000	160000	177000	18129000
1949-50	126000	328000	17063500	552000	141500	187000	17944000
1950-51	121350	300600	17898000	624000	139000	169500	18830500
1951-52	130500	313000	18275000	620000	130500	170000	19195500
1952-53	137000	333500	19852500	747500	137500	175000	20912500
1953-54	137000	333000	22350000	812500	121500	145000	23429000
1954-55	134500	328000	21635000	947500	108000	137500	22828000
1955-56	133250	321900	21409500	1057500	103000	127000	22697000
1956-57	127500	310500	23064500	1375000	95500	128000	24663000
1957-58	125000	311500	23404500	1717500	96000	130500	25348500
1958-59	120000	302000	24565500	2080000	95000	127500	26868000
1959-60	116500	289500	21878000	1950000	92000	129000	24049000
1960-61	111800	285000	21684500	2122500	78000	129000	24014000
1961-62	112500	282500	21415000	2350000	69500	150000	23984500
1962-63	111500	268000	21532500	2650000	66500	125000	24374000

NUMBER OF LIVESTOCK ON FARMS, MANITOBA, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	313050	15350	38500	75600	22450	60200	183700
1942-43	309850	16250	46650	77650	25100	63750	191250
1943-44	312600	17100	59050	82150	27700	74450	193300
1944-45	309000	18100	72400	85750	32000	84850	196550
1945-46	286600	17900	78000	81700	30800	85000	189400
1946-47	264950	17400	82050	78700	31950	78200	178600
1947-48	268400	18000	89700	80600	35150	75800	191500
1948-49	254050	17450	89600	72600	35000	67450	185750
1949-50	237250	16850	89850	66600	37350	58350	172600
1950-51	221850	16150	88100	61650	36300	50050	166950
1951-52	218000	16250	105250	61500	48500	56500	183500
1952-53	218000	17750	124250	63750	51500	64750	198500
1953-54	219500	18250	139500	58000	49500	68750	205000
1954-55	220500	19000	148500	50000	47500	76500	216500
1955-56	222500	20000	164900	49050	56500	84950	233850
1956-57	215750	20250	179100	51300	60300	93300	239000
1957-58	209000	19000	180400	50350	56650	83100	241000
1958-59	202100	18750	192900	47600	56750	76400	251000
1959-60	198400	19000	209650	46900	61450	88100	264000
1960-61	194900	18650	229200	47650	68950	106200	280750
1961-62	189500	18500	239500	44500	68000	91000	280500
1962-63	182000	19500	263000	45000	74000	112000	314000

NUMBER OF LIVESTOCK ON FARMS, MANITOBA (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	395800	708850	301500	115000	457500	572500	144150
1942-43	421550	731400	294000	146500	507000	653500	154350
1943-44	453750	766350	278500	148000	517000	665000	172450
1944-45	489650	798650	253000	99500	346500	446000	158600
1945-46	482800	769400	223050	76350	244150	320500	112150
1946-47	366900	731850	201500	72500	230000	302500	81100
1947-48	490750	759150	175500	87500	184500	272000	60100
1948-49	467850	721900	160500	78000	184000	262000	48750
1949-50	441600	678850	148500	75500	201000	276500	37000
1950-51	419200	641050	134450	81650	219350	301000	33150
1951-52	471500	689500	115500	108500	267500	376000	33000
1952-53	520500	738500	96500	105000	202500	307500	35500
1953-54	539000	758500	89500	84000	210500	294500	36000
1954-55	558000	778500	82500	106500	246000	352500	37750
1955-56	609250	831750	76550	103300	211950	315250	36900
1956-57	643250	859000	72000	92500	202500	295000	35000
1957-58	630500	839500	67000	110500	278500	389000	35000
1958-59	643400	845500	61000	149500	356000	505500	34000
1959-60	689100	887500	57500	124500	294000	418500	36000
1960-61	751400	946300	52900	106450	298800	405250	38550
1961-62	742000	931500	47000	99000	269000	368000	35500
1962-63	827500	1009500	43250	98500	266500	365000	34500

NUMBER OF LIVESTOCK ON FARMS, MANITOBA (continued)

Crop Years	Lambs Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	93350	237500	5585000	680500	62500	84000	6412000
1942-43	96750	251100	5676000	528000	65000	72000	6341000
1943-44	107500	279950	6224500	511500	60000	86000	6382000
1944-45	94500	253100	6082000	523500	59500	99000	6764000
1945-46	61200	173350	5579500	358500	60500	73000	6071500
1946-47	48900	130000	5756500	376000	63500	70000	6266000
1947-48	36400	96500	5635000	266000	56000	41000	5998000
1948-49	29500	78250	5273500	273500	52000	45000	5644000
1949-50	23000	60000	4611500	325000	51500	48500	5036500
1950-51	21100	54250	4660500	300500	52000	51000	5064000
1951-52	24500	57500	5070000	327500	55000	49000	5501500
1952-53	24500	60000	4927500	330000	53500	37000	5348000
1953-54	25750	61750	5065000	380000	54000	35500	5534500
1954-55	26000	63750	4750000	402500	52500	44500	5249500
1955-56	23650	60550	4565000	482000	45500	33500	5126000
1956-57	24500	59500	4750000	548500	46500	33500	5378500
1957-58	28000	63000	5090000	636500	55500	39000	5821000
1958-59	26000	60000	5350000	818000	61000	38000	6267000
1959-60	26000	62000	5000000	576000	63500	37500	5677000
1960-61	27100	65650	4873500	683000	69000	33000	5658500
1961-62	24500	60000	4582500	660000	65000	20500	5328000
1962-63	24500	59000	4635000	660000	62500	17500	5375000

NUMBER OF LIVESTOCK ON FARMS, SASKATCHEWAN, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	448900	22500	119100	117350	57400	124150	394050
1942-43	462050	23650	135350	124800	63200	152900	422800
1943-44	464350	24900	176450	133750	78550	205600	464350
1944-45	453700	26250	211000	139800	89950	222450	485000
1945-46	415050	25800	221200	129450	85000	183250	431400
1946-47	398950	27150	219100	120550	83750	164100	413150
1947-48	382300	26850	218050	114800	89450	160400	407650
1948-49	355750	23850	211450	109850	95350	126550	380350
1949-50	337700	24300	218050	95400	97700	109750	352350
1950-51	317600	22300	239750	89200	94950	102900	339200
1951-52	303500	25500	291000	80000	110000	128000	382500
1952-53	298500	29500	353500	73000	129500	151000	436500
1953-54	290500	30500	400500	62500	138500	156000	461500
1954-55	282000	32000	446500	59500	149000	176000	485500
1955-56	270100	34550	489800	54800	163350	202550	530850
1956-57	262000	36500	524500	55000	180500	221500	548000
1957-58	254000	36500	544500	52500	161500	185000	570500
1958-59	242000	36000	567000	51500	154500	155500	563000
1959-60	237500	36500	593500	50000	157000	155500	603500
1960-61	238050	38100	640550	50200	173950	189850	645350
1961-62	232500	36500	668000	46000	158500	158000	633000
1962-63	211500	38000	707000	41500	167000	173000	652000

NUMBER OF LIVESTOCK ON FARMS, SASKATCHEWAN (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	834550	1283450	693500	263500	853500	1117000	178000
1942-43	922700	1384750	773500	410000	948000	1358000	183350
1943-44	1083600	1547950	744500	445000	1099500	1544500	188700
1944-45	1074450	1628150	691000	279500	671000	950500	181350
1945-46	1076100	1491150	612700	167450	426150	593600	172950
1946-47	1027850	1426800	524000	147500	411500	559000	150350
1947-48	1017200	1399500	454500	168500	309500	478000	120100
1948-49	947400	1303150	405500	115000	282500	397500	105050
1949-50	897550	1235250	367500	133500	269500	403000	85250
1950-51	888300	1205900	314950	130800	332850	463650	73000
1951-52	1017000	1320500	287500	223000	374500	597500	72500
1952-53	1173000	1471500	266500	202500	295000	497500	74750
1953-54	1249500	1540000	210500	154500	293000	447500	74250
1954-55	1348500	1630500	186500	190000	365000	555000	76000
1955-56	1475900	1746000	171850	219350	354600	573950	76200
1956-57	1566000	1828000	162000	203000	365000	568000	83000
1957-58	1550500	1804500	150500	268500	473500	742000	87000
1958-59	1527500	1769500	135500	335500	505500	841000	85000
1959-60	1596000	1833500	123000	239500	380000	619500	97500
1960-61	1738000	1976050	112150	189500	382400	571900	94750
1961-62	1700000	1932500	100000	185500	314000	499500	86500
1962-63	1778500	1990000	90500	149500	255500	405000	78500

NUMBER OF LIVESTOCK ON FARMS, SASKATCHEWAN (continued)

Crop Years	Lambs Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	104500	282500	10266500	1250000	86000	86000	11688500
1942-43	108400	291750	9952000	913500	61500	68500	10995500
1943-44	111050	299750	11723500	919500	72500	103000	12818500
1944-45	112150	293500	11023500	866500	71500	108000	12069500
1945-46	101950	274900	8853000	583500	57000	75500	9569000
1946-47	75150	225500	9337500	628000	56500	74500	10096500
1947-48	62650	182750	7056000	363000	46000	46500	7511500
1948-49	49450	154500	7056500	428500	46000	55000	7586000
1949-50	46750	132000	6207500	397000	33500	42000	6680000
1950-51	42050	115050	6356500	348500	32500	44500	6782000
1951-52	44500	117000	6648500	473500	40000	59500	7221500
1952-53	45250	120000	6139000	470000	47500	70500	6727000
1953-54	46250	120500	5676000	470000	41000	62000	6249000
1954-55	46000	122000	5850000	505000	53500	76000	6484500
1955-56	44150	120350	6052000	554000	49500	67000	6722500
1956-57	45000	128000	6069500	607500	44500	54500	6776000
1957-58	49000	136000	6134000	727500	44000	57000	6962500
1958-59	55500	140500	5886000	800000	41500	50000	6777500
1959-60	56000	153500	5330500	662500	37500	44000	6074500
1960-61	60750	155500	5075500	735000	37500	43000	5891000
1961-62	58500	145000	4395000	575000	32500	35000	5037500
1962-63	56500	135000	4427500	512500	32500	35000	5007500

NUMBER OF LIVESTOCK ON FARMS, ALBERTA, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	366850	28900	245900	82200	92400	151300	405050
1942-43	373400	30450	274200	85150	107750	169450	435300
1943-44	372550	32200	320500	88000	119300	189400	451400
1944-45	356200	33700	360700	85200	127950	205700	487200
1945-46	325150	31600	346200	86550	118150	213700	459600
1946-47	317200	32300	359200	76500	125950	202300	456200
1947-48	312550	33950	376400	75600	126350	207800	476500
1948-49	314350	32950	360650	71300	126050	186150	455300
1949-50	302050	33000	390200	68850	116650	161700	432050
1950-51	279850	32600	391250	71100	121050	148600	433350
1951-52	282500	34000	447500	75000	146500	162000	470000
1952-53	283000	38500	512500	72500	170000	188500	540000
1953-54	284500	42500	562500	67500	192000	217500	595000
1954-55	282500	45000	617500	62500	207500	265000	629500
1955-56	281100	47950	704450	57650	213800	292450	692200
1956-57	279500	51000	738500	60000	246500	327000	738000
1957-58	270000	49500	763500	61500	218000	271000	799500
1958-59	270000	50000	790000	61000	216500	250500	820500
1959-60	274000	52000	810500	63000	220500	267000	859500
1960-61	282950	53550	853600	64850	226800	301000	881450
1961-62	280500	53000	879000	64000	233000	299500	872500
1962-63	275000	54500	896000	63500	243500	324500	880500

NUMBER OF LIVESTOCK ON FARMS, ALBERTA (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	1005750	1372600	637500	501000	1514500	2015500	367400
1942-43	1102300	1475700	621500	672500	1530000	2202500	411150
1943-44	1200800	1573350	588500	692500	1743500	2436000	420000
1944-45	1300450	1656650	551500	484000	1186000	1670000	400150
1945-46	1255800	1580950	492500	297000	874500	1171500	360200
1946-47	1252450	1569650	422000	253500	824500	1078000	325700
1947-48	1296600	1609150	376500	287000	686000	973000	280000
1948-49	1232400	1546750	341000	202500	559000	761500	238350
1949-50	1202450	1504500	307500	209500	614000	823500	175550
1950-51	1197950	1477800	270050	213050	696800	909850	175100
1951-52	1335000	1617500	241500	372500	752500	1125000	177500
1952-53	152 000	1805000	213000	360000	760000	1120000	181000
1953-54	1677000	1961500	182000	270000	840000	1110000	200500
1954-55	1827000	2109500	168500	355000	875000	1230000	211500
1955-56	2008500	2289600	156800	361150	872100	1233250	214700
1956-57	2161000	2440500	144000	388000	849500	1237500	212500
1957-58	2163000	2433000	134000	487500	1077500	1565000	216000
1958-59	2188500	2458500	126500	594000	1210500	1804500	231000
1959-60	2272500	2546500	121500	527000	978000	1505000	248500
1960-61	2381250	2664200	114600	427000	979000	14 6000	241900
1961-62	2401000	2681500	110000	425000	900000	1325000	223000
1962-63	2462500	2737500	103500	357500	795000	1152500	209500

NUMBER OF LIVESTOCK ON FARMS, ALBERTA (continued)

Crop Years	Lambs Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	247900	615300	7301000	635500	104500	95000	8136000
1942-43	245250	656400	7578500	581500	90000	89000	8339000
1943-44	271500	691500	8681500	684500	114500	104500	9585000
1944-45	243000	643150	8480500	684000	120500	104500	9389500
1945-46	248750	608950	7459000	565000	98500	79500	8202000
1946-47	230100	555800	7645000	584000	91500	79000	8399500
1947-48	167500	447500	6332500	479000	82500	60000	6954000
1948-49	148350	386700	6106500	426500	81500	65500	6680000
1949-50	141850	317400	5745000	422500	70500	58000	6296000
1950-51	111700	286800	6019500	384500	62500	61000	6527500
1951-52	139000	316500	5012500	480000	71000	83500	5647000
1952-53	133500	314500	6302500	410000	72000	101500	6886000
1953-54	137000	337500	6385000	480000	72500	102500	7040000
1954-55	156500	368000	6302500	457500	78500	115500	6954000
1955-56	158700	373400	6764500	575000	79500	89000	7508000
1956-57	163000	375500	7225000	628000	73500	79000	8005500
1957-58	172000	388000	7370000	674000	85000	82500	8211500
1958-59	179000	410000	7445000	699500	80500	79000	8304000
1959-60	181500	430000	6730000	648000	77000	73000	7528000
1960-61	197050	438950	6977500	765500	79500	77000	7899500
1961-62	169500	392500	6525000	595000	72500	65000	7257500
1962-63	150000	359500	6120000	562500	77500	67500	6827500

NUMBER OF LIVESTOCK ON FARMS, BRITISH COLUMBIA, CROP YEARS 1941-42 TO 1962-63

Crop Years	Milk Cows & Heifers 2 yrs. Over	Bulls 1 yr. Over	Beef Cows & Heifers 2 yrs. Over	Yearling Heifers for Milk	Yearling Heifers for Beef	Steers 1 yr. & Over	Calves Under 1 yr.
1941-42	92850	7150	62000	24450	22950	38200	79700
1942-43	96500	7150	65900	26350	24450	40750	83500
1943-44	100550	7500	70250	28000	26900	40050	79650
1944-45	106400	7800	75400	28250	29050	41200	81050
1945-46	104750	7450	78600	27200	28400	42000	75050
1946-47	101800	7700	72800	25650	25500	38800	72600
1947-48	96550	7350	68450	22750	23200	35450	73150
1948-49	90700	6550	67800	22700	23200	32850	72150
1949-50	93100	6600	73100	24600	23900	33250	68300
1950-51	85300	6150	72500	24600	25500	29200	67900
1951-52	83500	6000	70500	24250	25500	25750	76000
1952-53	86500	6500	78000	25000	26500	27500	86000
1953-54	88000	6750	94000	23250	28000	32000	92500
1954-55	98500	7000	102750	22750	30000	38500	95500
1955-56	89600	7950	108500	22000	34450	47950	97500
1956-57	86500	7750	108000	20250	28500	46000	93000
1957-58	89000	7250	104000	20250	31500	43000	95500
1958-59	88000	7500	108000	22500	30500	34000	107500
1959-60	90500	8000	112000	25750	31750	28500	113000
1960-61	91950	8050	119350	27050	35800	32850	120350
1961-62	93000	8500	125750	26000	40250	35000	128000
1962-63	91000	8500	136500	24500	43500	32500	129000

NUMBER OF LIVESTOCK ON FARMS, BRITISH COLUMBIA (continued)

Crop Years	Other Cattle & Calves	All Cattle and Calves	Horses	Hogs 6 Mons. & Over	Hogs Under 6 Mons.	All Hogs	Sheep 1 yr. & Over
1941-42	234450	327300	61450	23000	60000	83000	63950
1942-43	248100	344600	60800	25650	56950	82600	64900
1943-44	252350	352900	59900	27500	65450	92950	67550
1944-45	262750	369150	57900	24700	49700	74400	63000
1945-46	258700	363450	53950	18150	46550	64700	54850
1946-47	243050	344850	50300	18200	47500	65700	46650
1947-48	230350	326900	47100	17400	47600	65000	40850
1948-49	225250	315950	43950	11950	40200	52150	35750
1949-50	229750	322850	41050	11950	42500	54450	33600
1950-51	225850	311150	37650	13600	39550	53150	33450
1951-52	228000	311500	34500	20000	46250	66250	35250
1952-53	249500	336000	30500	15000	35250	50250	38750
1953-54	276500	364500	30000	14500	30500	45000	39500
1954-55	296500	386000	29000	19000	34750	53750	40500
1955-56	318350	407950	27400	18500	34200	52700	42200
1956-57	303500	390000	25950	13000	29000	42000	44000
1957-58	301500	390500	24500	15000	32000	47000	46500
1958-59	310000	398000	23500	17500	42000	59500	49000
1959-60	319000	409500	22750	18000	33500	51500	48000
1960-61	343450	435400	23450	12850	30450	43300	49900
1961-62	363500	456500	24500	12000	29000	41000	48250
1962-63	374500	465500	24500	11000	26000	37000	46500

NUMBER OF LIVESTOCK ON FARMS, BRITISH COLUMBIA (continued)

Crop Years	Lambs Under 1 yr.	All Sheep and Lambs	Hens and Chickens	Turkeys	Geese	Ducks	All Poultry
1941-42	37150	101100	2577500	43500	6500	18000	2645500
1942-43	38300	103200	2541500	41000	7000	15000	2604500
1943-44	38550	106100	2906500	44500	6500	14500	2972000
1944-45	33850	96850	2956000	54500	6000	13000	3029500
1945-46	32500	87350	3064500	74000	6500	14000	3159000
1946-47	25200	71850	3149500	114500	7500	13500	3285000
1947-48	24450	65300	2753500	141000	6500	12000	2913000
1948-49	20350	56100	2713000	184000	7500	14000	2918500
1949-50	20400	54000	2699000	243000	9500	14500	2966000
1950-51	21600	55050	2710500	221500	12500	14500	2959000
1951-52	21750	57000	2780000	267000	16500	19500	3083000
1952-53	23250	62000	2855000	255000	19500	21500	3151000
1953-54	24000	63500	3115000	277500	16500	20500	3429500
1954-55	25000	65500	3117500	290000	15500	21000	3444000
1955-56	27600	69800	3420500	277000	13000	21000	3731500
1956-57	28500	72500	3590000	289500	11000	20500	3911000
1957-58	29500	76000	3740500	279000	9500	23000	4052000
1958-59	30000	79000	4338500	354000	8000	24500	4725000
1959-60	31500	79500	4503500	340000	8500	25000	4877000
1960-61	32000	81900	4914000	366000	9000	23500	5312500
1961-62	31250	79500	5107500	372500	8500	21500	5510000
1962-63	29500	76000	5025000	362500	9000	20000	5416500

APPENDIX IV

LOCAL FEED USE OF WHEAT, BY PROVINCES AND CROP YEARS, 1941-1963
(thousand bushels)

Province	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Prince Edward Island	147	120	73	60	38	31	39	54	66	83	103
Nova Scotia	33	44	22	26	16	16	21	20	28	24	26
New Brunswick	66	72	48	50	33	23	32	54	56	62	69
Quebec	303	329	252	362	158	175	165	195	172	243	303
Ontario	11503	15319	11243	13119	13168	10573	11176	15597	12410	15331	13103
Manitoba	5534	6341	6159	6179	4093	6673	5519	5887	4197	3988	4171
Saskatchewan	15235	24957	15442	13916	8731	10834	11691	6953	6208	14949	23571
Alberta	20256	28168	19002	14773	11581	10336	10843	7314	7081	9027	14259
British Columbia	1737	2247	1570	1042	1328	964	983	704	0	435	489

LOCAL FEED USE OF WHEAT (continued)
(thousand bushels)

Province	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
Prince Edward Island	66	65	81	74	66	61	90	121	117	112	130
Nova Scotia	6	29	23	16	13	15	39	45	30	48	25
New Brunswick	49	50	63	40	54	73	52	64	69	46	75
Quebec	146	179	153	344	223	378	290	406	263	319	231
Ontario	10677	12450	15236	13699	11680	10428	12536	8189	8669	10237	9117
Manitoba	4268	4365	5723	4947	3880	4365	7469	4850	6014	4559	8798
Saskatchewan	18139	20370	25220	20176	18430	17072	16975	14938	15520	11349	9725
Alberta	11155	11252	17266	19303	16975	17266	13580	15326	13386	11058	9597
British Columbia	255	130	103	435	140	628	552	838	510	147	237

LOCAL FEED USE OF OATS, BY PROVINCES AND CROP YEARS, 1941-1963
(thousand bushels)

Province	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Prince Edward Island	3168	2946	3853	3853	3890	3375	3428	3567	3719	3978	3532
Nova Scotia	2206	2256	1774	2221	1701	2113	1733	2233	2312	2464	2382
New Brunswick	5257	5647	6100	5578	5481	5215	5202	5556	5751	6408	5990
Quebec	39392	40758	30914	36691	28742	28241	22186	32047	29341	39383	49328
Ontario	62615	75126	36348	55209	46488	58343	37357	57724	58681	68949	77992
Manitoba	26487	37222	33723	32936	31186	27565	23773	30272	27450	27277	31040
Saskatchewan	51436	111701	114647	95591	55112	46733	38778	41031	39867	41408	73817
Alberta	51670	100623	93478	68034	46963	51905	45076	43602	35484	45431	77794
British Columbia	3882	4048	3849	3343	3354	3664	3682	2918	3235	2364	5787

LOCAL FEED USE OF OATS (continued)
(thousand bushels)

Province	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
Prince Edward Island	2945	3989	3335	2747	3856	3647	3849	3698	4088	4155	4461
Nova Scotia	2091	1964	1836	1681	1849	1737	1648	1634	1833	1417	1211
New Brunswick	4208	5828	4356	3584	5519	5154	4621	3592	4447	3899	4166
Quebec	35986	42571	28949	32790	37876	45551	40503	39927	50187	45687	47091
Ontario	63176	65343	59017	55942	53469	69236	84737	89561	81896	80344	93248
Manitoba	31137	29294	22795	29197	34047	33659	38703	36569	36763	29100	43819
Saskatchewan	66251	64796	58976	70325	66542	48306	43844	45978	56648	28809	55529
Alberta	76339	65960	67609	74787	69840	59073	68094	70131	71586	60229	82555
British Columbia	3513	4122	3125	3067	3459	4018	3379	4093	2912	2501	

LOCAL FEED USE OF BARLEY, BY PROVINCES AND CROP YEARS, 1941-1963
(thousand bushels)

Province	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Prince Edward Island	273	280	319	230	216	124	148	133	146	168	133
Nova Scotia	284	278	196	207	145	155	121	134	138	145	144
New Brunswick	425	474	462	412	312	264	268	274	288	405	442
Quebec	2975	2655	2313	2402	1720	1670	1852	1771	1251	1656	2112
Ontario	9713	10668	6035	9362	8327	8915	5618	6362	5681	6294	6903
Manitoba	18998	26264	28511	22887	20536	12961	14222	17928	16638	12645	15423
Saskatchewan	15301	33362	40821	32507	18551	14102	14234	15339	13652	15018	20855
Alberta	23051	42592	45835	33849	22616	23867	24505	26286	20847	26025	47627
British Columbia	505	748	885	693	531	510	599	549	663	318	700

LOCAL FEED USE OF BARLEY (continued)
(thousand Bushels)

Province	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
Prince Edward Island	85	140	75	51	24	28	51	51	44	31	192
Nova Scotia	86	107	62	62	47	35	58	49	35	37	23
New Brunswick	220	304	223	134	133	142	137	130	111	76	124
Quebec	1170	1618	913	877	976	610	771	942	988	782	475
Ontario	6027	5377	3676	4594	7535	3254	3190	4098	2874	2906	3965
Manitoba	19885	14453	13483	17848	9797	13450	12553	10294	10268	8530	6272
Saskatchewan	17654	19982	30458	32301	29682	30477	26058	25783	30417	19357	15047
Alberta	16463	43165	47724	54126	54902	55267	52866	53340	57352	43916	43656
British Columbia	302	1078	854	829	816	928	638	968	811	497	520

LOCAL FEED USE OF MIXED GRAINS, BY PROVINCES AND CROP YEARS, 1941-1963
(thousand bushels)

Province	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Prince Edward Island	783	982	1462	1324	1453	1307	1735	1879	2006	2609	2721
Nova Scotia	142	145	136	148	102	102	93	120	176	238	314
New Brunswick	55	79	79	96	89	80	79	81	108	191	248
Quebec	4250	6798	5249	5061	4452	4142	3171	5352	4404	6683	7733
Ontario	34833	46187	17244	36232	29247	37176	20662	39705	35524	45150	48031
Manitoba	200	362	363	363	369	384	259	538	649	1036	953
Saskatchewan	227	492	417	441	178	135	149	281	347	436	983
Alberta	569	1891	1495	1152	760	683	268	945	555	1278	2926
British Columbia	70	104	112	95	60	81	85	81	82	94	101

LOCAL FEED USE OF MIXED GRAINS (continued)
(thousand bushels)

Province	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
Prince Edward Island	2495	2843	2503	2175	2517	2355	2411	2283	2480	2328	2387
Nova Scotia	372	400	404	399	428	410	344	317	354	325	275
New Brunswick	183	260	212	145	229	265	236	246	283	241	283
Quebec	6725	6857	5639	6062	6613	6586	5028	4329	4094	3954	3863
Ontario	44269	47517	45498	45817	41252	39599	39426	36337	31252	35386	38945
Manitoba	1099	1004	863	1055	2131	1725	3034	3819	3667	2531	4606
Saskatchewan	928	598	623	989	1514	1199	1589	1778	2543	1194	4084
Alberta	2657	2537	2291	4241	6696	5674	6650	8645	9228	10209	12496
British Columbia	114	153	113	119	223	177	163	178	155	188	186

LOCAL FEED USE OF CORN, BY PROVINCES AND CROP YEARS, 1941-1963
(thousand bushels)

Province	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
Ontario	11248	13521	6939	10977	10170	10416	6436	12028	13012	13302	15283	20021
Manitoba	2014	727	815	640	145	261	244	288	533	378	145	535

Province	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963
Ontario	21959	23920	34308	26807	28445	28722	29833	25142	28212	30936	31614
Manitoba	436	224	183	173	194	170	148	174	119	128	175

APPENDIX V

PRINCE EDWARD ISLAND: SOURCES OF FEED BY CROP YEAR 1941-1963
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grain						
Wheat	14112	11520	7008	5760	3648	2976
Oats	150746	140184	183342	183342	185103	160598
Barley	20324	20845	23749	17123	16080	9231
Mixed Grain	47438	59495	88577	80216	88033	79185
Corn and Other Grain	None - - -	- - -	- - -	- - -	- - -	- - -
Millfeeds	Assumed zero - - -	- - -	- - -	- - -	- - -	- - -
Ground Feeds	Assumed zero - - -	- - -	- - -	- - -	- - -	- - -
Total Local Grains	232620	232044	302676	286441	292864	251990
						345709
Locally Produced Forage						437116
Fodder Corn	None - - -	- - -	- - -	- - -	- - -	- - -
Tame Hay	712903	687512	591807	865250	785170	782825
Pasture	471533	464650	457766	450883	443999	1034815
Total Forage	1184436	1152162	1049573	1316133	1229169	43852
Imports of Corn	Assumed zero - - -	- - -	- - -	- - -	- - -	- - -
Total Feed Not Under Subsidy	1417056	1384206	1352249	1602574	1522033	1034815
Subsidy Movement of Grain						
Wheat	14716	37748	54208	39126	50460	43852
Oats	4332	18640	20580	11572	27758	33294
Barley	10283	30837	42876	30725	40775	45025
Rye	84	328	39	-	-	-
Corn	None under subsidy - - -	- - -	- - -	- - -	- - -	- - -
Millfeeds	16826	35314	42370	34295	43648	49547
Screenings	220	397	179	537	324	1447
Total Under Subsidy	46461	123264	160252	116255	162955	173165
Total Grain Fed	279081	355308	462928	402696	455829	425155
Total Feed Disappearance	1463517	1507470	1512501	1718829	1684998	1207980
Under Subsidy	46461	123264	160252	116255	162965	173165
% Under Subsidy (All Feeds)	3.17	8.18	10.60	6.76	9.67	14.34
% Under Subsidy (Grain)	16.65	34.69	34.62	28.87	35.75	40.73

SOURCES OF FEED, PRINCE EDWARD ISLAND (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grain						
Wheat	3744	5184	6336	7968	9888	6336
Oats	163120	169733	176965	189291	168068	140135
Barley	11018	9902	10870	12507	9902	6327
Mixed Grain	105117	113843	121537	158069	164855	151162
Corn and Other Grain	None					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	282999	298663	315708	367835	352713	303960
Locally Produced Forage						
Fodder Corn	None					
Tame Hay	345709	941423	835952	558604	757826	816421
Pasture	430232	423349	416466	409582	402699	396082
Total Forage	775941	1364772	1252418	968186	1160525	1212503
Imports of Corn	Assumed zero					
Total Feed Not Under Subsidy	1058940	1663434	1568126	1336021	1513238	1516463
Subsidy Movement of Grain						
Wheat	34896	12672	15344	22412	25270	21946
Oats	24661	15749	18109	12597	14940	19717
Barley	46264	43331	37112	25502	30397	24686
Rye	-	-	-	-	-	-
Corn	None under subsidy					
Millfeeds	41364	28163	31779	29709	22367	21528
Screenings	549	1604	3465	2197	1781	2134
Total Under Subsidy	147734	101519	105809	92417	94755	90011
Total Grain Fed	430733	400181	421517	460252	447468	393971
Total Feed Disappearance	1206674	1764953	1673935	1428438	1607993	1606474
Under Subsidy	147734	101519	105809	92417	94755	90011
% Under Subsidy (All Feeds)	12.24	5.75	6.32	6.47	5.89	5.60
% Under Subsidy (Grain)	34.30	25.37	25.10	20.08	21.18	22.85

SOURCES OF FEED, PRINCE EDWARD ISLAND (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957	1958
Locally Produced Grain						
Wheat	6240	7776	7104	6336	5856	8640
Oats	189813	158694	130714	183485	173540	183152
Barley	10424	5584	3797	1786	2086	3797
Mixed Grain	172248	151648	131775	152497	142682	146074
Corn and Other Grain	None					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	378725	323702	273390	344104	324164	341663
Locally Produced Forage						
Fodder Corn	None					
Tame Hay	708997	777358	800796	824234	515634	746107
Pasture	389465	382846	376230	369613	362996	356380
Total Forage	1098462	1160204	1177026	1193847	878630	1102487
Imports of Corn	Assumed zero					
Total Feed Not Under Subsidy	1477187	1483906	1450416	1537951	1202794	1444150
Subsidy Movement of Grain						
Wheat	12020	16406	26486	22900	17238	21396
Oats	8382	12505	14593	6194	7191	8156
Barley	12978	23584	27328	20192	21003	28783
Rye	67	45	136	-	-	-
Corn	None under subsidy					
Millfeeds	13462	20963	21668	18311	19850	21382
Screenings	937	1496	3117	1106	2103	4414
Total Under Subsidy	47846	74999	93328	68703	67385	84131
Total Grain Fed	426571	398701	366718	412807	391549	425794
Total Feed Disappearance	1525033	1558905	1543744	1606654	1270179	1528281
Under Subsidy	47846	74999	93328	68754	67385	84131
% Under Subsidy (All Feeds)	3.14	4.81	6.05	4.28	5.31	5.50
% Under Subsidy (Grain)	11.22	18.81	25.45	16.64	17.21	19.76

SOURCES OF FEED, PRINCE EDWARD ISLAND (continued)
(thousand therms digestible energy)

	1959	1960	1961	1962
Locally Produced Grain				
Wheat	11616	11232	10752	12480
Oats	175966	194524	197713	212274
Barley	3797	3276	2308	14293
Mixed Grain	138318	150255	141046	144620
Corn and Other Grain	None			
Millfeeds	Assumed zero			
Ground Feeds	Assumed zero			
Total Local Grains	329697	359287	351819	383667
Locally Produced Forage				
Fodder Corn	None			
Tame Hay	585948	675793	646496	582042
Pasture	349761	343144	336528	329911
Total Forage	935709	1018937	983024	911953
Imports of Corn	Assumed zero			
Total Feed Not Under Subsidy	1265406	1378224	1334843	1295620
Subsidy Movement of Grain				
Wheat	20368	20244	12704	9632
Oats	9981	7231	3370	5649
Barley	32584	32199	22968	16859
Rye	-	-	-	-
Corn	None under subsidy			
Millfeeds	25243	28055	26150	22101
Screenings	3361	2882	2468	2592
Total Under Subsidy	91537	90611	67660	56833
Total Grain Fed	421234	449898	419479	440500
Total Feed Disappearance	1356943	1468835	1402503	1352453
Under Subsidy	91537	90611	67660	56833
% Under Subsidy (All Feeds)	6.75	6.17	4.82	4.20
% Under Subsidy (Grain)	21.73	20.14	16.13	12.90

NOVA SCOTIA: SOURCES OF FEED BY CROP YEAR 1941-1963
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grains						
Wheat	3168	4224	2112	2496	1536	1536
Oats	104971	107350	84414	105684	80940	100545
Barley	21144	20698	14593	15411	10795	11539
Mixed Grains	8602	8784	8239	8966	6180	6180
Corn and Other Grains	None					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	137885	141056	109358	132557	99451	119800
Locally Produced Forage						
Fodder Corn	None					
Tame Hay	1292992	1343774	1533231	1269554	1521512	1140645
Pasture	1107707	1079313	1050918	1022521	994127	965732
Total Forage	2400699	2423087	2584149	2292075	2515639	2106377
Imports of Corn	Assumed zero					
Total Feed Not Under Subsidy	2538584	2564143	2693507	2424632	2615090	2226177
Subsidy Movement of Grain						
Wheat	41088	94004	138996	108532	101428	94234
Oats	39869	64729	92723	91903	119672	143010
Barley	51685	95883	124183	104962	117566	141027
Rye	1024	1665	136	06	-	-
Corn	None under subsidy					
Millfeeds	91055	148136	156339	168381	167985	175640
Screenings	1491	1989	1118	1706	3035	5793
Total Under Subsidy	2286212	406406	513495	475490	509686	559704
Total Grain Fed	364097	547462	622853	608047	609137	679504
Total Feed Disappearance	2764796	2970549	3207002	2900122	3124776	2785881
Under Subsidy	226212	406406	513495	475490	509686	559704
% Under Subsidy (All Feeds)	8.18	13.68	16.01	16.40	16.31	20.09
% Under Subsidy (Grain)	62.12	74.23	82.44	78.20	83.67	82.37

SOURCES OF FEED, NOVA SCOTIA (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grains						
Wheat	2016	1920	2688	2304	2496	576
Oats	82463	106255	110015	117248	113346	99499
Barley	9009	9977	10274	10795	10721	6402
Mixed Grains	5635	8483	10663	14420	19024	22538
Corn and Other Grains	None					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	99123	126635	133640	144767	145587	129015
Locally Produced Forage						
Fodder Corn	None					
Tame Hay	1357446	1519558	1283226	1289086	1347680	1603544
Pasture	937338	908944	880547	852152	823758	791285
Total Forage	2294784	2428502	2163773	2141238	2171438	2394829
Imports of Corn	Assumed zero					
Total Feed Not Under Subsidy	2393907	2555137	2297413	2286005	2317025	2523844
Subsidy Movement of Grain						
Wheat	79200	33568	31492	68266	81068	81348
Oats	122019	111269	108034	93741	103725	115369
Barley	116259	117566	82438	76657	88920	71936
Rye	–	–	67	30	–	–
Corn	None Under Subsidy					
Millfeeds	157019	126475	126558	125687	114109	108405
Screenings	3098	5435	11860	11589	8644	9907
Total Under Subsidy	477595	394313	360449	375970	396466	386965
Total Grain Fed	576718	520948	494089	520737	542053	515980
Total Feed Disappearance	2871502	2949450	2657862	2661975	2713491	2910809
Under Subsidy	477595	394313	360449	375970	396466	386965
% Under Subsidy (All Feeds)	16.63	13.37	13.56	14.12	14.61	13.29
% Under Subsidy (Grain)	82.81	75.69	72.95	72.20	73.14	75.00

SOURCES OF FEED, NOVA SCOTIA (continued)
(thousand therms digestible energy

	1953	1954	1955	1956	1957
Locally Produced Grains					
Wheat	2784	2208	1536	1248	1440
Oats	93456	87364	79990	87984	82655
Barley	7966	4616	4616	3500	2605
Mixed Grains	24235	24478	24174	25932	24840
Corn and Other Grains	None				
Millfeeds	Assumed zero				
Ground Feeds	Assumed zero				
Total Local Grains	123441	113666	110316	118664	111540
Locally Produced Forage					
Fodder Corn	None				
Tame Hay	1392603	1347680	1410182	1349634	931657
Pasture	758814	726341	693870	661397	628924
Total Forage	2151417	2074021	2004052	2011031	1560581
Imports of Corn	Assumed zero				
Total Feed Not Under Subsidy	2279858	2192687	2214368	2129695	1672121
Subsidy Movement of Grain					
Wheat	70870	81468	91172	109046	105948
Oats	111461	107539	104121	94998	100519
Barley	73300	83367	83965	82962	75460
Rye	609	525	268	-	-
Corn	None Under Subsidy				
Millfeeds	94795	98249	98802	95456	88243
Screenings	8482	9211	11781	10433	8893
Total Under Subsidy	359517	380359	390109	392895	379163
Total Grain Fed	487958	499025	500525	511559	490703
Total Feed Disappearance	2639375	2573046	2604477	2522590	2051284
Under Subsidy	359517	380359	390109	392895	379163
% Under Subsidy (All Feeds)	13.62	14.78	14.98	15.58	18.48
% Under Subsidy (Grain)	81.06	76.21	77.94	76.80	77.27

SOURCES OF FEED, NOVA SCOTIA (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grains					
Wheat	3744	4320	2880	4608	2400
Oats	78418	77754	72946	67427	57625
Barley	4319	3648	2605	2754	1712
Mixed Grains	20841	19207	21448	19691	16661
Corn and Other Grains	None - - -	- - -	- - -	- - -	- - -
Millfeeds	Assumed zero - - -	- - -	- - -	- - -	- - -
Ground Feeds	Assumed zero - - -	- - -	- - -	- - -	- - -
Total Local Grains	107322	104929	99879	94480	78398
Locally Produced Forage					
Fodder Corn	None - - -	- - -	- - -	- - -	- - -
Tame Hay	1216819	1082051	1042987	1000018	908219
Pasture	596453	563980	531510	499037	466564
Total Forage	1813272	1646031	1574497	1499055	1374783
Imports of Corn	Assumed zero - - -	- - -	- - -	- - -	- - -
Total Feed Not Under Subsidy	1920594	1750960	1674376	1593535	1453181
Subsidy Movement of Grain					
Wheat	151802	147040	144554	107636	74980
Oats	87824	79042	67981	55361	68801
Barley	83336	97227	103257	81257	63826
Rye	-	-	-	335	-
Corn	None Under Subsidy - - -	- - -	- - -	- - -	- - -
Millfeeds	88965	97596	103263	106547	93294
Screenings	12932	13247	17545	18721	19421
Total Under Subsidy	424859	434152	446600	369857	320322
Total Grain Fed	532181	539081	546479	464337	398720
Total Feed Disappearance	2345453	2185112	2120976	1963392	1773503
Under Subsidy	424859	434152	446600	369857	320322
% Under Subsidy (All Feeds)	18.11	19.87	21.06	18.84	18.06
% Under Subsidy (Grain)	79.83	80.54	81.72	79.65	80.34

NEW BRUNSWICK: SOURCES OF FEED BY CROP YEARS, 1941-63
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grains						
Wheat	6336	6912	4608	4800	3168	2208
Oats	250149	268708	290264	265426	260810	248151
Barley	31640	35288	34395	30672	23228	19655
Mixed Grains	3333	4787	4787	5816	5392	4848
Corn and Other Grains	None					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	291458	315695	334054	306714	292598	274862
Locally Produced Forage						
Fodder Corn	None					
Tame Hay	1755891	1843783	1746125	1628935	1808626	1195334
Pasture	866334	850241	834144	818051	801957	785863
Total Forage	2622225	2694024	2580269	2446986	2610583	1981197
Imports of Corn	Assumed zero					
Total Feed Not Under Subsidy	2913683	3009719	2914323	2753700	2903181	2256059
Subsidy Movement of Grain						
Wheat	37648	65152	83610	84790	89260	81348
Oats	37264	53286	81960	83355	105750	139715
Barley	23914	56206	98756	100390	111604	129439
Rye	644	2316	50	15	-	-
Corn	None Under Subsidy					
Millfeeds	86506	133175	138902	146682	160938	176668
Screenings	1769	3519	2125	6280	7304	9302
Total Under Subsidy	187745	316654	405403	421512	474856	536472
Total Grain Fed	479203	629349	739457	728226	767454	811334
Total Feed Disappearance	3101428	3323373	3319726	3175212	3378037	2792531
Under Subsidy	187745	313654	405403	421512	474856	536472
% Under Subsidy (All Feed)	6.05	9.44	12.21	13.28	14.06	19.21
% Under Subsidy (Grain)	39.18	49.84	54.82	57.88	61.87	66.12

SOURCES OF FEED, NEW BRUNSWICK (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grains						
Wheat	3072	5184	5376	5952	6624	4704
Oats	247534	264378	273656	304920	285030	200235
Barley	19952	20398	21441	30151	32905	16379
Mixed Grains	4787	4909	6543	11573	15025	11087
Corn and Other Grains	None	–	–	–	–	–
Millfeeds	Assumed zero	–	–	–	–	–
Ground Feeds	Assumed zero	–	–	–	–	–
Total Local Grains	275345	294869	307016	352596	339584	232405
Locally Produced Forage						
Fodder Corn	None	–	–	–	–	–
Tame Hay	1460964	1597685	1242210	910173	1550809	1707062
Pasture	769767	753673	737579	721483	705389	681062
Total Forage	2230731	2351358	1979789	1631656	2256198	2388124
Imports of Corn	Assumed zero	–	–	–	–	–
Total Feed Not Under Subsidy	2906076	2646227	2286805	1984252	2595782	2620529
Subsidy Movement of Grain						
Wheat	70630	24388	23484	43940	56252	50156
Oats	114519	65568	61157	52147	61414	77709
Barley	115016	87514	60025	49520	61593	51938
Rye	–	–	69	–	–	–
Corn	None Under Subsidy	–	–	–	–	–
Millfeeds	145357	106307	106349	105113	100881	97745
Screenings	4857	4695	8826	8141	7328	9036
Total Under Subsidy	450379	288472	259910	258861	287468	286584
Total Grain Fed	725724	583341	566926	611457	627052	518989
Total Feed Disappearance	2956455	3114699	2546715	2243113	2883250	2907113
Under Subsidy	450379	288472	259910	258861	287468	286584
% Under Subsidy (All Feed)	15.23	9.26	10.21	11.54	9.97	9.86
% Under Subsidy (Grain)	62.06	49.45	45.85	42.34	45.84	55.22

SOURCES OF FEED, NEW BRUNSWICK (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957
Locally Produced Grains					
Wheat	4800	6048	3840	5184	7008
Oats	277322	207277	170543	262616	245248
Barley	22631	16601	9977	9902	10571
Mixed Grains	15752	12844	8784	13875	16056
Corn and Other Grains	None - - - - - - - - - - - -				
Millfeeds	Assumed zero - - - - - - - - - -				
Ground Feeds	Assumed zero - - - - - - - - - -				
Total Local Grains	320505	242770	193144	291577	278883
Locally Produced Forage					
Fodder Corn	None - - - - - - - - - - - -				
Tame Hay	1328149	1488308	1609404	1480495	1335961
Pasture	656734	632406	608079	583751	559424
Total Forage	1984883	2120714	2217481	2064246	1895385
Imports of Corn	Assumed zero - - - - - - - - - -				
Total Feed Not Under Subsidy	2305388	2363484	2410625	2355823	2174268
Subsidy Movement of Grain					
Wheat	40816	47264	53030	51476	57092
Oats	58319	57337	66765	47733	46272
Barley	44308	54472	54133	47793	49502
Rye	350	365	121	-	-
Corn	None Under Subsidy - - - - - - - - -				
Millfeeds	84618	86402	83734	77506	73667
Screenings	7623	6532	8153	6002	5157
Total Under Subsidy	236034	252372	265936	230510	231690
Total Grain Fed	556539	495142	259080	522087	510573
Total Feed Disappearance	2541422	2615856	2676561	2586333	2405958
Under Subsidy	236034	252372	265936	230510	231690
% Under Subsidy (All Feed)	9.29	9.65	9.94	8.91	9.63
% Under Subsidy (Grain)	42.41	50.97	57.93	44.16	45.38

SOURCES OF FEED, NEW BRUNSWICK (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grains					
Wheat	4992	6144	6624	4416	7200
Oats	219886	170922	211607	185532	198235
Barley	10199	9678	8263	5658	9231
Mixed Grains	14298	14904	17145	14602	17145
Corn and Other Grains	None				
Millfeeds	Assumed zero				
Ground Feeds	Assumed zero				
Total Local Grains	249375	201648	243639	210208	231811
Locally Produced Forage					
Fodder Corn	None				
Tame Hay	1230491	1144552	1123067	1064472	1064472
Pasture	535096	510769	486441	462114	437786
Total Forage	1765587	1655321	1609508	1526586	1502258
Imports of Corn	Assumed zero				
Total Feed Not Under Subsidy	2014962	1856969	1853147	1736794	1734069
Subsidy Movement of Grain					
Wheat	70400	65226	52444	37620	31972
Oats	51883	51429	32412	30576	39480
Barley	58073	62366	64209	50789	40735
Rye	–	–	–	503	121
Corn	None Under Subsidy				
Millfeeds	82872	92880	96480	96901	81767
Screenings	6650	7321	12932	12494	14721
Total Under Subsidy	269878	279222	258477	228883	208796
Total Grain Fed	519253	480870	502116	439091	440607
Total Feed Disappearance	2284840	2136191	2111624	1965677	1942865
Under Subsidy	269878	279222	258477	228883	208796
% Under Subsidy (All Feed)	11.81	13.07	12.24	11.64	10.75
% Under Subsidy (Grain)	51.97	58.07	51.48	52.13	47.39

QUEBEC: SOURCES OF FEED BY CROP YEARS, 1941-63
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grains						
Wheat	29088	31584	24192	34752	15168	16800
Oats	1874436	1939437	1471018	1745912	1367664	1343826
Barley	221483	197659	172198	178825	128051	124329
Mixed Grain	257492	411866	318018	306628	269731	250950
Corn and Other Grain	None					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	2382499	2580546	1985426	2266117	1780614	1735905
Locally Produced Forage						
Fodder Corn	380104	488119	382155	419755	434111	391042
Tame Hay	7775530	10123228	12467020	10775584	12756088	10299013
Pasture	8553374	8432066	8310757	8189449	8068141	7946833
Total Forage	16709008	19043413	21159932	19384788	21258340	18636888
Imports of Corn	Assumed zero					
Total Feed Not Under Subsidy	19091507	21623959	23145358	21650905	23038954	20372793
Subsidy Movement of Grain						
Wheat	334342	585260	804118	796240	816560	767270
Oats	247964	341034	665012	708327	809920	1082820
Barley	287569	506691	1086644	996906	1075056	1337642
Rye	3201	11552	7955	786	97	-
Corn	None Under Subsidy					
Millfeeds	632536	907880	817124	867704	913718	990074
Screenings	48736	41048	27811	59324	44618	66562
Total Under Subsidy	1554348	2391465	3408664	3429287	3659969	4244368
Total Grain Fed	3936847	4975011	5394090	5695404	5440583	5980273
Total Feed Disappearance	20645855	20018424	26554022	25080192	26698923	24617161
Under Subsidy	1554348	2394465	3408664	3429287	3659969	4244368
% Under Subsidy (All Feed)	7.53	9.97	12.84	13.67	13.71	17.24
% Under Subsidy (Grain)	39.48	48.13	63.19	60.21	67.27	70.97

SOURCES OF FEED, QUEBEC (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grains						
Wheat	15840	18720	16512	23328	29088	14016
Oats	1055703	1524931	1396168	1874008	2366404	1712365
Barley	137878	131848	93135	123286	157234	87105
Mixed Grain	192119	324259	266823	404898	468514	407444
Corn and Other Grain	None					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	1401540	1999758	1772638	2425520	3021240	2220930
Locally Produced Forage						
Fodder Corn	328147	410184	505210	618694	499741	483333
Tame Hay	11246295	10681832	8978677	8662265	12845933	13203362
Pasture	7825525	7704217	7582908	7461600	7340292	7244488
Total Forage	19399967	18796233	17066795	16742559	20685966	20931183
Imports of Corn	Assumed zero					
Total Feed Not Under Subsidy	20801507	20795991	18839433	19168279	23707206	23152113
Subsidy Movement of Grain						
Wheat	654652	313004	334548	494676	593664	500364
Oats	989487	802959	918563	638027	743161	843842
Barley	1187923	1032874	761732	654157	842835	632916
Rye	-	-	2711	1145	-	-
Corn	None Under Subsidy					
Millfeeds	863849	712397	752009	777220	736288	723420
Screenings	34219	60142	103588	81849	77873	101538
Total Under Subsidy	3730130	2921376	2873151	2647074	2993821	2802080
Total Grain Fed	5131670	4921134	4645789	5072594	6015061	5023010
Total Feed Disappearance	24531637	23717367	21712584	21815153	26701027	25954193
Under Subsidy	3730130	2921376	2873151	2647074	2993821	2802080
% Under Subsidy (All Feed)	15.09	8.10	13.23	12.13	11.21	10.80
% Under Subsidy (Grain)	72.69	59.36	61.84	52.18	49.77	55.78

SOURCES OF FEED, QUEBEC (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957
Locally Produced Grains					
Wheat	17184	14688	33024	21408	36288
Oats	2025707	1377516	1560287	1802300	2167507
Barley	120457	67971	65292	72662	45412
Mixed Grain	415440	341647	367275	400658	399055
Corn and Other Grain	None				
Millfeeds	Assumed zero				
Ground Feeds	Assumed zero				
Total Local Grains	2578788	1801822	2025878	2297028	2648229
Locally Produced Forage					
Fodder Corn	540759	413602	516832	431377	440948
Tame Hay	11187700	12804917	12736556	11918182	11174028
Pasture	7148683	7052879	6957074	6861272	6765468
Total Forage	18877142	20271398	20210462	19210831	18380444
Imports of Corn	Assumed zero				
Total Feed Not Under Subsidy	21455930	22073220	22236340	21507859	21028673
Subsidy Movement of Grain					
Wheat	460502	497644	666816	622164	638170
Oats	619463	780392	832711	659976	643271
Barley	715616	903221	868226	818127	869095
Rye	7525	8814	19189	121	1726
Corn	None Under Subsidy				
Millfeeds	636059	741938	784654	725929	803961
Screenings	83127	73612	90138	79076	84519
Total Under Subsidy	2622292	3015621	3261734	2905393	3040742
Total Grain Fed	5201080	4817443	5287612	5202421	5688971
Total Feed Disappearance	24078222	25088841	25498074	24413252	24069415
Under Subsidy	2622292	3015621	3261734	2905393	3040742
% Under Subsidy (All Feed)	10.89	12.02	12.79	11.90	12.63
% Under Subsidy (Grain)	50.42	62.60	61.69	55.85	53.45

SOURCES OF FEED, QUEBEC (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grains					
Wheat	27840	38976	25248	30624	22176
Oats	1927303	1899894	2388109	2173980	2240788
Barley	57400	70129	73555	58219	35363
Mixed Grain	304629	262279	248040	239559	234045
Corn and Other Grain	None -				
Millfeeds	Assumed zero -				
Ground Feeds	Assumed zero -				
Total Local Grains	2317172	2271278	2734952	2502382	2532372
Locally Produced Forage					
Fodder Corn	371900	379420	360278	397195	428642
Tame Hay	10972853	11418173	10775584	11902557	12343971
Pasture	6669664	6573859	6478055	6382250	6286446
Total Forage	18014417	18371452	17613917	18682002	19059059
Imports of Corn	Assumed zero -				
Total Feed Not Under Subsidy	20331589	20642730	20348869	21184384	21591431
Subsidy Movement of Grain					
Wheat	764854	645770	584960	445862	423174
Oats	816668	684888	557751	517924	645648
Barley	1103661	1029237	946169	861428	863458
Rye	6145	505	-	7998	3756
Corn	None Under Subsidy - - - - - - - - - - - - - - - - - - -				
Millfeeds	844967	810180	823885	771003	695399
Screenings	91265	61284	77660	69551	81172
Total Under Subsidy	3627560	3231856	2990425	2673766	2712607
Total Grain Fed	5944732	5503134	5725377	5176148	5244979
Total Feed Disappearance	23959149	23874586	23339294	23858150	24304038
Under Subsidy	3627560	3231856	2990425	2673766	2712607
% Under Subsidy (All Feed)	15.14	13.54	12.81	11.21	11.16
% Under Subsidy (Grain)	61.02	58.73	52.23	51.66	51.72

ONTARIO: SOURCES OF FEED BY CROP YEARS, 1941-63
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grain						
Wheat	1104288	1470624	1079328	1259424	1264128	1015008
Oats	2979484	3574811	1729590	2627076	2212095	2776206
Barley	723114	794211	449293	696982	619929	663705
Mixed Grain	2110405	2798304	1044751	2195165	1771970	2252360
Corn and Other Grain	1009170	1213104	622568	984856	912452	934524
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	7926461	9851054	4925530	7763503	6780574	7641803
Locally Produced Forage						
Fodder Corn	2016738	2085786	1969567	2078266	1584678	1808911
Tame Hay	10740427	14625262	14232677	11634974	14472916	11711147
Pasture	12548075	12424315	12300556	12176796	12053038	11929278
Total Forage	25305240	29135363	28502800	25890036	28110632	25449336
Local Feed	33231701	38986417	33428330	23653539	34891206	33091139
Imports of Corn	201720	333920	371103	190121	140979	550365
Total Feed Not Under Subsidy	33433421	39320337	33799433	33843660	35032185	33641504
Subsidy Movement of Grain						
Wheat	714422	817664	1353044	1112134	1150282	1013412
Oats	387268	488288	1466543	980068	1237187	1604118
Barley	383530	525292	1373060	954151	1209417	1161417
Rye	45540	32986	11510	779	108	-
Corn	None Under Subsidy					
Millfeeds	357100	587972	706349	678888	766454	899885
Screenings	90532	56483	78115	97057	87827	84223
Total Under Subsidy	1978392	2508685	4988621	3823077	4451275	4763055
Total Grain Fed	10106573	12693659	10285254	11776701	11372828	12955223
Total Feed Disappearance	35411813	41829022	38788054	37666737	39483460	38404559
% Under Subsidy (All Feed)	5.59	6.00	12.86	10.15	11.27	12.40
% Under Subsidy (Grain)	19.58	19.76	48.50	32.46	39.14	36.77

SOURCES OF FEED, ONTARIO (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grain						
Wheat	1072896	1497312	1191360	1471776	1257888	1024992
Oats	1777602	2746750	2792289	3280884	3711186	3006180
Barley	418249	473638	422939	468576	513916	448699
Mixed Grains	2351836	2405584	2152271	2735476	2910026	2682098
Corn and Other Grain	577438	1079152	1167436	1193456	1371190	1796284
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	5098021	8202436	7726295	9150168	9764206	8958253
Locally Produced Forage						
Fodder Corn	1704998	2204055	2235503	2501439	1927865	2052287
Tame Hay	12861559	12582257	8216944	10177917	14369398	12025606
Pasture	11805517	11681759	11557999	11434241	11310480	11163181
Total Forage	26372074	26468071	22010446	24113597	27607743	25241074
Local Feed	31470095	34670507	29736741	33263765	37371949	34199327
Imports of Corn	401448	522594	680221	781708	527478	412194
Total Feed Not Under Subsidy	31871543	35193101	30416962	34045473	37899427	34611521
Subsidy Movement of Grain						
Wheat	889116	362794	305084	458032	627498	520988
Oats	1366744	1055219	1171413	675302	839263	1041240
Barley	1224656	994811	627301	456047	641003	467856
Rye	–	–	705	1161	59	129
Corn	None Under Subsidy					
Millfeeds	760113	575300	539802	495500	451287	425435
Screenings	67840	59004	93003	58092	59704	104244
Total Under Subsidy	4308469	3047128	2737308	2144134	2618114	2559892
Total Grain Fed	9807938	11772158	11143824	12076010	12910498	11930339
Total Feed Disappearance	36180012	38240229	33154270	36189607	40518241	37171413
% Under Subsidy (All Feed)	11.91	7.97	8.26	5.92	6.46	6.89
% Under Subsidy (Grain)	43.93	25.88	24.56	17.76	20.28	21.46

SOURCES OF FEED, ONTARIO (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957
Locally Produced Grain					
Wheat	1195200	1462656	1315104	1121280	1001088
Oats	3109295	2808277	2661955	2544279	3294539
Barley	400308	273671	342014	560965	242253
Mixed Grains	2878883	2756560	2775888	2499311	2399161
Corn and Other Grain	1970162	2146102	3078114	2405124	2552086
Millfeeds	Assumed zero				
Ground Feeds	Assumed zero				
Total Local Grains	9553848	9447266	10173075	9130959	9489127
Locally Produced Forage					
Fodder Corn	1842410	1588096	1738497	1813697	1935385
Tame Hay	14232677	12884997	11670131	12531475	12890856
Pasture	11015884	10868585	10721288	10573989	10426690
Total Forage	27090971	25341678	24129916	24919161	25252931
Local Feed	36644819	34788944	34302991	34050120	34742058
Imports of Corn	575458	270233	197533	833459	664808
Total Feed Not Under Subsidy	37220277	35059177	34500524	34883579	35406866
Subsidy Movement of Grain					
Wheat	459372	451590	722080	842692	867980
Oats	914490	849316	1000576	1039014	865817
Barley	546517	546273	626008	790165	833824
Rye	5507	7780	10341	3532	1289
Corn	None Under Subsidy				
Millfeeds	383985	413496	442004	461954	490725
Screenings	82345	71605	123543	156538	117711
Total Under Subsidy	2392216	2340060	2924552	3293895	3177346
Total Grain Fed	12521522	12057559	13295160	13258313	13331281
Total Feed Disappearance	39612493	37399237	37425076	38177474	38584212
% Under Subsidy (All Feed)	6.04	6.26	7.81	8.63	8.23
% Under Subsidy (Grain)	19.10	19.41	22.00	24.84	23.83

SOURCES OF FEED, ONTARIO (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grain					
Wheat	1203456	786144	832224	982752	875232
Oats	4032143	4261689	3896956	3823105	2307131
Barley	237490	305087	213963	216346	295187
Mixed Grains	2388680	2201528	1893447	2143910	2359536
Corn and Other Grain	2576938	2676616	2255740	2531180	2775578
Millfeeds	Assumed zero				
Ground Feeds	Assumed zero				
Total Local Grains	10438707	10231064	9092330	9697293	8612664
Locally Produced Forage					
Fodder Corn	2092622	2176710	1776097	2253277	2363343
Tame Hay	10824413	12949451	14299084	14996362	12437723
Pasture	10279393	10132094	9984797	9837498	9690199
Total Forage	23196428	25258255	26059978	27087137	24491265
Local Feed	33635135	35489319	35152308	36784430	33103929
Imports of Corn	1006294	912923	1617394	2286455	2352327
Total Feed Not Under Subsidy	34641429	36402242	36769702	39070885	35456256
Subsidy Movement of Grain					
Wheat	969226	780784	730278	398244	336020
Oats	688661	631997	742999	284123	453577
Barley	932679	1014028	1158104	555469	591657
Rye	1604	137	-	1785	1445
Corn	None Under Subsidy				
Millfeeds	463986	478661	510530	429111	375374
Screenings	78815	82188	100372	46979	68319
Total Under Subsidy	3134973	2987795	3242283	1715711	1826392
Total Grain Fed	14579974	14431782	13952007	13699459	12791383
Total Feed Disappearance	37776402	39390037	40011985	40786596	37282648
% Under Subsidy (All Feed)	8.30	7.59	8.10	4.21	4.90
% Under Subsidy (Grain)	21.50	21.14	23.24	12.52	14.28

MANITOBA: SOURCES OF FEED BY CROP YEARS, 1941-63
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grain						
Wheat	531264	608736	591264	593184	392928	640608
Oats	1260364	1771178	1604682	1567233	1483960	1311658
Barley	1414362	1955303	2122586	1703891	1528864	964920
Mixed Grain	12117	21932	21993	21993	22355	23265
Corn and Other Grains	180696	65226	73122	57420	13010	23416
Millfeeds	82872	90158	36392	41762	51777	50659
Ground Feeds	83571	134835	199260	186553	209286	244082
Total Local Grains	3865246	4647368	4649299	4172036	3702180	3258608
Locally Produced Forage						
Fodder Corn	123739	58109	57426	45804	29397	29397
Tame Hay	1968714	1628298	1480991	1357679	1279411	716901
Pasture	3154903	3141895	3128887	3115878	3102870	3089864
Total Forage (no straw)	5247356	4828302	4667304	4519361	4411678	3836162
Grain Crop Aftermath (oats straw 1 T/ac.)	2377800	2615400	2782800	2664000	2876400	2491200
Total Forage (with straw)	7625156	7443702	7450104	7183361	7288148	6327362
Total Feed Not Under Subsidy						
(no straw)	9112602	9475670	9316603	8691397	8113858	7094770
(with straw)	11490402	12091070	12099403	11355397	10990258	9585970

There is no subsidy movement of grain to this province.

SOURCES OF FEED, MANITOBA (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grain						
Wheat	529824	565152	402912	382848	200416	409728
Oats	1131220	1440468	1306186	1297954	1476993	1481630
Barley	1058798	1334705	1238666	941395	1148211	1480398
Mixed Grain	15691	32596	39320	62767	57739	65584
Corn and Other Grains	21892	25840	47820	33914	13010	48000
Millfeeds	58687	44512	15188	25169	25169	25940
Ground Feeds	201838	149687	129666	124653	131335	131817
Total Local Grains	3017950	3592960	3179758	2868700	3052873	3644097
Locally Produced Forage						
Fodder Corn	43069	40335	55375	57426	38284	72456
Tame Hay	1315337	1249557	1101572	1668495	1315458	1348632
Pasture	3076856	3063848	3050839	3037831	3024823	3013341
Total Forage (no straw)	4435262	4353740	4207786	4763752	4378565	4434439
Grain Crop Aftermath (oats straw 1 T/ac.)	2341800	2541600	2889000	2739600	2957400	2899800
Total Forage (with straw)	6777062	6895340	7096786	7503352	7335965	7334239
Total Feed Not Under Subsidy						
(no straw)	7453212	7946700	7387544	7632452	7431438	8078536
(with straw)	9795012	10488300	10276544	10372052	10388838	10978336

There is no subsidy movement of grain to this province.

SOURCES OF FEED, MANITOBA (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957
Locally Produced Grain					
Wheat	419040	549408	474912	372480	419040
Oats	1393932	1084681	1389316	1620099	1601636
Barley	1075998	1003783	1328747	729366	1001326
Mixed Grain	60829	52286	63920	129111	104512
Corn and Other Grains	39118	20098	16418	15522	17406
Millfeeds	19028	21794	28600	15971	18639
Ground Feeds	140084	132587	138257	129909	129642
Total Local Grains	3148029	2864637	3440170	3012458	3292201
Locally Produced Forage					
Fodder Corn	62895	51957	64262	66997	61528
Tame Hay	1921150	2308433	2354438	2556939	2564054
Pasture	2992580	2976458	2960336	2944215	2928091
Total Forage (no straw)	4976625	5336848	5379036	5568151	5553673
Grain Crop Aftermath (oats straw 1 T/ac.)	2541600	2718000	2673000	3510000	2700000
Total Forage (with straw)	7518225	8054848	8052036	9078151	8253673
Total Feed Not Under Subsidy					
(no straw)	8124654	8201485	8819206	8580609	8845874
(with straw)	10666254	10919485	11492206	12090609	11545874

There is no subsidy movement of grain to this province.

SOURCES OF FEED, MANITOBA (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grain					
Wheat	717024	465600	577344	437664	844608
Oats	1841651	1740106	1749337	1384700	2085091
Barley	934547	766368	764432	635041	466937
Mixed Grain	183819	231278	222171	153345	279062
Corn and Other Grains	15252	13010	15612	10676	11484
Millfeeds	31534	36702	10964	49703	27878
Ground Feeds	129148	131341	133531	136773	142673
Total Local Grains	3852975	3384505	3473391	2807902	3857733
Locally Produced Forage					
Fodder Corn	75200	99811	97761	85455	177746
Tame Hay	2080439	2986918	3253995	1868122	4295232
Pasture	2911969	2895847	2879726	2863604	2847482
Total Forage (no straw)	5067608	5982576	6231482	4817181	7320460
Grain Crop Aftermath (oats straw 1 T/ac.)	2574000	2556000	2700000	2340000	3229000
Total Forage (with straw)	7641608	8538576	8931482	7157181	10549460
Total Feed Not Under Subsidy					
(no straw)	8920583	9367081	9704873	7625083	11178193
(with straw)	11494583	11923081	12804873	9965083	14407193

There is no subsidy movement of grain to this province.

SASKATCHEWAN: SOURCES OF FEED BY CROP YEARS, 1941-63
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grain						
Wheat	1462560	2395872	1482432	1335936	838176	1040064
Oats	2448825	5315202	5455386	4548621	2622460	2223752
Barley	1139129	2483734	3039043	2420081	1381085	1049866
Mixed Grain	13753	29809	25265	26719	10785	8179
Corn and Other Grain	Assumed zero					
Millfeeds	112595	122492	49444	56738	70349	68828
Ground Feeds	113550	183196	270731	253467	284352	331628
Total Local Grains	5290412	10530305	10322301	8641562	5207207	4722317
Locally Produced Forage						
Fodder Corn	22560	15040	15724	12989	10938	9571
Tame Hay	1224631	1781282	1701202	1617216	1373071	1310570
Pasture	6458973	6423275	6387579	6351882	6316184	6280488
Total Forage (no straw)	7706164	8219597	8104505	7982087	7700193	7606629
Grain Crop Aftermath (oats straw 1 T/ac.)	7246800	8623800	11016000	9349200	9131400	7795800
Total Forage (with straw)	14952964	16843397	19120505	17331287	16831593	15396429
Total Feed Not Under Subsidy						
(no straw)	12996576	18749902	18426806	16623649	12907400	12322946
(with straw)	20243376	27373702	29442806	25972849	22038800	20118746

There is no subsidy movement of grain to this province.

SOURCES OF FEED, SASKATCHEWAN (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grain						
Wheat	1122336	667488	595968	1425104	2262816	1741344
Oats	1845221	1952428	1897040	1970367	3512523	3152500
Barley	1059694	1156848	1016365	1118060	1552613	1314304
Mixed Grain	9027	17026	21023	26415	59556	56225
Corn and Other Grain	Assumed zero					
Millfeeds	79736	60478	20635	34196	34196	35249
Ground Feeds	274234	203375	176176	169364	178441	179097
Total Local Grains	4390248	4057643	3727207	4753506	7600145	6478719
Locally Produced Forage						
Fodder Corn	10938	9571	6153	6836	2051	3418
Tame Hay	1199240	1501980	1267601	1912144	1986364	1943394
Pasture	6244790	6209093	6173395	6137699	6102001	6077562
Total Forage (no straw)	7454968	7720644	7447149	8056679	8090416	8024374
Grain Crop Aftermath (oats straw 1 T/ac.)	7169400	6573600	6085800	6085800	6867000	6051600
Total Forage (with straw)	14624368	14294244	13532949	14142479	14957416	14075974
Total Feed Not Under Subsidy						
(no straw)	11845216	11778287	11174356	12810185	15690561	14503093
(with straw)	19014616	18351887	17260156	18895985	22557561	20554693

There is no subsidy movement of grain to this province.

SOURCES OF FEED, SASKATCHEWAN (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957
Locally Produced Grain					
Wheat	1955520	2421120	1936896	1769280	1638912
Oats	3083267	2806326	3346360	3166347	2298602
Barley	1487620	2267538	2404745	2209766	2268952
Mixed Grain	36230	37745	59920	91728	72643
Corn and Other Grain	Assumed zero				
Millfeeds	25855	29615	38858	21697	25326
Ground Feeds	190329	180143	187846	175816	176141
Total Local Grains	6778821	7742487	7974625	7434634	6480576
Locally Produced Forage					
Fodder Corn	2735	2051	2051	4102	3418
Tame Hay	1810579	2119179	2207071	2085975	1777376
Pasture	6053121	6028682	6004241	5979802	5955361
Total Forage (no straw)	7866435	8149912	8213363	8069879	7736155
Grain Crop Aftermath (oats straw 1 T/ac.)	4897800	5131800	6577200	5475600	3659400
Total Forage (with straw)	12764235	13281712	14790563	13545479	11395555
Total Feed Not Under Subsidy					
(no straw)	14645256	15892399	16187988	15504513	14216731
(with straw)	19543056	21024199	22765188	20980113	17876131

There is no subsidy movement of grain to this province.

SOURCES OF FEED, SASKATCHEWAN (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grain					
Wheat	1629600	1434048	1489920	1089504	933600
Oats	2086282	2187827	2695549	1370853	2642303
Barley	1939967	1919493	2264484	1441090	1120218
Mixed Grain	96272	107723	154072	72339	247434
Corn and Other Grain	Assumed zero	- - -	- - -	- - -	- - -
Millfeeds	42840	49867	14393	67532	37874
Ground Feeds	175471	178450	181427	185830	193848
Total Local Grains	5970432	5877408	6800345	4227148	5175277
Locally Produced Forage					
Fodder Corn	2735	4102	3418	1367	4102
Tame Hay	1710968	2138710	3078180	1355493	3027398
Pasture	5930922	5906481	5882042	5857601	5833162
Total Forage (no straw)	7644625	8049293	8963640	7214461	8864662
Grain Crop Aftermath (oats straw 1 T/ac.)	3744000	3376800	4543200	2685600	4881600
Total Forage (with straw)	11388625	11426093	13506840	9900061	13746262
Total Feed Not Under Subsidy					
(no straw)	13615057	13926701	15763985	11441609	14039939
(with straw)	17359057	17303501	20307185	14127209	18921539

There is no subsidy movement of grain to this province.

ALBERTA: SOURCES OF FEED BY CROP YEARS, 1941-63
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grains						
Wheat	1944576	2704128	1824192	1418208	1111776	992256
Oats	2458676	4788065	4448077	3237344	2234696	2469859
Barley	1716101	3170889	3412323	2519990	1683715	1776850
Mixed Grain	34473	114569	90576	69796	46045	41380
Corn and Other Grain	None recorded					
Millfeeds	122778	133571	53917	61871	76712	75056
Ground Feeds	123820	199766	295218	276391	310071	361624
Total Local Grains	6400424	11110988	10124303	7583600	5463015	5717025
Locally Produced Forage						
Fodder Corn	6836	7520	5469	6836	3418	2051
Tame Hay	1710968	2455122	2679736	2705127	2326214	2943412
Pasture	8931267	7333332	7311863	7290396	7268927	7247460
Total Forage	10649071	9795974	9997068	10002359	9598559	10192923
Grain Crop Aftermath (oats straw 1 T/ac.)	5160600	5911200	6480000	5502600	5605200	4959000
Total Forage (with straw)	15809671	15707174	16477068	15504959	15203759	15151923
Total Feed Not Under Subsidy						
(no straw)	17049495	29906962	20121371	17585959	15061574	15909948
(with straw)	22210095	26818162	26601371	23088559	20666774	20868948

There is no subsidy movement of grain to this province.

SOURCES OF FEED, ALBERTA (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grains						
Wheat	1040928	1702144	679776	866592	1368864	1070880
Oats	2144906	2074767	1688479	2161709	3701765	3632530
Barley	1824348	1956940	1552016	1937509	3545736	3459078
Mixed Grain	16238	57253	33626	77430	177276	160977
Corn and Other Grain	None recorded					
Millfeeds	86945	65948	22500	37287	37285	38435
Ground Feeds	299037	358892	192110	184682	194580	195296
Total Local Grains	5412402	5215944	4168507	5265299	9025506	8557196
Locally Produced Forage						
Fodder Corn	2735	2051	2735	15724	6153	10255
Tame Hay	2921927	3019585	2171914	5675829	4212966	4416095
Pasture	7225993	7204523	7183056	7161587	7140120	7176335
Total Forage	10150655	10226159	9357705	9853140	11359239	11602685
Grain Crop Aftermath (oats straw 1 T/ac.)	4561200	4413600	4264200	4710600	5137200	4656600
Total Forage (with straw)	14711855	14739759	13621905	14563740	16496439	16259285
Total Feed Not Under Subsidy						
(no straw)	15562057	15442103	12526212	15118439	20384745	20159881
(with straw)	20124257	19855703	17790412	19829039	25521945	24816481

There is no subsidy movement of grain to this province.

SOURCES OF FEED, ALBERTA (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957
Locally Produced Grains					
Wheat	1080192	1657536	1853088	1629600	1657536
Oats	3138653	3217120	3558680	3323281	2810942
Barley	3213549	3552956	4029573	4087345	4114517
Mixed Grain	153708	138804	256948	405686	343767
Corn and Other Grain	None recorded				
Millfeeds	28193	32292	42370	23659	27614
Ground Feeds	207545	196437	204837	192468	192073
Total Local Grains	7821840	8795145	9945496	9662039	9146449
Locally Produced Forage					
Fodder Corn	Discontinued				
Tame Hay	5078216	4199294	5191499	4445392	4628989
Pasture	7212551	7248768	7284983	7321198	7357414
Total Forage	12290767	11448062	12476482	11766590	11986403
Grain Crop Aftermath (oats straw 1 T/ac.)	4242600	4237200	4768200	4374000	3780000
Total Forage (with straw)	16533367	15685262	17244682	16140590	15766403
Total Feed Not Under Subsidy					
(no straw)	20112607	20243207	22421978	21428629	21132852
(with straw)	24355207	24480407	27190178	25802629	24912852

There is no subsidy movement of grain to this province.

SOURCES OF FEED, ALBERTA (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grains					
Wheat	1303680	1471296	1285076	1061568	921312
Oats	3240199	3337129	3406362	2865853	3928314
Barley	3935767	3971057	4269742	3269457	3250102
Mixed Grain	402900	523769	559092	618404	757087
Corn and Other Grain	None recorded - - -	- - -	- - -	- - -	- - -
Millfeeds	46717	54378	16241	73638	41299
Ground Feeds	191340	194590	197837	202637	211380
Total Local Grains	9120603	9552219	9734350	8091557	9109494
Locally Produced Forage					
Fodder Corn	Discontinued - - -	- - -	- - -	- - -	- - -
Tame Hay	4882900	5468848	6250112	6193470	7812640
Pasture	7393629	7429846	7466062	7502277	7538492
Total Forage	12276529	12898694	13716174	13695747	15351132
Grain Crop Aftermath (oats straw 1 T/ac.)	4140000	4194000	4176000	4194000	4762800
Total Forage (with straw)	16416529	17092694	17892174	17889747	20113932
Total Feed Not Under Subsidy					
(no straw)	21397132	22450913	23450524	21787304	24460626
(with straw)	25537132	26644913	27626524	25981304	29223426

There is no subsidy movement of grain to this province.

BRITISH COLUMBIA: SOURCES OF FEED BY CROP YEARS, 1941-63
(thousand therms digestible energy)

	1941	1942	1943	1944	1945	1946
Locally Produced Grain						
Wheat	166752	215712	150720	100032	127488	92544
Oats	184722	192620	183152	159075	157217	174349
Barley	37596	56686	65886	51592	39532	37968
Mixed Grain	4240	6302	6786	5755	3635	4909
Corn and Other Grain	Not recorded	–	–	–	–	–
Millfeeds	Assumed zero	–	–	–	–	–
Ground Feeds	Assumed zero	–	–	–	–	–
Total Local Grains	393310	470320	406544	316454	327871	309770
Locally Produced Forage						
Fodder Corn	36233	32131	34182	34866	32131	30764
Tame Hay	1185568	1376978	1115254	1250022	1373071	1386744
Pasture	1365740	1392051	1418362	1444671	1470982	1497293
Total Forage (no straw)	2587541	2801160	2567798	2729559	2876184	2914801
Grain Crop Aftermath (oats straw 1 T/ac.)	168840	151920	150300	156960	163800	168840
Total Forage (with straw)	2756381	2953080	2718098	2886519	3039984	3083641
Total Feed Not Under Subsidy						
(no straw)	2980851	3271480	2974342	3046013	3204055	3224571
(with straw)	3149691	3423400	3124642	3202973	3367855	3393411
Subsidy Movement of Grain						
Wheat	157622	226118	363540	359292	385612	445466
Oats	56211	86787	143896	157185	186807	219548
Barley	29471	64271	101904	90352	92833	124036
Rye	40	-	-	30	-	-
Corn	21540	15598	13376	14492	16530	20516
Millfeeds	67050	127494	186692	179879	203834	224955
Screenings	2512	8298	3894	4690	6740	7923
Total Under Subsidy	334446	528566	813302	805893	892356	1042444
Total Grain Fed	727756	998886	1219846	1122347	1220227	1352214
Total Feed Disappearance	3315297	3800046	3787644	3851906	4096411	4267015
Total Feed Disappearance (with straw)	3484137	3951966	3937944	4008866	4260211	4435855
% Under Subsidy (All feeds/no straw)	10.09	13.91	21.47	20.92	21.78	24.43
% Under Subsidy (Grain)	45.96	52.92	66.73	71.80	73.13	77.09
% Under Subsidy (All Feeds with straw)	9.60	13.37	20.65	20.10	20.95	23.50

SOURCES OF FEED, BRITISH COLUMBIA (continued)
(thousand therms digestible energy)

	1947	1948	1949	1950	1951	1952
Locally Produced Grain						
Wheat	94368	67584	–	41760	46944	24480
Oats	175205	138850	153935	112490	275371	167162
Barley	44594	40872	49359	23674	52114	22484
Mixed Grain	5149	4909	4967	5694	6119	6907
Corn and Other Grain	Not recorded					
Millfeeds	Assumed zero					
Ground Feeds	Assumed zero					
Total Local Grains	319316	252215	208261	183618	380548	221033
Locally Produced Forage						
Fodder Corn	25295	22560	31447	24611	28713	31447
Tame Hay	1335961	1326196	1296898	1187521	1093770	1539090
Pasture	1523604	1549915	1576224	1602535	1628846	1632649
Total Forage (no straw)	2884860	2898671	2904569	2814667	2751329	3203186
Grain Crop Aftermath (oats straw 1 T/ac.)	175680	158760	173880	185400	185400	180000
Total Forage (with straw)	3060540	3057431	3078449	3000067	2936729	3383186
Total Feed Not Under Subsidy						
(no straw)	3204176	3150886	3112830	2998285	3131877	3424219
(with straw)	3379856	3309646	3286710	3183685	3317277	3604219
Subsidy Movement of Grain						
Wheat	403238	260262	223620	246672	272476	246810
Oats	188948	201470	177876	157026	173972	167192
Barley	106779	104210	70717	61472	77438	64211
Rye	–	–	–	–	–	–
Corn	18664	19948	21644	16990	14710	18782
Millfeeds	193480	153443	134651	140947	150273	144720
Screenings	6624	7962	17424	17533	17076	13293
Total Under Subsidy	917733	747297	645932	640640	705945	655008
Total Grain Fed	1237049	999512	854193	824258	1086493	876041
Total Feed Disappearance	4121909	3898183	3758762	3638925	3837822	4079227
Total Feed Disappearance (with straw)	4297589	4056943	3932642	3824325	4023222	4259227
% Under Subsidy (All feeds/no straw)	22.26	19.17	17.18	17.61	18.39	16.06
% Under Subsidy (Grain)	74.19	74.77	75.62	77.72	64.97	74.77
% Under Subsidy (All feeds/with straw)	21.36	18.42	16.42	16.75	17.55	15.38

SOURCES OF FEED, BRITISH COLUMBIA (continued)
(thousand therms digestible energy)

	1953	1954	1955	1956	1957
Locally Produced Grain					
Wheat	12480	9888	41760	13440	60288
Oats	196141	148702	145941	164594	191193
Barley	80256	63578	61717	60749	69089
Mixed Grain	9270	6846	7209	13510	10724
Corn and Other Grain	Not recorded				
Millfeeds	Assumed zero				
Ground Feeds	Assumed zero				
Total Local Grains	298147	229014	256627	252293	331294
Locally Produced Forage					
Fodder Corn	26662	26662	27346	42386	23244
Tame Hay	1507840	1425807	1523465	1277367	1742219
Pasture	1636451	1640254	1644056	1647859	1651659
Total Forage (no straw)	3170953	3092723	3194867	2967612	3417122
Grain Crop Aftermath (oats straw 1 T/ac.)	176400	151920	149400	166500	161460
Total Forage (with straw)	3347353	3244643	3344267	3134112	3578582
Total Feed Not Under Subsidy					
(no straw)	3469100	3321737	3451494	3219905	3748416
(with straw)	3645500	3473657	3600894	3386405	3909816
Subsidy Movement of Grain					
Wheat	247196	265750	256384	281604	266106
Oats	176443	163456	146297	110332	101980
Barley	79015	91964	99323	101721	97379
Rye	-	-	368	15	-
Corn	24190	14784	9913	8500	8514
Millfeeds	140861	143784	124308	112262	110734
Screenings	12717	8412	6994	4874	10815
Total Under Subsidy	680422	688150	643587	619308	595528
Total Grain Fed	978569	917164	900214	871601	926822
Total Feed Disappearance	4149522	4009887	4095081	3839213	4343944
Total Feed Disappearance (with straw)	4325922	4161807	4244481	4005713	4505404
% Under Subsidy (All feeds/no straw)	16.40	17.16	15.72	16.13	13.71
% Under Subsidy (Grain)	69.53	75.03	71.49	71.05	64.25
% Under Subsidy (All feeds/with straw)	15.73	16.53	15.16	15.46	13.22

SOURCES OF FEED, BRITISH COLUMBIA (continued)
(thousand therms digestible energy)

	1958	1959	1960	1961	1962
Locally Produced Grain					
Wheat	52992	80448	48960	14112	22752
Oats	160787	194763	138565	97024	119007
Barley	47498	72065	60377	37000	38713
Mixed Grain	9876	10785	9392	11390	11269
Corn and Other Grain	Not recorded				
Millfeeds	Assumed zero				
Ground Feeds	Assumed zero				
Total Local Grains	271153	358061	257294	159526	191741
Locally Produced Forage					
Fodder Corn	23244	35549	34182	34182	40335
Tame Hay	1433619	1607451	1796907	1724640	1757844
Pasture	1655462	1659264	1663066	1666869	1670671
Total Forage (no straw)	3112325	3302264	3494155	3425691	3468850
Grain Crop Aftermath (oats straw 1 T/ac.)	158760	160740	156060	159300	158580
Total Forage (with straw)	3271085	3463004	3650215	3584991	3624730
Total Feed Not Under Subsidy					
(no straw)	3383478	3660325	3751449	3585217	3660595
(with straw)	3542238	3821065	3807509	3744517	3819175
Subsidy Movement of Grain					
Wheat	279228	270026	242480	200458	188272
Oats	130030	124153	123269	125900	121212
Barley	125035	157144	167374	163636	178941
Rye	15	-	225	116	-
Corn	6014	5790	5251	4050	3562
Millfeeds	129056	133610	126763	132797	96545
Screenings	25291	17516	13041	6435	8523
Total Under Subsidy	694669	708239	678403	633392	597055
Total Grain Fed	965822	1066300	935697	792918	788796
Total Feed Disappearance	4078147	4368564	4429852	4218609	4257646
Total Feed Disappearance (with straw)	4236907	4529304	4585912	4377909	4416226
% Under Subsidy (All Feeds/no straw)	17.03	16.21	15.31	15.01	14.02
% Under Subsidy (Grain)	71.93	66.42	72.50	79.88	75.69
% Under Subsidy (All Feeds/with straw)	16.40	15.64	14.79	14.47	13.52

APPENDIX VI

TOTAL FEED CONSUMPTION, CANADA AND PROVINCES, 1941-63
(thousand therms digestible energy)

Province	1941	1942	1943	1944	1945	1446	1947
Prince Edward Island	1463517	1507470	1512501	1718829	1684998	1207980	1206674
Nova Scotia	2764796	2970549	3207002	2900122	3124776	2785881	2871502
New Brunswick	3101428	3323373	3319726	3175212	3378037	2792531	2956455
Quebec	20645855	24018424	26554022	25080192	26698923	24617161	24531637
Ontario	35411813	41829022	38788054	37666737	39483460	38404559	36180012
Manitoba	11490402	12091070	12099403	11355397	10990258	9585970	9795012
Saskatchewan	20243376	27373702	29442806	25972849	22038800	20118746	19014616
Alberta	22210095	26818162	26601371	23088559	20666774	20868948	20124257
British Columbia	3484137	3951966	3937944	4008866	4260211	4435855	4297589
Canada	120815419	143883738	145462829	134966763	132326237	124817631	120977754

TOTAL FEED CONSUMPTION, CANADA AND PROVINCES, 1941-63
(thousand therms digestible energy)

Province	1948	1949	1950	1951	1952	1953	1954
Prince Edward Island	1764953	1673935	1428438	1607993	1606474	1525033	1558905
Nova Scotia	2949450	2657862	2661975	2713491	2910809	2639375	2573046
New Brunswick	3114699	2546715	2243113	2883250	2907113	2541422	2615856
Quebec	23717367	21712584	21815153	26701027	25954193	24078222	25088841
Ontario	38240229	33154270	36189607	40518241	37171413	39612493	37399237
Manitoba	10488300	10276544	10372052	10388838	10978336	10666254	10919485
Saskatchewan	18351887	17260156	18895985	22557561	20554693	19543056	21024199
Alberta	19855703	17790412	19829039	25521945	24816481	24355207	24480407
British Columbia	4056943	3932642	3824325	4023222	4259227	4325922	4161807
Canada	122539531	111005120	117259687	136915568	131158739	129286984	129821783

TOTAL FEED CONSUMPTION, CANADA AND PROVINCES, 1941-63
(thousand therms digestible energy)

	1955	1956	1957	1958	1959	1960	1961	1962
Prince Edward Island	1543744	1606654	1270179	1528281	1356943	1468835	1402503	1352453
Nova Scotia	2604477	2522590	2051284	2345453	2185112	2120976	1963392	1773503
New Brunswick	2676561	2586333	2405958	2284840	2136191	2111624	1965677	1942865
Quebec	25498074	24413252	24069415	23959149	23874586	23339294	23858150	24304038
Ontario	37425076	38177474	38584212	37776402	39390037	40011985	40786596	37282648
Manitoba	11492206	12090609	11545874	11494583	11923081	12404873	9965083	14407193
Saskatchewan	22765188	20980113	17876131	17359057	17303501	20307185	14127209	18921539
Alberta	27190178	25802629	24912852	25537132	26644913	27626524	25981304	29223426
British Columbia	4244481	4005713	4505404	4236907	4529304	4585912	4377909	4416226
Canada	135439985	132185367	127221309	126521804	129343668	133977208	124427823	133623891

APPENDIX VII

DESIGN OF FINAL MATRIX, ONE PROVINCE CASE

(located in the pocket inside the back cover)

APPENDIX VIII

Format of the Matrix

The I.B.M. 7040/7044 Linear Programming System I was available at the University of Saskatchewan at the time the matrix was initially prepared. The IBM 7040 computer had a capacity for a matrix of up to 1023 rows while the number of possible activities was limited only by their ability to be incorporated into one reel of tape. Subsequent and timely additions to the complement of computational equipment made possible the use of version III of the program.[1] The latter version contained additional agenda and this combined with equipment improvements greatly increased computation speed. The data format was therefore modified to allow use of the latter program.

Restrictions and activities are identified in the program by six alphanumeric characters (SHARE format) - the first character being numeric and representing in the present application the respective region being considered. The other five characters were chosen in such a fashion as to represent in abbreviated English particular restrictions or activities.

The following is a list of the regions analyzed and the numbers

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[1]This program is described in detail in 7040/7044 Linear Programming System III, (7040-CO-12X) Users Manual. New York: International Business Machines Corporation, 1966.

assigned in the analysis:

1. Prince Edward Island
2. Nova Scotia
3. New Brunswick
4. Quebec
5. Ontario
6. Manitoba
7. Saskatchewan
8. Alberta
9. British Columbia

0 Dummy (Export and Import)

A representative list of restriction names includes the following:

1	FDGAC	acres devoted to feed grain and forage production
1	THYAC	acres devoted to tame hay
1	WHTLP	volume of wheat production
1	OATLP	volume of oats production
1	BLYLP	volume of barley production
1	MXDLP	volume of mixed grain production
1	CRNLP	volume of corn production
1	MFDLP	volume of production of millfeeds
1	GFDLP	volume of production of ground feeds
1	SCRLP	volume of production of screenings
1	FDCLP	fodder corn production
1	THYLP	tame hay production

1 OTSLP	oats straw production
1 PSTLP	pasture in terms of nutrient produced
1 WHTAV	wheat available for feeding
1 OATAV	oats available for feeding
1 BLYAV	barley available for feeding
1 MXDAV	mixed grain available for feeding
1 CRNAV	corn available for feeding
1 MFDAV	millfeeds available for feeding
1 GFDAV	ground feeds available for feeding
1 SCRAV	screenings available for feeding
1 RYEAV	rye available for feeding
1 THYAV	tame hay available for feeding
1 CONAV	concentrates available (a composite of grains used for cattle)
1 RGEAV	roughage available (a composite of roughage used for cattle)
1 GNAUS	grain used by animals outside the study
1 RNAUS	roughage used by animals outside the study
1 BHCAT	size of basic herd (cattle)
1 CAN02	number of cattle in the 0-2--# live weight range
1 CAN24	number of cattle in the 200-400# live weight range
1 CAN46	number of cattle in the 400-600# live weight range
1 CAN80	number of cattle in the 800-1000# live weight range
1 CANFA	number of finished animals (1000# live weight)
1 CACPS	capacity of cattle slaughtering facilities

1 CABFO output of beef

1 CABFD demand for beef (consumption)

1 CAVLO output of veal

1 CAVLD demand for veal (consumption)

1 BHHGS size of basic herd (hogs)

1 PIGO2 number of shoats in 0-200# weight range

1 HGSFA number of finished hogs (200# live weight)

1 HGCPS capacity of hog slaughtering facilities

1 PORKO output of pork

1 PORKD demand for pork (consumption)

1 THARN size of basic herd (hens and roosters)

1 SETEG production of eggs

1 CHKSN output of chickens

1 PLYMT output of poultry meat

1 PYMTD demand for poultry meat (consumption)

1 EGGOD demand for eggs (consumption)

1 THAGN size of basic herd (turkey hens and gobblers)

1 TSTEG output of turkey eggs

1 TKPLT output of turkey poults

1 TKYOP output of turkey

1 TKYOD demand for turkey meat (consumption)

A representative list of production activities includes:

1 OATAC conversion of feed acres to oat grain and straw

1 BLYAC conversion of feed acres to barley

1 MXDAC conversion of feed acres to mixed grain

1 TAHYA	conversion of feed acres to tame hay
1 WHTDU	transfer of wheat to an available position
1 OATGD	transfer of oats to an available position
1 BLYDU	transfer of barley to an available position
1 MXDDU	transfer of mixed grain to an available position
1 CRNDU	transfer of corn to an available position
1 MFDDU	transfer of millfeeds to an available position
1 GFDDU	transfer of ground feeds to an available position
1 SCRDU	transfer of screenings to an available position
1 FDRCD	transfer of fodder corn to an available position
1 THYDU	transfer of tame hay to an available position
1 OATSD	transfer of oat straw to an available position
1 PASTD	transfer of pasture to an available position
1 WHTCO	conversion of available wheat into available concentrate
1 OATCO	conversion of available oats into available concentrate
1 BLYCO	conversion of available barley into available concentrate
1 MXDCO	conversion of available mixed grain into available concentrate
1 CRNCO	conversion of available corn into available concentrate
1 MFDCO	conversion of available millfeeds into available concentrate
1 GRDFC	conversion of available ground feeds into available concentrate
1 SCRCO	conversion of available screenings into available concentrate
1 RYECO	conversion of available rye into available concentrate
1 EWHTD	transfer of available wheat outside area of analysis

1 EOATD	transfer of available oats outside area of analysis
1 EBLYD	transfer of available barley outside area of analysis
1 EROUD	transfer of available roughage outside area of analysis
1 CFBH1	feeding basic herd (cattle) - ration 1 (roughage only)
1 CFBH2	feeding basic herd (cattle) - ration 2 (hay and grain in winter)
1 CFBH3	feeding basic herd (cattle) - ration 3 (silage and grain in winter)
1 CF021	feeding 0-200# cattle
1 CF241	feeding 200-400# cattle
1 CF461	feeding 400-600# cattle - 70:30 concentrate-roughage ratio
1 CF462	feeding 400-600# cattle - 50:50 concentrate-roughage ratio
1 CF463	feeding 400-600# cattle - 30:70 concentrate-roughage ratio
1 CF681	feeding 600-800# cattle - 70:30 concentrate-roughage ratio
1 CF682	feeding 600-800# cattle - 50:50 concentrate-roughage ratio
1 CF683	feeding 600-800# cattle - 30:70 concentrate-roughage ratio
1 CF801	feeding 800-1000# cattle - 70:30 concentrate-roughage ratio
1 CF802	feeding 800-1000# cattle - 50:50 concentrate-roughage ratio
1 CF803	feeding 800-1000# cattle - 30:70 concentrate-roughage ratio
1 CSLA2	cattle slaughter 200# live weight
1 CSLA4	cattle slaughter 400# live weight
1 CSLA6	cattle slaughter 600# live weight
1 CSLA8	cattle slaughter 800# live weight
1 CSLA0	cattle slaughter 1000# live weight
1 CABFC	beef consumption
1 CAVLC	veal consumption

1	HGBH1	feeding basic hog herd - wheat emphasis ration
1	HFBH2	feeding basic hog herd - barley emphasis ration
1	HFBH3	feeding basic hog herd - corn emphasis ration
1	HFBH4	feeding basic hog herd - mixed grain emphasis ration
1	HFO21	feeding 0-200# shoats - wheat emphasis ration
1	HFO22	feeding 0-200# shoats - barley emphasis ration
1	HFO23	feeding 0-200# shoats - corn emphasis ration
1	HFO24	feeding 0-200# shoats - mixed grain emphasis ration
1	HGSLA	hog slaughter 200# live weight
1	PORKC	pork consumption
1	HRFA1	feeding basic poultry herd - wheat emphasis ration
1	HRFA2	feeding basic poultry herd - wheat and oats emphasis ration
1	HRFA3	feeding basic poultry herd - oats emphasis ration
1	BROFA	feeding broilers
1	CAPFA	feeding capons
1	EGGDU	egg consumption
1	EGGHA	egg hatching
1	PYMTC	poultry meat consumption
1	TFBHA	feeding turkey basic herd
1	TYKHA	turkey egg hatching
1	TKBFA	feeding broiler turkeys
1	TKMFA	feeding turkeys to maturity
1	TKMTC	turkey meat consumption
1	EWHET	receiving wheat under subsidy

1 EBALY receiving barley under subsidy

1 ESCRE receiving screenings under subsidy

1 EOATS receiving oats under subsidy

1 EMFDS receiving millfeeds under subsidy

1 EXRYE receiving rye under subsidy

A representative list of transportation activities includes:

12 THAY transporting hay from P.E.I. to Nova Scotia

12 CA24 transporting 200# cattle from P.E.I. to Nova Scotia

12 CA46 transporting 400# cattle from P.E.I. to Nova Scotia

12 CA68 transporting 600# cattle from P.E.I. to Nova Scotia

12 CA80 transporting 800# cattle from P.E.I. to Nova Scotia

12 CAFA transporting 1000# cattle from P.E.I. to Nova Scotia

12 CABF transporting beef from P.E.I. to Nova Scotia

12 CAVL transporting veal from P.E.I. to Nova Scotia

12 HGFA transporting finished hogs from P.E.I. to Nova Scotia

12 PORK transporting pork from P.E.I. to Nova Scotia

12 EGGS transporting eggs from P.E.I. to Nova Scotia

12 PYMT transporting poultry meat from P.E.I. to Nova Scotia

12 TKMT transporting turkey meat from P.E.I. to Nova Scotia

There are 13 X 10 X 9 = 1170 transportation activities exclusive of movements under subsidy. The first digit of the name refers to the region of origin and the second the region receiving the shipment, i.e. 89 PORK refers to movement of pork from Alberta to British Columbia.

The units of measurement vary according to the particular resource involved. Acres are measured in thousands of acres, animals in thousands of animals, feeds in thousands of therms, eggs in thousands of dozens and the respective meats in thousand pounds. The restriction rows were further coded by .001 and the objective rows by 0.1 to accommodate the respective data within the SHARE format. These codes should therefore be borne in mind during the interpretation of the print-out.

TABLE I

EFFECT OF THE RESOURCE RESTRICTIONS IMPOSED BY RIGHT HAND SIDE ONE IN COMBINATION WITH ALTERNATIVE COST SITUATIONS UPON THE LEVEL OF ACTIVITIES AT OPTIMALITY

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
1OATAC				
1BLYAC				
1MXDAC				
1TAHYA				
1WHTDU	1.24800000	1.24800000	1.24800000	1.24800000
1OATGD	18.61966694	21.22740000	18.61966694	18.61966694
1BLYDU	1.42930000	1.42930000	1.42930000	1.42930000
1MXDGD	14.46200000	14.46200000	14.46200000	14.46200000
1THYDU	28.77400725	29.83569047	28.77400725	28.77400725
1PASTD	28.77400725	29.83569047	28.77400725	28.77400725
1OATCD	2.45223380	5.05996686	2.45223380	2.45223380
1BLYCD				
1MXDCD	9.19019102	9.19019102	9.19019102	9.19019102
1TAHAR	28.77400725	29.83569047	28.77400725	28.77400725
1EOATD	10.27350000	10.27350000	10.27350000	10.27350000
1EBLYD				
1EROUD	5.17580000	5.17580000	5.17580000	5.17580000
1CFBH1	.00439800	.00439800	.00439800	.00439800
1CFO21	.00327576	.00327576	.00327576	.00327576
1CF241	.00325938	.00325938	.00325938	.00325938
1CF461	.00324309	.00405667	.00324309	.00324309
1CF682	.00322687	.00403639	.00322687	.00322687
1CF802	.00321074	.00401620	.00321074	.00321074
1CSLA4				
1CSLAO	.00296000	.00296000	.00296000	.00296000
1CABFC	.76147500	.76147500	.76147500	.76147500
1CAVLC	.07029000	.07029000	.07029000	.07029000
1HFBH2				
1HFBH4	.00060700	.00060700	.00060700	.00060700
1HFO21	.00030208	.00030208	.00030208	.00030208
1HFO24	.00266972	.00266972	.00266972	.00266972

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
1PORKC	.53569500	.53569500	.53569500	.53569500
1HRFA3	.02725000	.02725000	.02725000	.02725000
1EGGDU	2.81272509	2.81272509	2.81272509	2.81272509
1EGGHA	.12714796	.12714796	.12714796	.12714796
1BROFA	.08900357	.08900357	.08900357	.08900357
1PYMTC	.24921000	.24921000	.24921000	.24921000
1TFBHA	.00014800	.00014800	.0014800	.00014800
1TKYHA	.00538128	.00538128	.00538128	
1TKMFA	.00322877	.00322877	.00322877	.00322877
1TKMTC	.08520000	.08520000	.08520000	.08520000
2BLYAC				
2MXDAC				
2TAHYA				
2WHTDU	.24000000	.24000000	.24000000	.24000000
2OATGD	5.76250000	5.76250000	5.76250000	5.76250000
2BLYDU	.17120000	.17120000	.17120000	.17120000
2MXDGD	1.66610000	1.66610000	1.66610000	1.66610000
2THYDU	33.37173036	33.37173036	33.37173036	33.37173036
2PASTD	46.65640000	46.65640000	46.65640000	46.65640000
2BLYCO				
2CRNCO				
2SCRCO	19.98359000	9.66880521	19.98359000	1.82522001
2TAHAR	33.37173036	33.37173036	33.37173036	33.37173036
2EWHTO		16.64350111		
2EOATD	16.70120000	.00000329	16.70120000	16.70120000
2EBLYD		.05769889		
2EROUD	8.30270000	8.30270000	8.30270000	8.30270000
2CFBH1	.00568599	.00654718	.00568599	.00654718
2CF021	.00423510	.00487654	.00423510	.00487654
2CF241	.00421392	.00485215	.00421392	.00485215
2CF461	.00573145	.00243714	.00573145	.00243714
2CF682	.00570279	.00242495	.00570279	.00242495

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
2CF802	.0056728	.00241283	.0056728	.00241283
2CSLA4		.00239075		.00239075
2CSLAD	.00564591	.00240077	.00564591	.00240077
2CABFC	5.37680000	5.37680000	5.37680000	5.37680000
2CAVLC	.49632000	.49632000	.49632000	.49632000
2HFBH1	.00006334	.00014226	.00006334	.00006334
2HFBH2				
2HFBH4	.00051066	.00226191	.00051066	.00051066
2HFO21	.00912660		.00912660	.00912660
2HFO24		.00226191		
2HGSLA	.01792645	.01119906	.01792645	.01792645
2PORKC	3.78256	3.78256	3.78256	3.78256
2HRFA1	.10940000	.06165586	.10940000	.10940000
2HRFA3		.04774414		.00049400
2EGGDU	19.86074430	19.86074430	19.86074430	19.86074430
2EGGHA	.89779592	.89779592	.89779592	.89779592
2BROFA	.62845714	.62845714	.62845714	.62845714
2PYMTC	1.75968000	1.75968000	1.75968000	1.75968000
2TFBHA	.00074000	.00074000	.00074000	.00074000
2TKYHA	.02690640	.02690640	.02690640	.02690640
2TKMFA	.01614384	.01614384	.01614384	.01614384
2TKMTC	.08520000	.08520000	.08520000	.08520000
2OATAC				
3BLYAC				
3MXDAC				
3TAHYA				
3WHTDU	.72000000	.72000000	.72000000	.72000000
3OATDG	19.82350000	19.82350000	19.82350000	19.82350000
3BLYDU	.92310000	.92310000	.92310000	.92310000
3MXDGD	1.71450000	1.71450000	1.71450000	1.71450000
3THYDU	43.77860000	43.77860000	43.77860000	43.77860000

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3PASTD	43.77860000	43.77860000	43.77860000	43.77860000
3BLYCO				
3MXDCO	1.71450000	1.71450000	1.71450000	
3CRNCO	5.29313884	5.29313884	5.29313884	
3RYECO	.54153000	.54153000	.54153000	.54153000
3SCRCO				12.14000480
3TAHAR	43.77860000	43.77860000	43.77860000	43.77860000
3EWHTD		1.80807750		
3EOATD	15.52670000	13.71862250	15.52670000	15.64963388
3EBLYD	.92310000	.92310000	.92310000	.80016612
3EROUD	7.57270000	7.57270000	7.57270000	7.57270000
3CFBH1	.00757100	.00757100	.00757100	.00714250
3CFO21	.00563911	.00563911	.00563911	.00531994
3CF241	.00561091	.00561091	.00561091	.00529335
3CF461	.00168523	.00168523	.00168523	.00332439
3CF682	.00167680	.00167680	.00167680	.00330777
3CF802	.00166842	.00166842	.00166842	.00329123
3CSLA4	.00235903	.00308404	.00235903	.00194249
3CSLAO	.00189476	.00269620	.00189476	.00350946
3CABFC	4.36865000	4.36865000	4.36865000	4.36865000
3CAVLC	.40326000	.40326000	.40326000	.40326000
3HFBH2				
3HFBH4				.00015408
3HFO21				
3HFO22				
3HFO24				.00228041
3HGSLA				.00223480
3PORKC	3.07333000	3.07333000	3.07333000	3.07333000
3HRFA1	.01749809		.01749809	.02463103
3HRFA3	.04054191	.05804000	.04054191	.03340897
3EGGDU	16.13685474	16.13685474	16.13685474	16.13685474

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3EGGHA				
3BROFA				
3PYMTC	1.42974000	1.42974000	1.42974000	1.42974000
3TFBHA	.00036200	.00036200	.00036200	.00036200
3TKYHA	.01316232	.01316232	.01316232	.01316232
3TKMFA	.00789739	.00789739	.00789739	.00789739
3TKMTC	.48880000	.48880000	.48880000	.48880000
4BLYAC				
4TAHYA				
4WHTOU	2.21760000	2.21760000	2.21760000	2.21760000
4OATGD	224.07880000	224.07880000	224.07880000	224.07880000
4BLYDU	3.53630000	3.53630000	3.53630000	3.53630000
4MXDGD	14.76947352	19.86227601	14.76947352	13.07767680
4THYDU	449.64802433	449.64802433	449.64802433	449.64802433
4PASTD	628.64460000	628.64460000	628.64460000	628.64460000
4CRNCO	174.41312281	179.49597164	174.41312281	179.59554163
4RYECO				
4SCRCO				
4TAHAR	449.64802433	449.64802433	449.64802433	449.64802433
4EOATD	208.39974070	191.95225999	208.39974070	185.73088480
4EBLYD	59.25165930	75.69914001	59.25165930	81.92051520
4EROUD	62.72060000	62.72060000	62.72060000	62.72060000
4CFBH1	.08957076	.08914638	.08957076	.08913807
4CF021	.06671499	.06639890	.06671499	.06639271
4CF241	.06638141	.06606691	.06338141	.06606075
4CF461	.04648801	.04811136	.04648801	.04814316
4CF682	.04625557	.04787080	.04625557	.04790244
4CF802	.04602429	.04763145	.04602429	.04766293
4CSLA4	.01956149	.01762521	.01956149	.01758728
4CSLAO	.04579417	.04739329	.04579417	.04742462
4CABFC	38.79232500	38.79232500	38.79232500	38.79232500

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
4CAVLC	3.58083000	3.58083000	3.58083000	3.58083000
4HFBH2				
4HFBH4	.00128439	.00172727	.00128439	.00113727
4HFO21				
4HFO22				
4HFO24	.01990806	.02677274	.01990806	.01762765
4HGSLA	.08680162	.08680162	.08680162	.08680162
4PORKC	27.290265	27.290265	27.290265	27.290265
4HRFA1	.35794952	.21666606	.35794952	.13262320
4HRFA3	.06879048	.21007394	.06879048	.29411680
4EGGDU	143.29051621	143.29051621	143.29051621	143.29051621
4EGGHA	1.78752260		1.78752260	1.78657537
4BROFA	1.25126582		1.25126582	1.25060276
4PYMTC	12.69567000	12.69567000	12.69567000	12.69567000
4TKBHA	.01079800	.01079800	.01079800	.01079800
4TKYHA	.39261528	.39261528	.39261528	.39261528
4TKMFA	.23556917	.23556917	.23556917	.23556917
4TKMTC	4.34040000	4.34040000	4.34040000	4.34040000
5OATAC				
5BLYAC				
5MXDAC				
5TAHYA				
5WHTDU	87.52320000	87.52320000	87.52320000	87.52320000
5OATGD	230.71310000	230.71310000	230.71310000	230.71310000
5BLYDU	29.51870000	29.51870000	29.51870000	29.51870000
5MXDGD	234.26361756	235.95360000	234.26361756	234.26361756
5CRNDU	277.55780000	277.55780000	277.55780000	277.55780000
5FDRCD	236.33430000	236.33430000	236.33430000	236.33430000
5THYDU	456.77255811	456.77255811	456.77255811	456.77255811
5PASTD	969.01990000	969.01990000	969.01990000	969.01990000
5BLYCO				
5CRNCO	323.08423836	318.00138952	323.08423836	321.36973836

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
5TAHAR	456.77255811	456.77255811	456.77255811	456.77255811
5EOATD	123.01343983	137.14654935	123.01343983	145.56491369
5EBLYD	130.49486017	116.36175065	130.49486017	107.94338631
5EROUD	73.08140000	73.08140000	73.08140000	73.08140000
5CFBH1	.13595973	.13624300	.13595973	.13610287
5CFO21	.10126688	.10147787	.10126688	.10137350
5CF241	.10076055	.10097048	.10076055	.10086663
5CF461	.08876634	.08768274	.08876634	.08821877
5CF682	.08832251	.08724432	.08832251	.08777768
5CF802	.08788090	.08680810	.08788090	.08733879
5CSLA4	.01149040	.01278289	.01149040	.01214353
5CSLAO	.08744149	.08637406	.08744149	.08690209
5CABFC	45.80647500	45.80647500	45.80647500	45.80647500
5CAVLC	4.22829000	4.22829000	4.22829000	4.22829000
5HFBH4	.02085400	.02085400	.02085400	.02085400
5HFO24	.31281000	.31281000	.31281000	.31281000
5HGSLA	.23926208	.24598947	.23926208	.23702728
5PORKC	32.22469500	32.22469500	32.22469500	32.22469500
5HRFA3	1.03644000	1.03644000	1.03644000	1.03644000
5EGGDU	169.19927972	169.19927972	169.19927972	169.19927972
5EGGHA	10.75694085	14.06530609	10.75694085	10.75694085
5BROFA	7.52985860	9.84571427	7.52985860	7.52985860
5PYMTC	14.99121000	14.99121000	14.99121000	14.99121000
5TFBHA	.00437100	.00437100	.00437100	.00437100
5TKYHA	.15892956	.15892956	.15892956	.15892956
5TKMFA	.09535774	.09535774	.09535774	.09535774
5TKMTC	5.12520000	5.12520000	5.12520000	5.12520000
6OATAC				
6BLYAC				
6TAHYA				
6WHTDU	23.95586999	23.95586999	23.95586999	23.95586999

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
6OATGD	208.50910000	208.50910000	208.50910000	208.50910000
6BLYDU	46.69370000	46.69370000	46.69370000	46.69370000
6CRNDU	1.14840000	1.14840000	1.14840000	1.14840000
6MFDDU	2.78780000	2.78780000	2.78780000	2.78780000
6GFDDU	14.26730000	14.26730000	14.26730000	14.26730000
6OATSD	284.74820000	284.74820000	284.74820000	284.74820000
6PASTD	284.74820000	284.74820000	284.74820000	284.74820000
6OATCO	96.83254136	96.83254136	96.83254136	96.83254136
6BLYCO	18.75283420	18.75283420	18.75283420	18.75283420
6CRNCO	1.14840000	1.14840000	1.14840000	1.14840000
6MFDCO	2.78780000	2.78780000	2.78780000	2.78780000
6GRDFC	14.26730000	14.26730000	14.26730000	14.26730000
6EOATD	53.16770000	53.16770000	53.16770000	53.16770000
6EROUD	31.08870000	31.08870000	31.08870000	31.08870000
6CFBH1	.04403601	.04403601	.04403601	.04403601
6CFO21	.03279934	.03279934	.03279934	.03279934
6CF241	.03263535	.03263535	.03263535	.03263535
6CF461	.03784347	.03784347	.03784347	.03784347
6CF682	.03765426	.03765426	.03765426	.03765426
6CF802	.03746599	.03746599	.03746599	.03746599
6CSLA4	.01187665	.00940467	.01187665	.01122352
6CSLAO	.03793627	.04037135	.03793627	.03857965
6CABFC	6.74602500	6.74602500	6.74602500	6.74602500
6CAVLC	.62271000	.62271000	.62271000	.62271000
6HFBH2	.00368300	.00368300	.00368300	.00368300
6HFO22	.05450840	.05450840	.05450840	.05450840
6HGSLA	.05341823	.05341823	.05341823	.05341823
6PORKC	4.74580500	4.74580500	4.74580500	4.74580500
6HRFA3	.23822000	.23822000	.23822000	.23822000
6EGGDU	24.91836735	24.91836735	24.91836735	24.91836735
6EGGHA	1.12642347	1.12642347	1.12642347	1.12642347

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
6BROFA	.78849643	.78849643	.78849643	.78849643
6PYMTC	2.20779000	2.20779000	2.20779000	2.20779000
6TFBHA	.01088400	.01088400	.01088400	.01088400
6TKYHA	.39574224	.39574224	.39574224	.39574224
6TKMFA	.23744534	.23744534	.23744534	.23744534
6TKMTC	.75480000	.75480000	.75480000	.75480000
6OATAC				
7BLYAC				
7WHTDU	20.40511856	20.40511856	20.40511856	20.40511856
7OATGD	212.62263703	220.54593615	212.62263703	214.71607105
7BLYDU	27.13903566	27.13903566	27.13903566	27.13903566
7MFDDU	3.78740000	3.78740000	3.78740000	3.78740000
7GFDDU	19.38480000	19.38480000	19.38480000	19.38480000
7THYDU	55.69491137	58.92071458	55.69491137	56.54720864
7OATSD	488.16000000	488.16000000	488.16000000	488.16000000
7PASTD	543.85491137	547.08071458	543.85491137	544.70720864
7OATCO	90.55824792	98.48154703	90.55824792	92.65168194
7MFDCO	3.78740000	3.78740000	3.78740000	3.78740000
7GRDCO	19.38480000	19.38480000	19.38480000	19.38480000
7TAHAR	55.69491137	58.92071458	55.69491137	56.54720864
7EOATD	68.94850000	68.94850000	68.94850000	68.94850000
7EBLYD				
7EROUD	65.99380000	65.99380000	65.99380000	65.99380000
7CFBH1	.09618700	.09618700	.09618700	.09618700
7CF021	.07164296	.07164296	.07164296	.07164296
7CF241	.06769175	.06769175	.06769175	.06769175
7CF461	.03706534	.03953732	.03706534	.03771846
7CF682	.02384001	.02629963	.02384001	.02448987
7CF802	.02043981	.02288713	.02043981	.02108642
7CSLA4				
7CSLAO	.01968000	.01968000	.01968000	.01968000

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
7CABFC	6.66737500	6.66737500	6.66737500	6.66737500
7CAVLC	.61545000	.61545000	.61545000	.61545000
7HFBH1				
7HFBH2	.00373700	.00373700	.00373700	.00373700
7HFO22	.05157060	.05157060	.05157060	.05157060
7HGSLA	.05053919	.05053919	.05053919	.05053919
7PORKC	4.69047500	4.69047500	4.69047500	4.69047500
7HRFA3	.20591000	.20591000	.20591000	.20591000
7EGGDU	24.62785114	24.62785114	24.62785114	24.62785114
7EGGHA	1.11329082	1.11329082	1.11329082	1.11329082
7BROFA	.77930357	.77930357	.77930357	.77930357
7PYMTC	2.18205000	2.18205000	2.18205000	2.18205000
7TFBHA	.00845100	.00845100	.00845100	.00845100
7TKYHA	.30727836	.30727836	.30727836	.30727836
7TKMFA	.18436702	.18436702	.18436702	.18436702
7TKMTC	.74600000	.74600000	.74600000	.74600000
8OATAC				
8BLYAC				
8TAHYA				
8WHTDU	56.68236621	45.18479582	56.68236621	56.68952725
8OATGD	366.77733579	364.87110598	366.77733579	366.39840177
8BLYDU	83.20259509	83.20259509	83.20259509	83.20259509
8MFDDU	4.12990000	4.12990000	4.12990000	4.12990000
8GFDDU	2.11380000	2.11380000	2.11380000	2.11380000
8THYDU	12.89389503	8.60640861	12.89389503	12.04159777
8OATSD	476.28000000	476.28000000	476.28000000	476.28000000
8PASTD	489.17389503	484.88640861	489.17389503	488.32159777
8OATCO	157.19344763	155.28721782	157.19344763	156.81451361
8MFDCO	4.12990000	4.12990000	4.12990000	4.12990000
8GRFDC	2.11380000	2.11380000	2.11380000	2.11380000
8TAHAR	12.89389503	8.60640861	12.89389503	12.04159777

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
8EOATD	92.09500000	92.09500000	92.09500000	92.09500000
8EROUD	92.86380000	92.86380000	92.86380000	92.86380000
8CFBH1	.07714845	.07642836	.07714845	.07700530
8CF021	.05746248	.05692613	.05746248	.05735586
8CF241	.05717517	.056664150	.05717517	.05706908
8CF461	.04416299	.04363200	.04416299	.04405744
8CF682	.04394218	.04341384	.04394218	.04383715
8CF802	.04372246	.04319677	.04372246	.04361796
8CSLA4	.01272630	.01272630	.01272630	.01272630
8CSLAO	.04350385	.04298078	.04350385	.04339987
8CABFC	9.94565000	9.94565000	9.94565000	9.94565000
8CAVLC	.91806000	.91806000	.91806000	.91806000
8HFBH2	.01115800	.01115800	.01115800	.01115800
8HF022	.16067520	.16067520	.16067520	.16067520
8HGSLA	.15704870	.15704870	.15704870	.15704870
8PORKC	6.99673000	6.99673000	6.99673000	6.99673000
8HRFA3	.23204193	.23204193	.23204193	.23204193
8EGGDU	36.73709484	36.73709484	36.73709484	36.73709484
8EGGHA	5.75762328	4.23678064	5.75762328	5.75857051
8BROFA	4.03033630	2.96574645	4.03033630	4.03099936
8PYMTC	3.25494000	3.25494000	3.25494000	3.25494000
8TFBHA	.00927300	.00927300	.00927300	.00927300
8TKYHA	.33716628	.33716628	.33716628	.33716628
8TKMFA	.20229977	.20229977	.20229977	.20229977
8TKMTC	1.11280000	1.11280000	1.11280000	1.11280000
9OATAC				
9BLYAC				
9TAHYA				
9WHTDU	2.27520000	2.27520000	2.27520000	2.27520000
9OATGD	11.90070000	11.90070000	11.90070000	11.90070000
9BLYDU	3.87130000	3.87130000	3.87130000	3.87130000

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
9OATSD	8.92646880	8.92646880	8.92646880	8.92646880
9PASTD	12.47993120	12.47993120	12.47993120	12.47993120
9BLYCO				
9EOATD	24.04690000	24.04690000	24.04690000	24.04690000
9EBLYD	3.87130000	3.87130000	3.87130000	3.87130000
9EROUD	21.40640000	21.40640000	21.40640000	21.40640000
9CABFC	12.00842500	12.00842500	12.00842500	12.00842500
9CAVLC	1.10847000	1.10847000	1.10847000	1.10847000
9HFBH2				
9HFO22				
9HGSLA				
9PORKC	8.44788500	8.44788500	8.44788500	8.44788500
9HRFA3	.21824711	.21824711	.21824711	.21824711
9EGGDU	44.35654262	44.35654262	44.35654262	44.35654262
9EGGHA				
9BROFA				
9PYMTC	3.93003000	3.93003000	3.93003000	3.93003000
9TFBHA	.00499076	.00499076	.00499076	.00499076
9TKYHA	.18146411	.18146411	.18146411	.18146411
9TKMFA	.10887847	.10887847	.10887847	.10887847
9TKMTC	1.34360000	1.34360000	1.34360000	1.34360000
WHTDU	105.85344000	105.85344000	105.85344000	105.85344000
OATGD	135.24898000	135.24898000	135.24898000	135.24898000
BLYDU	177.02236000	177.02236000	177.02236000	177.02236000
RYEDU	.54153000	.54153000	.54153000	.54153000
SCRDU	19.98359000	9.66880521	19.98359000	19.98359000
ECNDU	259.55610000	259.55610000	259.55610000	259.55610000
CORND	34.32340000	34.32340000	34.32340000	34.32340000

TABLE I (continued)

ACTIVITY Production Movement	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
13 EGGS	2.00518445	2.00518445	2.00518445	2.00518445
14 EGGS				
23 EGGS	1.52405178	1.52405178	1.52405178	1.52405178
53 EGGS	.93362011	.93362011	.93362011	.93362011
54 EGGS	32.30586732	28.99750208	32.30586732	32.30586732
64 EGGS	19.05978398	19.05978398	19.05978398	19.05978398
74 EGGS	10.49901804	10.49901804	10.49901804	10.49901804
84 EGGS	.26364826	1.78449090	.26364826	.26270103
1 EGGS				
3 EGGS	.47460000	.47460000	.47460000	.47460000
51PORK	.53569500	.53569500	.53569500	.53569500
52PORK	.05559190	1.06470083	.05559190	.05559190
53PORK	3.07333	3.07333	3.07333	2.73811041
61PORK				
62PORK				
64PORK	3.26692977	3.26692977	3.26692977	3.26692977
74PORK	2.89040318	2.89040318	2.89040318	2.89040318
84PORK	8.11268942	8.11268942	8.11268942	8.11268942
89PORK	8.44788500	8.44788500	8.44788500	8.44788500
1PORK				
2PORK	1.03800000	1.03800000	1.03800000	1.03800000
12CABF		.73810262		.73810262
13CABF	.77476501	.03666238	.77476501	.03666238
62CABF				
63CABF	1.66437785	2.93265875	1.66437785	2.51057841
64CABF	10.85418009	10.29571082	10.85418009	10.06194492
65CABF	.42433998	.97833717	.42433998	.70428858
74CABF	3.54654500	3.54654500	3.54654500	3.54654500
75CABF				
82CABF				

TABLE I (continued)

ACTIVITY Production Movement	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
84CABF	.62442438	.35295118	.62442438	.57045899
85CABF				
89CABF	12.00842500	12.00842500	12.00842500	12.00842500
2CABF	2.44657428	3.39270000	2.44657428	3.39270000
3CABF	.94612572		.94612572	
31CAVL		.07029000		
32CAVL	.08647431		.08647431	
35CAVL		.16669749		
41CAVL	.07029000		.07029000	.07029000
42CAVL	.40984569		.40984569	
43CAVL				
45CAVL		.07816438		
65CAVL	1.84288202	1.32969918	1.84288202	1.70729274
85CAVL				
86CAVL				
87CAVL	.61545000	.61545000	.61545000	.61545000
89CAVL	1.10847000	1.10847000	1.10847000	1.10847000
21TKMT	.04387177	.04387177	.04387177	.04387177
23TKMT	.07756938	.07756938	.07756938	.07756938
53TKMT				
65TKMT	2.28450040	2.28450040	2.28450040	2.28450040
73TKMT	.19534401	.19534401	.19534401	.19534401
74TKMT	1.32511465	1.32511465	1.32511465	1.32511465
75TKMT	.09343915	.09343915	.09343915	.09343915
83TKMT				
85TKMT	1.47663703	1.47663703	1.47663703	1.47663703
89TKMT				
93TKMT				
95TKMT	.05004440	.05004440	.05004440	.05004440
1TKMT				

TABLE I (continued)

ACTIVITY Production Movement	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
2TKMT				
3TKMT	.11480000	.11480000	.11480000	.11480000
9TKMT				
23PYMT				
51PYMT				
53PYMT	1.00024000	1.00024000	1.00024000	1.00024000
54PYMT	5.09215407	11.57654995	5.09215407	5.09215407
84PYMT	4.09997164	1.11912005	4.09997164	4.10182820
89PYMT	3.93003000	3.93003000	3.93003000	3.93003000
1PYMT				
2PYMT				
3PYMT	.42950000	.42950000	.42950000	.42950000
9PYMT				
70CA24	.00359300	.00359300	.00359300	.00359300
80CA24				
12CA46				
13CA46				
31CA46		.00081358		
32CA46	.00153860		.00153860	
41CA46				
42CA46				
45CA46				
75CA46				
76CA46	.01724795	.01477597	.01724795	.01659482
70CA46	.01304000	.01304000	.01304000	.01304000
80CA46				
70CA68	.01304000	.01304000	.01304000	.01304000
80CA68				
70CA80	.00328100	.00328100	.00328100	.00328100
12CAFA				

TABLE I (continued)

ACTIVITY	COST COMBINATION			
Production Movement	1 COST	2 COST	3 COST	4 COST
13CAFA	.00023468	.00103612	.00023468	.00023468
76CAFA	.00065761	.00309270	.00065761	.00013099
12HGFA	.00898239	.00898239	.00898239	.00898239
13HGFA				
23HGFA				
54HGFA	.06729172	.06056433	.06729172	.06952652
60HGFA				
80HGFA	.00041300	.00041300	.00041300	.00041300
Feed Receipts from Outside Sources				
2EWHET	24.60134179	32.45809958	24.60134179	24.60134179
2EOATS	14.13310952	.00000745	14.13310952	14.13310952
2EBALY	2.66772540	.00000841	2.66772540	2.66772540
2ESCRE	19.98359000	9.66880521	19.98359000	7.84358520
3EWHET	2.12568064	1.60161288	2.12568064	3.07635935
3EXRYE	.54153000	.54153000	.54153000	.54153000
3ESCRE				12.14000480
4EWHET	74.32169192	41.97776064	74.32169192	44.28303840
4EOATS				
4EBALY	56.74011053	73.54094544	56.74011053	79.29158440
4EXRYE				
4ESCRE				
5EWHET		25.01124124		
5EOATS	84.93469533	99.06780485	84.93469533	107.48616920
5EBALY	117.61452407	103.48141456	117.61452407	95.06305021
9EWHET	4.80472565	4.80472565	4.80472565	33.89270046
9EOATS	36.18117515	36.18117515	36.18117515	13.62970128

TABLE I (continued)

ACTIVITY	COST COMBINATION			
Feed Receipts from Outside Sources	1 COST	2 COST	3 COST	4 COST
2EXCRN				1.82522001
3EXCRN	5.29313884	5.29313884	5.29313884	
4EXCRN	174.41312281	179.49597164	174.41312281	179.59554163
5EXCRN	45.52643836	40.44358952	45.52643836	43.81193836
Basic Herd Distribution				
1TBHCA				
2TBHCA				
3TBHCA				
4TBHCA				
5TBHCA				
6TBHCA				
7TBHCA				
8TBHCA				
1TBHHG				
2TBHHG	No Basic Herd Distribution for This Right Hand Side			
4TBHHG				
5TBHHG				
6TBHHG				
7TBHHG				
8TBHHG				
9TBHHG				
1TTHAR				
2TTHAR				
3TTHAR				

TABLE I (continued)

ACTIVITY Basic Herd Distribution	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
4TTHAR				
5TTHAR				
6TTHAR				
7TTHAR				
8TTHAR				
9TTHAR				
1TTHAG				
2TTHAG				
3TTHAG				
4TTHAG				
5TTHAG				
6TTHAG				
7TTHAG				
8TTHAG				
9TTHAG				
Pasture-Forage Balance				
1FORDU	57.54801451	59.67138093	57.54801451	57.54801451
2FORDU	80.02813036	80.02813036	80.02813036	80.02813036
3FORDU	87.55720000	87.55720000	87.55720000	87.55720000
4FORDU	1078.29262433	1078.29262433	1078.29262433	1078.29262433
5FORDU	1662.12675811	1662.12675811	1662.12675811	1662.12675811
6FORDU	569.49640000	569.49640000	569.49640000	569.49640000
7FORDU	1087.70982274	1094.16142916	1087.70982274	1089.41441728
8FORDU	978.34779007	969.77281723	978.34779007	976.64319554
9FORDU	21.40640000	21.40640000	21.40640000	21.40640000

TABLE I

EFFECT OF THE RESOURCE RESTRICTIONS IMPOSED BY RIGHT HAND SIDE TWO IN COMBINATION WITH ALTERNATIVE COST SITUATIONS UPON THE LEVEL OF ACTIVITIES AT OPTIMALITY

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
1OATAC	.00131579	.00351089	.00351089	.00351089
1BLYAC	.01096028	.01249886	.01249886	.01249886
1MXDAC				
1TAHYA	.01015629	.01016061	.01016061	.01016061
1WHTDU	1.24800000	1.24800000	1.24800000	1.24800000
1OATGD	2.99924377	2.94946094	2.94946094	2.94946094
1BLYDU	32.37490413	36.91963546	36.91963546	36.91963546
1MXDGD				
1THYDU	32.97707745	32.99110000	32.99110000	32.99110000
1PASTD	32.97707745	32.99110000	32.99110000	32.99110000
1OATCD				
1BLYCD	21.96611175	22.00055428	22.00055428	22.00055428
1MXDCD				
1TAHAR	32.97707745	32.99110000	32.99110000	32.99110000
1EOATD				
1EBLYD	10.27350000	10.27350000	10.27350000	10.27350000
1EROUD	5.17580000	5.17580000	5.17580000	1.17580000
1CFBH1	.00439800	.00439800	.00439800	.00439800
1CFO21	.00327576	.00327576	.00327576	.00327576
1CF241	.00325938	.00325938	.00325938	.00325938
1CF461	.00646396	.00647470	.00647470	.00647470
1CF682	.00643164	.00644233	.00644233	.00644233
1CF802	.00639948	.00641012	.00641012	.00641012
1CSLA4				
1CSLAO	.00296000	.00296000	.00296000	.00296000
1CABFC	.76147500	.76147500	.76147500	.76147500
1CAVLC	.07029000	.07029000	.07029000	.07029000
1HFBH2	.00002001	.00060700	.00060700	.00060700
1HFBH4				
1HFO21	.00030208	.00030208	.00030208	.00030208
1HFO24		.00886362	.00886362	.00886362

TABLE I (continued)

ACTIVITY Production	1 COST	2 COST	3 COST	4 COST
1PORKC	.53569500	.53569500	.53569500	.53569500
1HRFA3	.02725000	.02725000	.02725000	.02725000
1EGGDU	2.81272509	2.81272509	2.81272509	2.81272509
1EGGHA	.12714796	.12714796	.12714796	.12714796
1BROFA	.08900357	.08900357	.08900357	.08900357
1PYMTC	.24921000	.24921000	.24921000	.24921000
1TFBHA	.00014800	.00014800	.00014800	.00014800
1TKYHA	.00538128	.00538128	.00538128	.00538128
1TKMFA	.00322877	.00322877	.00322877	.00322877
1TKMTC	.08520000	.08520000	.08520000	.08520000
2BLYAC		.01335028		
2MXDAC	.01907666	.00572638	.01907666	.01907666
2TAHYA	.00836334	.00836334	.00836334	.00836334
2WHTDU	.24000000	.24000000	.24000000	.24000000
2OATGD				
2BLYDU				
2MXDGD				
2THYDU	33.37173036	33.37173036	33.37173036	33.37173036
2PASTD	46.45640000	46.65640000	46.65640000	46.65640000
2BLYCO	20.09195578	9.66880521		
2CRNCO				
2SCRCO			19.98359000	9.92680003
2TAHAR	33.37173036	33.37173036	33.37173036	33.37173036
2EWHTO				
2EOATD				
2EBLYD	16.70120000	16.70120000	16.70120000	16.70120000
2EROUD	8.30270000	8.30270000	8.30270000	8.30270000
2CFBH1	.00567694	.00654718	.00568599	.00653399
2CF021	.00422836	.00487654	.00423510	.00486671
2CF241	.00420722	.00485215	.00421392	.00484238
2CF461	.00576606	.00243714	.00573145	.00248760
2CF682	.00573723	.00242495	.00570279	.00247516

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
2CF802	.00570854	.00241283	.00567428	.00246279
2CSLA4	.00239075			.00233056
2CSLAD	.00568000	.00240077	.00564591	.00245047
2CABFC	5.37680000	5.37680000	5.37680000	5.37680000
2CAVLC	.49632000	.49632000	.49632000	.49632000
2HFBH1			.00057400	
2HFBH2	.00057400	.00057400		.00057400
2HFBH4				
2HF021	.00912660	.00912660	.00912660	.00912660
2HF024				
2HGSLA	.00924011	.01792645	.01792645	.01792645
2PORKC	3.78256	3.78256	3.78256	3.78256
2HRFA1				
2HRFA3	.10940000	.10940000	.10940000	.10940000
2EGGDU	19.86074430	19.86074430	19.86074430	19.86074430
2EGGHA	.89779592	.89779592	.89779592	.89779592
2BROFA	.62845714	.62845714	.62845714	.62845714
2PYMTC	1.75968000	1.75968000	1.75968000	1.75968000
2TFBHA	.00074000	.00074000	.00074000	.00074000
2TKYHA	.02690640	.02690640	.02690640	.02690640
2TKMFA	.01614384	.01614384	.01614384	.01614384
2TKMTC	.08520000	.08520000	.08520000	.08520000
3OATAC	.00325698	.00512616	.00325698	.00325698
3BLYAC	.00933294	.01453967	.00936156	.00936156
3MXDAC	.01521335	.00813743	.01518473	.01518473
3TAHYA	.01159673	.01159673	.01159673	.01159673
3WHTDU	.72000000	.72000000	.72000000	.72000000
3OATGD	6.42751101	10.11627988	6.42751101	6.42751101
3BLYDU	24.36568382	37.95900186	24.44040390	24.44040390
3MXDGD				
3THYDU	43.77860000	43.77860000	43.77860000	43.77860000

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3PASTD	43.77860000	43.77860000	43.77860000	43.77860000
3BLYCO	7.54916884	17.78067888		
3MXDCO			7.62388891	7.62388891
3CRNCO				
3RYECO				
3SCRCO				10.15678997
3TAHAR	43.77860000	43.77860000	43.77860000	43.77860000
3EWHTD				
3EOATD				
3EBLYD	16.44980000	16.44980000	16.44980000	16.44980000
3EROUD	7.57270000	7.57270000	7.57270000	7.57270000
3CFBH1	.00757100	.00671676	.00756476	.00671676
3CFO21	.00563911	.00500285	.00563446	.00500285
3CF241	.00561091	.00497783	.00560629	.00497783
3CF461	.00168523	.00495294	.00170909	.00495294
3CF682	.00167680	.00492818	.00170055	.00492818
3CF802	.00166842	.00490354	.00169205	.00490354
3CSLA4	.00194249		.00194249	
3CSLAO	.00506756	.00829709	.00510166	.00829709
3CABFC	4.36865000	4.36865000	4.36865000	4.36865000
3CAVLC	.40326000	.40326000	.40326000	.40326000
3HFBH2	.00005487	.00049800	.00005487	.00005487
3HFBH4				
3HFO21	.00081202	.00081202	.00081202	.00081202
3HFO22		.00655838		
3HFO24				
3HGSLA	.00079578	.00722299	.00079578	.00079578
3PORKC	3.07333000	3.07333000	3.07333000	3.07333000
3HRFA1				
3HRFA3	.05804000	.05804000	.05804000	.05804000
3EGGDU	16.13685474	16.13685474	16.13685474	16.13685474

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3EGGHA				
3BROFA				
3PYMTC	1.42974000	1.42974000	1.42974000	1.42974000
3TFBHA	.00036200	.00036200	.00036200	.00036200
3TKYHA	.01316232	.01316232	.01316232	.01316232
3TKMFA	.00789739	.00789739	.00789739	.00789739
3TKMTC	.48880000	.48880000	.48880000	.48880000
4BLYAC	.13374883	.11802650	.13100562	.13182748
4TAHYA	.33885117	.35457350	.34159438	.34077252
4WHTOU	2.21760000	2.21760000	2.21760000	2.21760000
4OATGD				
4BLYDU	347.18521485	306.37318827	340.06438531	342.19776113
4MXDGD				
4THYDU	449.64802433	449.64802433	449.64802433	449.64802433
4PASTD	628.64460000	628.66460000	628.64460000	628.64460000
4CRNCO	145.32464821	165.47167067	165.31367584	165.31367584
4RYECO	.54153000	.54153000	.54153000	.54153000
4SCRCO	19.98359			
4TAHAR	449.64802433	449.64802433	449.64802433	449.64802433
4EOATD				
4EBLYD	267.65410000	267.65410000	267.65410000	267.65410000
4EROUD	62.72060000	62.72060000	62.72060000	62.72060000
4CFBH1	.09028572	.09027207	.09028526	.09028526
4CF021	.06724751	.06723735	.06724717	.06724717
4CF241	.06691127	.06690116	.06691094	.06691094
4CF461	.04375307	.04380527	.04375481	.04375481
4CF682	.04353430	.04358624	.04353603	.04353603
4CF802	.04331663	.04336831	.04331835	.04331835
4CSLA4	.01997803	.01952977	.01997803	.01958996
4CSLA0	.04310005	.04315147	.04310176	.04310176
4CABFC	38.79232500	38.79232500	38.79232500	38.79232500

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
4CAVLC	3.58083000	3.58083000	3.58083000	3.58083000
4HFBH2	.01140203	.00563798	.01054349	.01057068
4HFBH4				
4HF021	.15665709	.08738863	.16342405	.13192809
4HF022	.02007437			.03191739
4HF024				
4HGSLA	.17319682	.16015557	.16015557	.16056857
4PORKC	27.290265	27.290265	27.290265	27.290265
4HRFA1				
4HRFA3	.42674000	.42674000	.42674000	.42674000
4EGGDU	143.29051621	143.29051621	143.29051621	143.29051621
4EGGHA				
4BROFA				
4PYMTC	12.69567000	12.69567000	12.69567000	12.69567000
4TKBHA	.01079800	.01079800	.01079800	.01079800
4TKYHA	.39261528	.39261528	.39261528	.39261528
4TKMFA	.23556917	.23556917	.23556917	.23556917
4TKMTC	4.34040000	4.34040000	4.34040000	4.34040000
5OATAC	.07194303	.08018179	.07239391	.07239391
5BLYAC	.14456906	.14581495	.14463536	.14463536
5MXDAC	.05633365	.07363539	.05728051	.05728051
5TAHYA	.31890427	.29211787	.31744022	.31744022
5WHTDU	87.52320000	87.52320000	87.52320000	87.52320000
5OATGD	172.84096639	192.63435551	173.92418790	173.92418790
5BLYDU	452.91461941	456.81781816	453.12233426	453.12233426
5MXDGD	179.21986597	234.26361756	182.23221395	182.23221395
5CRNDU				
5FDRCD	236.33430000	236.33430000	236.33430000	236.33430000
5THYDU	244.60871021	244.59701541	244.59701541	244.59701541
5PASTD	672.39754189	672.38119160	672.38119160	672.38119160
5BLYCO	186.67738873	186.67115426	186.67115426	186.67115426
5CRNCO				

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
5TAHAR	244.60871021	244.50830000	244.59701541	244.59701541
5EOATD				
5EBLYD	253.50830000	253.50830000	253.50830000	253.50830000
5EROUD	73.08140000	73.08140000	73.08140000	73.08140000
5CFBH1	.09517956	.09517720	.09517720	.09517720
5CF021	.07089259	.07089084	.07089084	.07089084
5CF241	.07053813	.07053638	.07053638	.07053638
5CF461	.04981795	.04981621	.04981621	.04981621
5CF682	.04956886	.04956713	.04956713	.04956713
5CF802	.04932102	.04931930	.04931930	.04931930
5CSLA4	.02036749	.02036749	.02036749	.02036749
5CSLA0	.04907441	.04907270	.04907270	.04907270
5CABFC	45.80647500	45.80647500	45.80647500	45.80647500
5CAVLC	4.22829000	4.22829000	4.22829000	4.22829000
5HFBH4	.01595404	.02085400	.01622220	.01622220
5HF024	.23931060	.31281000	.24333296	.24333296
5HGSLA	.23452439	.23203909	.23846630	.23846630
5PORKC	32.22469500	32.22469500	32.22469500	32.22469500
5HRFA3	1.03644000	1.03644000	1.03644000	1.03644000
5EGGDU	169.19927972	169.19927972	169.19927972	169.19927972
5EGGHA	14.63628571	14.63628571	14.63628571	14.63628571
5BROFA	10.24540000	10.24540000	10.24540000	10.24540000
5PYMTC	14.99121000	14.99121000	14.99121000	14.99121000
5TFBHA	.00437100	.00437100	.00437100	.00437100
5TKYHA	.15892956	.15892956	.15892956	.15892956
5TKMFA	.09535774	.09535774	.09535774	.09535774
5TKMTC	5.12520000	5.12520000	5.12520000	5.12520000
6OATAC	.15819344	.15819344	.15819344	.15819344
6BLYAC	.01216179	.01216179	.01216179	.01216179
6TAHYA	.06237576	.06237576	.06237576	.06237576
6WHTDU	23.95586999	23.95586999	23.95586999	23.95586999

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
6OATGD	293.16362059	293.16362059	293.16362059	293.16362059
6BLYDU	27.94086580	27.94086580	27.94086580	27.94086580
6CRNDU				
6MFDDU	2.78780000	2.78780000	2.78780000	2.78780000
6GFDDU	14.26730000	14.26730000	14.26730000	14.26730000
6OATSD	284.74820000	284.74820000	284.74820000	284.74820000
6PASTD	284.74820000	284.74820000	284.74820000	284.74820000
6OATCO	181.48706195	181.48706195	181.48706195	181.48706195
6BLYCO				
6CRNCO				
6MFDCO	2.78780000	2.78780000	2.78780000	2.78780000
6GRDFC	14.26730000	14.26730000	14.26730000	14.26730000
6EOATD	53.16770000	53.16770000	53.16770000	53.16770000
6EROUD	31.08870000	31.08870000	31.08870000	31.08870000
6CFBH1	.03862972	.03862972	.03862972	.03862972
6CFO21	.02877257	.02877257	.02877257	.02877257
6CF241	.02862871	.02862871	.02862871	.02862871
6CF461	.05852421	.05852421	.05852421	.05852421
6CF682	.05823159	.05823159	.05823159	.05823159
6CF802	.05794043	.05794043	.05794043	.05794043
6CSLA4	.00299957	.00299957	.00299957	.00299957
6CSLAO	.05765073	.05765073	.05765073	.05765073
6CABFC	6.74602500	6.74602500	6.74602500	6.74602500
6CAVLC	.62271000	.62271000	.62271000	.62271000
6HFBH2	.00368300	.00368300	.00368300	.00368300
6HFO22	.05450840	.05450840	.05450840	.05450840
6HGSLA	.05300523	.05341823	.05341823	.05300523
6PORKC	4.74580500	4.74580500	4.74580500	4.74580500
6HRFA3	.23822000	.23822000	.23822000	.23822000
6EGGDU	24.91836735	24.91836735	24.91836735	24.91836735
6EGGHA	1.12642347	1.12642347	1.12642347	1.12642347

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
6BROFA	.78849643	.78849643	.78849643	.78849643
6PYMTC	2.20779000	2.20779000	2.20779000	2.20779000
6TFBHA	.01088400	.01088400	.01088400	.01088400
6TKYHA	.39574224	.39574224	.39574224	.39574224
6TKMFA	.23744534	.23744534	.23744534	.23744534
6TKMTC	.75480000	.75480000	.75480000	.75480000
7OATAC	.30248004	.30248004	.30248004	.30248004
7BLYAC	.01564896	.01564896	.01564896	.01564896
7WHTDU	20.40511856	20.40511856	20.40511856	20.40511856
7OATGD	184.45932699	184.45932699	184.45932699	184.45932699
7BLYDU	31.63342840	31.63342840	31.63342840	31.63342840
7MFDDU	3.78740000	3.78740000	3.78740000	3.78740000
7GFDDU	19.38480000	19.38480000	19.38480000	19.38480000
7THYDU				
7OATSD	544.46407671	544.46407671	544.46407671	544.46407671
7PASTD	544.46407671	544.46407671	544.46407671	544.46407671
7OATCO	88.41850571	88.41850571	88.41850571	88.41850571
7MFDCO	3.78740000	3.78740000	3.78740000	3.78740000
7GRDCO	19.38480000	19.38480000	19.38480000	19.38480000
7TAHAR				
7EOATD	54.10665764	54.10665764	54.10665764	54.10665764
7EBLYD	14.84184236	14.84184236	14.84184236	14.84184236
7EROUD	65.99380000	65.99380000	65.99380000	65.99380000
7CFBH1	.09618700	.09618700	.09618700	.09618700
7CFO21	.07164296	.07164296	.07164296	.07164296
7CF241	.07128475	.07128475	.07128475	.07128475
7CF461	.03639776	.03639776	.03639776	.03639776
7CF682	.02317577	.02317577	.02317577	.02317577
7CF802	.01977889	.01977889	.01977889	.01977889
7CSLA4				
7CSLAO	.01968000	.01968000	.01968000	.01968000

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
7CABFC	6.66737500	6.66737500	6.66737500	6.66737500
7CAVLC	.61545000	.61545000	.61545000	.61545000
7HFBH1				
7HFBH2	.00231217	.00231217	.00231217	.00231217
7HFO22	.03190799	.03190799	.03190799	.03190799
7HGSLA	.03126983	.03126983	.03126983	.03126983
7PORKC	4.69047500	4.69047500	4.69047500	4.69047500
7HRFA3	.20591000	.20591000	.20591000	.20591000
7EGGDU	24.62785114	24.62785114	24.62785114	24.62785114
7EGGHA	1.11329082	1.11329082	1.11329082	1.11329082
7BROFA	.77930357	.77930357	.77930357	.77930357
7PYMTC	2.18205000	2.18205000	2.18205000	2.18205000
7TFBHA	.00845100	.00845100	.00845100	.00845100
7TKYHA	.30727836	.30727836	.30727836	.30727836
7TKMFA	.18436702	.18436702	.18436702	.18436702
7TKMTC	.74600000	.74600000	.74600000	.74600000
8OATAC	.41041931	.41041931	.41041931	.41041931
8BLYAC	.02405705	.02415899	.02415899	.02405705
8TAHYA	.20874464	.20864270	.20864270	.20874464
8WHTDU	31.99709727	40.86818990	34.64989254	25.70950276
8OATGD	403.46462207	404.36066316	403.89942898	402.99824786
8BLYDU	51.50109074	51.71931950	51.71931950	51.50109074
8MFDDU	4.12990000	4.12990000	4.12990000	4.12990000
8GFDDU	2.11380000	2.11380000	2.11380000	2.11380000
8THYDU				
8OATSD	738.75476250	738.75476250	738.65476250	738.75476250
8PASTD	738.75476250	738.75476250	738.75476250	738.75476250
8OATCO	229.11805498	229.11805498	229.11805498	229.11805498
8MFDCO	4.12990000	4.12990000	4.12990000	4.12990000
8GRFDC	2.11380000	2.11380000	2.11380000	2.11380000
8TAHAR				

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
8EOATD	92.09500000	92.09500000	92.09500000	92.09500000
8EROUD	92.86380000	92.86380000	92.86380000	92.86380000
8CFBH1	.12262900	.12262900	.12262900	.12262900
8CFO21	.09133776	.09133776	.09133776	.09133776
8CF241	.08728807	.08728807	.08728807	.08728807
8CF461	.06257768	.06257768	.06257768	.06257768
8CF682	.06226479	.06226479	.06226479	.06226479
8CF802	.06195347	.06195347	.06195347	.06195347
8CSLA4	.01272630	.01272630	.01272630	.01272630
8CSLAO	.06164370	.06164370	.06164370	.06164370
8CABFC	9.94565000	9.94565000	9.94565000	9.94565000
8CAVLC	.91806000	.91806000	.91806000	.91806000
8HFBH2	.00690663	.00693589	.00693589	.00690663
8HFO22	.09945541	.09987684	.09987684	.09945541
8HGSLA	.09746630	.09746630	.09746630	.09746630
8PORKC	6.99673000	6.99673000	6.99673000	6.99673000
8HRFA3	.22567396	.23204193	.22757823	.22116052
8EGGDU	36.73709484	36.73709484	36.73709484	36.73709484
8EGGHA	2.49237607	3.66580102	2.84327491	1.66068367
8BROFA	1.74466325	2.56606071	1.99029244	1.16247857
8PYMTC	3.25494000	3.25494000	3.25494000	3.25494000
8TFBHA	.00927300	.00927300	.00927300	.00927300
8TKYHA	.33716628	.33716628	.33716628	.33716628
8TKMFA	.20229977	.20229977	.20229977	.20229977
8TKMTC	1.11280000	1.11280000	1.11280000	1.11280000
9OATAC	.01142727	.01118187	.01135388	.01160120
9BLYAC	.01155861	.01155861	.01155861	.01155861
9TAHYA	.54491412	.54515952	.54498750	.54474019
9WHTDU	2.27520000	2.27520000	2.27520000	2.27520000
9OATGD	27.78048335	27.18389803	27.60208157	28.20332716
9BLYDU	30.77977869	30.77977869	30.77977869	30.77977869

TABLE I (continued)

ACTIVITY Production	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
9OATSD	8.92646880	8.92646880	8.92646880	8.92646880
9PASTD	12.47993120	12.47993120	12.47993120	12.47993120
9BLYCO				
9EOATD				
9EBLYD	27.91820000	27.91820000	27.91820000	27.91820000
9EROUD	21.40640000	21.40640000	21.40640000	21.40640000
9CABFC	12.00842500	12.00842500	12.00842500	12.00842500
9CAVLC	1.10847000	1.10847000	1.10847000	1.10847000
9HFBH2	.00037400	.00037400	.00037400	.00037400
9HFO22	.00561000	.00561000	.00561000	.00561000
9HGSLA	.00549780	.00549780	.00549780	.00549780
9PORKC	8.44788500	8.44788500	8.44788500	8.44788500
9HRFA3	.22402070	.21824711	.22229418	.22811287
9EGGDU	44.35654262	44.35654262	44.35654262	44.35654262
9EGGHA	1.17342495		.82252611	2.05511735
9BROFA	.82139747		.57576827	1.40358214
9PYMTC	3.93003000	3.93003000	3.93003000	3.93003000
9TFBHA	.00499076	.00499076	.00499076	.00499076
9TKYHA	.18146411	.18146411	.18146411	.18146411
9TKMFA	.10887847	.10887847	.10887847	.10887847
9TKMTC	1.34360000	1.34360000	1.34360000	1.34360000
WHTDU	105.85344000	79.37014876	105.85344000	105.85344000
OATGD	135.24898000	96.78308720	127.17072027	132.13476347
BLYDU	40.79583575		19.36952512	20.70387998
RYEDU	.54153000	.54153000	.54153000	.54153000
SCRDU	19.98359000		19.98359000	19.98359000
ECNDU	179.64804821	199.79507067	199.63707584	199.63707584
CORND	34.32340000	34.32340000	34.32340000	34.32340000

TABLE I (continued)

ACTIVITY Product Movement	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
13 EGGS				
14 EGGS	2.00518445	2.00518445	2.00518445	2.00518445
23 EGGS	1.52405178	1.52405178	1.52405178	1.52405178
53 EGGS	2.93880456	2.93880456	2.93880456	2.93880456
54 EGGS	26.42133801	26.42133801	26.42133801	26.42133801
64 EGGS	19.05978398	19.05978398	19.05978398	19.05978398
74 EGGS	10.49901804	10.49901804	10.49901804	10.49901804
84 EGGS	2.35547052	2.35547052	2.35547052	2.35547052
1 EGGS				
3 EGGS	.47460000	.47460000	.47460000	.47460000
51PORK		.53569500	.53569500	.53569500
52PORK		.05559190	.05559190	.05559190
53PORK	2.95396283	1.98988118	2.95396283	2.95396283
61PORK	.53569500			
62PORK	.35854352			
64PORK	1.31074125	3.26692977	3.26692977	3.20497977
74PORK				
84PORK				
89PORK	7.62321501	7.62321501	7.62321501	7.62321501
1PORK				
2PORK	1.03800000	1.03800000	1.03800000	1.03800000
12CABF		.71230476		.71230476
13CABF	.77476501	.06246024	.77476501	.06246024
62CABF				
63CABF				
64CABF	16.42339915	16.39671342	16.42251128	16.42251128
65CABF	6.75130509	6.77799082	6.75219296	6.75219296
74CABF				
75CABF	3.54654500	3.54654500	3.54654500	3.54654500
82CABF		.02579786		

TABLE I (continued)

ACTIVITY Product Movement	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
84CABF				
85CABF	10.03900499	10.01320713	10.03900499	10.03900499
89CABF	12.00842500	12.00842500	12.00842500	12.00842500
2CABF	2.42888000	3.39270000	2.44657428	3.39270000
3CABF	.96382000		.94612572	
31CAVL				
32CAVL				
35CAVL				
41CAVL	.07029000	.07029000	.07029000	.07029000
42CAVL	.49632000	.40326000	.49632000	.01249484
43CAVL				.40326000
45CAVL				
65CAVL				
85CAVL				
86CAVL				
87CAVL	.61545000	.61545000	.61545000	.61545000
89CAVL	1.10847000	1.10847000	1.10847000	1.10847000
21TKMT				
23TKMT	.12144115	.12144115	.12144115	.12144115
53TKMT				
65TKMT	2.28450040	2.28450040	2.28450040	2.28450040
73TKMT				
74TKMT	1.32511465	1.32511465	1.32511465	1.32511465
75TKMT	.28878316	.28878316	.28878316	.28878316
83TKMT	.14529961	.14529961	.14529961	.14529961
85TKMT	1.33133743	1.33133743	1.33133743	1.33133743
89TKMT				
93TKMT	.05004440	.05004440	.05004440	.05004440
95TKMT				
1TKMT	.04387177	.04387177	.04387177	.04387177

TABLE I (continued)

ACTIVITY Product Movement	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
2TKMT				
3TKMT	.07092823	.07092823	.07092823	.07092823
9TKMT				
23PYMT				
51PYMT				
53PYMT	1.00024000	1.00024000	1.00024000	1.00024000
54PYMT	12.69567000	12.69567000	12.69567000	12.69567000
84PYMT				
89PYMT	1.63011710	3.93003000	2.31787883	
1PYMT				
2PYMT				
3PYMT	.42950000	.42950000	.42950000	.42950000
9PYMT				
70CA24				
80CA24	.00359300	.00359300	.00359300	.00359300
12CA46				
13CA46				
31CA46	.00195514		.00192668	
32CA46				
41CA46	.00126573	.00323162	.00130494	.00323162
42CA46	.00157988		.00153860	
45CA46				
75CA46				
76CA46	.03303821	.03303821	.03303821	.03303821
70CA46	.00149235	.00149235	.00149235	.00149235
80CA46	.01154765	.01154765	.01154765	.01154765
70CA68	.01304000	.01304000	.01304000	.01304000
80CA68				
70CA80	.00328100	.00328100	.00328100	.00328100
12CAFA				

Leaf 433 omitted in page numberin.

TABLE I (continued)

ACTIVITY Product Movement	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
13CAFA		.00341807	.00341807	.00341807
76CAFA	.00340748			
12HGFA	.00029604	.00898239	.00898239	.00898239
13HGFA				
23HGFA				
54HGFA		.07451471		
60HGFA	.00041300			.00041300
80HGFA		.00041300	.00041300	
Feed Receipts from Outside Sources				
2EWHET	9.91763496	9.91763496	10.84986263	9.91763496
2EOATS	15.09618997	15.09618997	15.56847144	15.09618997
2EBALY	40.79583575		19.36952512	20.70387998
2ESCRE			19.98359000	9.82680000
3EWHET				
3EXRYE				
3ESCRE				
4EWHET	52.93213960	35.31994099	54.65270719	46.64454508
4EOATS	120.15279003	81.68689723	111.60224883	117.03857349
4EBALY				
4EXRYE	.54153	.54153	.54153	.54153
4ESCRE	19.98359			
5EWHET	29.32784716	29.32784716	29.32784716	29.32784716
5EOATS				
5EBALY				
9EWHET	13.67581828	4.80472565	11.02302302	19.96341279
9EOATS				

TABLE I (continued)

ACTIVITY	COST COMBINATION			
Feed Receipts from Outside Sources	1 COST	2 COST	3 COST	4 COST
2EXCRN				
3EXCRN				
4EXCRN	145.32464821	165.47167067	165.31367584	165.31367584
5EXCRN				
Basic Herd Distribution				
1TBHCA				
2TBHCA				
3TBHCA				
4TBHCA				
5TBHCA				
6TBHCA				
7TBHCA				
8TBHCA				
1TBHHG				
2TBHHG	No Basic Herd Distribution for This Right Hand Side			
4TBHHG				
5TBHHG				
6TBHHG				
7TBHHG				
8TBHHG				
9TBHHG				
1TTHAR				
2TTHAR				
3TTHAR				

TABLE I (continued)

ACTIVITY Basic Herd Distribution	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
4TTHAR				
5TTHAR				
6TTHAR				
7TTHAR				
8TTHAR				
9TTHAR				
1TTHAG				
2TTHAG				
3TTHAG				
4TTHAG				
5TTHAG				
6TTHAG				
7TTHAG				
8TTHAG				
9TTHAG				
Pasture-Forage Balance				
1FORDU	65.95415491	65.98220000	65.98220000	65.98220000
2FORDU	80.02813036	80.02813036	80.02813036	80.02813036
3FORDU	87.55720000	87.55720000	87.55720000	87.55720000
4FORDU	1078.29262433	1078.29262433	1078.29262433	1078.29262433
5FORDU	1153.34055210	1153.31250701	1153.31250701	1153.31250701
6FORDU	569.49640000	569.49640000	569.49640000	569.49640000
7FORDU	1088.92815342	1088.92815342	1088.92815342	1088.92815342
8FORDU	1477.50952501	1477.50952501	1477.50952501	1477.50952501
9FORDU	21.40640000	21.40640000	21.40640000	21.40640000

TABLE I

EFFECT OF THE RESOURCE RESTRICTIONS IMPOSED BY RIGHT HAND SIDE THREE IN COMBINATION WITH ALTERNATIVE COST SITUATIONS UPON THE LEVEL OF ACTIVITIES AT OPTIMALITY

ACTIVITY GROUP	COST COMBINATION			
	1 COST	2 COST	3 COST	4 COST
1OATAC	.00064650	.00577015	.00313317	.00314177
1BLYAC	.00347802	.00415706	.00385200	.00385200
1MXDAC	.00300342	.01391217	.00857575	.00857575
1TAHYA	.01016061	.01016061	.01016061	.01016061
1WHTDU	1.24800000	1.24800000	1.24800000	1.24800000
1OATGD	1.46382674	11.70641947	7.09408367	7.11368858
1BLYDU	10.27350000	12.27929153	11.37817916	11.37817916
1MXDGD	8.48127311	39.28616795	24.21679434	24.21679434
1THYDU	32.99110000	32.99110000	32.99110000	32.99110000
1PASTD	32.99110000	32.99110000	32.99110000	32.99110000
1OATCO				
1BLYCO				
1MXDCO	8.48127311	10.91158010	8.58963889	8.58963889
1TAHAR	32.99110000	32.99110000	32.99110000	32.99110000
1EOATD				
1EBLYD	10.27350000	10.27350000	10.27350000	10.27350000
1EROUD	5.17580000	5.17580000	5.17580000	5.17580000
1CFBH1	.00552673	.00532383	.00551769	.00551769
1CFO21	.00411648	.00396535	.00410974	.00410974
1CF241	.00409589	.00394552	.00408919	.00408919
1CF461	.00215695	.00293314	.00219156	.00219156
1CF682	.00214617	.00291847	.00218060	.00218060
1CF802	.00213544	.00290388	.00216970	.00216970
1CSLA4	.00033858	.00033858	.00033858	.00033858
1CSLAO	.00212476	.00262142	.00215885	.00215885
1CABFC	.76147500	.76147500	.76147500	.76147500
1CAVLC	.07029000	.07029000	.07029000	.07029000
1HGBH2				
1HFBH4		.00251400	.00138457	.00138457
1HFO21				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
1HFO22				
1HFO24		.03796134	.02090701	.02090701
1PORKC	.53569500	.53569500	.53569500	.53569500
1HRFA3	.01358502	.01347855	.01358502	.01347855
1EGGDU	2.81272509	2.81272509	2.81272509	2.81272509
1EGGHA	.12714796	.10782686	.12714796	.10782686
1BROFA	.08900357	.07547880	.08900357	.07547880
1PYMTC	.24921000	.24921000	.24921000	.24921000
1TFBHA	.00020214	.00030511	.00020214	.00030511
1TYKHA	.00734992	.01109375	.00734992	.01109375
1TKMFA	.00440995	.00665625	.00440995	.00665625
1TKMTC	.08520000	.08520000	.08520000	.08520000
2BLYAC		.01159091	.00982727	.01107058
2MXDAC				
2TAHYA	.02744000	.01584909	.01761273	.01636942
2WHTDU	.24000000	.24000000	.24000000	.24000000
2OATGD				
2BLYDU		26.37000521	22.35762433	25.18624412
2MXDGD				
2THYDU	33.37173036	33.37173036	33.37173036	33.37173036
2PASTD	46.65640000	46.65640000	46.65640000	46.65640000
2BLYCO	.10836578	9.66880521		
2CRNCO				
2SCRCO	19.98359000		19.98359000	19.98359000
2TAHAR	33.37173036	33.37173036	33.37173036	33.37173036
2EWHTD				
2EOATD				
2EBLYD	16.70120000	16.70120000	16.70120000	16.70120000
2EROUD	8.30270000	8.30270000	8.30270000	8.30270000
2CFBH1	.00567694	.00654718	.00568599	.00568599
2CFO21	.00422836	.00487654	.00423510	.00423510
2CF241	.00420722	.00485215	.00421392	.00421392
2CF461	.00576606	.00243714	.00573145	.00573145

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
2CF682	.00573723	.00242495	.00570279	.00570279
2CF802	.00570854	.00241283	.00567428	.00567428
2CSLA4		.00239075		
2CSLAO	.00568000	.00266871	.00564591	.00564591
2CABFC	5.37680000	5.37680000	5.37680000	5.37680000
2CAVLC	.49632000	.49632000	.49632000	.49632000
2HFBH1			.00121679	
2HFBH2	.00253169			.00121679
2HFBH4				
2HFO21	.04025395		.01934694	.01934694
2HFO24				
2HGSLA	.01896000	.01896000	.01896000	.01896000
2PORKC	3.78256000	3.78256000	3.78256000	3.78256000
2HRFA1	.00279514			
2HRFA3	.09985714	.10084155	.10191742	.10191742
2EGGDU	19.86074430	19.86074430	19.86074430	19.86074430
2EGGHA	1.04747131	.67866327	.89779592	.89779592
2BROFA	.73322992	.47506429	.62845714	.62845714
2PYMTC	1.75968000	1.75968000	1.75968000	1.75968000
2TFBHA	.00215851		.00174740	.00030511
2TKYHA	.07848341		.06353549	.01109375
2TKMFA	.04709005		.03812130	.00665625
2TKMTC	.08520000	.08520000	.0852000	.08520000
3OATAC	.00440459	.00445519	.00440459	.00445519
3BLYAC	.01311151	.01376917	.01311151	.01311151
3MXDAC				
3TAHYA	.02188390	.02117563	.02188390	.02183330
3WHTDU	.72000000	.72000000	.72000000	.72000000
3OATGD	8.69227898	8.79214515	8.69227898	8.79214515
3BLYDU	34.23047888	35.94745282	34.23047888	34.23047888
3MXDGD				
3THYDU	43.77860000	43.77860000	43.77860000	43.77860000
3PASTD	43.77860000	43.77860000	43.77860000	43.77860000

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3BLYCO	17.78067888	19.49765282	17.78067888	17.78067888
3MXDCO				
3CRNCO				
3RYECO				
3SCRCO				
3TAHAR	43.77860000	43.77860000	43.77860000	43.77860000
3EWHTD				
3EOATD				
3EBLYD	16.44980000	16.44980000	16.44980000	16.44980000
3EROUD	7.57270000	7.57270000	7.57270000	7.57270000
3CFBH1	.00671676	.00657341	.00671676	.00671676
3CF021	.00500285	.00489608	.00500285	.00500285
3CF241	.00497783	.00487159	.00497783	.00497783
3CF461	.00495294	.00550131	.00495294	.00495294
3CF682	.00492818	.00547380	.00492818	.00492818
3CF802	.00490354	.00544643	.00490354	.00490354
3CSLA4				
3CSLA0	.00487902	.00541920	.00487902	.00487902
3CABFC	4.36865000	4.36865000	4.36865000	4.36865000
3CAVLC	.40326000	.40326000	.40326000	.40326000
3HFBH2				
3HFBH4				
3HF021				
3HF022				
3HF024				
3HGSLA	.02048887	.01824211	.02048887	.02048887
3PORKC	3.07333000	3.07333000	3.07333000	3.07333000
3HRFA1				
3HRFA3	.08412154	.08362798	.08412154	.08362798
3EGGDU	16.13685474	16.13685474	16.13685474	16.13685474
3EGGHA	.09523810		.09523810	
3BROFA	.06666667		.06666667	
3PYMTC	1.42974000	1.42974000	1.42974000	1.42974000

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3TFBHA		.00050754		.00050754
3TKHYA		.01845417		.01845417
3TKMFA		.01107250		.01107250
3TKMTC	.48880000	.48880000	.48880000	.48880000
4BLYAC	.05873321	.10310941	.10310941	.10310941
4TAHYA	.41386679	.36949059	.36949059	.36949059
4WHTDU	2.21760000	2.21760000	2.21760000	2.21760000
4OATGD				
4BLYDU	152.45967635	267.65140000	267.65140000	267.65140000
4MXDGD				
4THYDU	449.64802433	449.64802433	449.64802433	449.64802433
4PASTD	628.64460000	628.64460000	628.64460000	628.64460000
4CRNCO	138.79189514	141.70017462	135.42430498	135.42430498
4RYECO	.54153000	.54153000	.54153000	.54153000
4SCRCO				
4TAHAR	449.64802433	449.64802433	449.64802433	449.64802433
4EOATD				
4EBLYD	267.65140000	267.65140000	267.65140000	267.65140000
4EROUD	62.72060000	62.72060000	62.72060000	62.72060000
4CFBH1	.09249958	.09225677	.09278074	.09278074
4CF021	.06889646	.06871561	.06910588	.06910588
4CF241	.06855198	.06837203	.06876035	.06876035
4CF461	.03528435	.03621319	.03420882	.03420882
4CF682	.03510793	.03603212	.03403777	.03403777
4CF802	.03493239	.03585196	.03386758	.03386758
4CSLA4	.02158194	.02025066	.02264142	.02264142
4CSLAD	.03475773	.03567270	.03369825	.03369825
4CABFC	38.79232500	38.79232500	38.79232500	38.79232500
4CAVLC	3.58083000	3.58083000	3.58083000	3.58083000
4HFBH2	.00398466			
4HFBH4				
4HF021	.06176226			
4HF022				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
4HFO24				
4HGSLA	.06052702			
4PORKC	27.290265	27.290265	27.290265	27.290265
4HRFA1				
4HRFA3	.77049027	.77049027	.77049027	.77049027
4EGGDU	143.29051621	143.29051621	143.29051621	143.29051621
4EGGHA	6.47738265	6.47738265	6.47738265	6.47738265
4BROFA	4.53416786	4.53416786	4.53416786	4.53416786
4PYMTC	12.69567000	12.69567000	12.69567000	12.69567000
4TKBHA	.01554335	.01554335	.01554335	.01554335
4TKYHA	.56515625	.56515625	.56515625	.56515625
4TKMFA	.33909375	.33909375	.33909375	.33909375
4TKMTC	4.34040000	4.34040000	4.34040000	4.34040000
5OATAC	.06392189	.06437479	.06395319	.06403423
5BLYAC	.08464099	.08467992	.08464099	.08464099
5MXDAC	.05160329	.05214297	.05160329	.05160329
5TAHYA	.39158382	.39055232	.39155252	.39147148
5WHTDU	87.52320000	87.52320000	87.52320000	87.52320000
5OATGD	153.57042304	154.65849799	153.64561001	153.84032723
5BLYDU	265.16837842	265.29032231	265.16837842	265.16837842
5MXDGD	164.17071815	165.88765488	164.17071815	164.17071815
5CRNDU	277.55780000	277.55780000	277.55780000	277.55780000
5FDRCD	236.33430000	236.33430000	236.33430000	236.33430000
5THYDU	216.99442808	216.99442808	216.99442808	216.99442808
5PASTD	633.79052394	633.79052394	633.79052394	633.79052394
5BLYCD				
5MXDCD				
5CRNCO	277.55780000	277.55780000	277.55780000	277.55780000
5TAHAR	216.99442808	216.99442808	216.99442808	216.99442808
5EOATD				
5EBLYD	253.50830000	253.50830000	253.50830000	253.50830000
5EROUD	73.08140000	73.08140000	73.08140000	73.08140000
5CFBH1	.08080183	.08080183	.08080183	.08080183

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
5CF021	.06018363	.06018363	.06018363	.06018363
5CF241	.05988271	.05988271	.05988271	.05988271
5CF461	.07944401	.07944401	.07944401	.07944401
5CF682	.07904679	.07904679	.07904679	.07904679
5CF802	.07865156	.07865156	.07865156	.07865156
5CSLA4				
5CSLA0	.07825830	.07825830	.07825830	.07825830
5CABFC	45.80647500	45.80647500	45.80647500	45.80647500
5CAVLC	4.22829000	4.22829000	4.22829000	4.22829000
5HFBH4	.01461437	.01476721	.01461437	.01461437
5HF024	.21921561	.22150822	.21921561	.21921561
5HGSLA	.21483130	.21707806	.21483130	.21483130
5PORKC	32.22469500	32.22469500	32.22469500	32.22469500
5HRFA3	.86209238	.86337694	.86282002	.86231164
5EGGDU	169.19927972	169.19927972	169.19927972	169.19927972
5EGGHA	8.13312223	8.39735682	8.28279762	8.17822416
5BROFA	5.69318556	5.87814977	5.79795833	5.72475691
5PYMTC	14.99121000	14.99121000	14.99121000	14.99121000
5TFBHA	.01835379	.01949068	.01835379	.01918557
5TKYHA	.66734375	.70868125	.66734375	.69758750
5TKMFA	.40040625	.42520875	.40040625	.41855250
5TKMTC	5.12520000	5.12520000	5.12520000	5.12520000
6OATAC	.15819344	.17654714	.17654714	.17654714
6BLYAC	.03550649	.04938078	.04938078	.04938078
6TAHYA	.03903106	.00680308	.00680308	.00680308
6WHTDU	12.35026030	12.35026030	12.35026030	12.35026030
6OATGD	345.36634598	385.43595355	385.43595355	385.43595355
6BLYDU	81.57368299	113.44888321	113.44888321	113.44888321
6CRNDU				
6MFDDU	2.78780000	2.78780000	2.78780000	2.78780000
6GFDDU	14.26730000	14.26730000	14.26730000	14.26730000
6OATSD	284.74820000	284.74820000	284.74820000	284.74820000
6PASTD	284.74820000	284.74820000	284.74820000	284.74820000

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
6OATCO	187.67422048	192.76852716	192.76852716	192.76852716
6BLYCO				
6CRNCO				
6MFDCO	2.78780000	2.78780000	2.78780000	2.78780000
6GRDFC	14.26730000	14.26730000	14.26730000	14.26730000
6EOATD	53.16770000	53.16770000	53.16770000	53.16770000
6EROUD	31.08870000	31.08870000	31.08870000	31.08870000
6CFBH1	.03811315	.03768782	.03768782	.03768782
6CFO21	.02838782	.02807102	.02807102	.02807102
6CF241	.02824588	.02793066	.02793066	.02793066
6CF461	.06050025	.06212726	.06212726	.06212726
6CF682	.06019775	.06181662	.06181662	.06181662
6CF802	.05989676	.06150754	.06150754	.06150754
6CSLA4	.00160272			
6CSLAO	.05959728	.06120000	.06120000	.06120000
6CABFC	6.74602500	6.74602500	6.74602500	6.74602500
6CAVLC	.62271000	.62271000	.62271000	.62271000
6HFBH2	.01075256	.01495416	.01495416	.01495416
6HFO22	.15913791	.22132160	.22132160	.22132160
6HGSLA	.15595515	.21648217	.21648217	.21648217
6PORKC	4.74580500	4.74580500	4.74580500	4.74580500
6HRFA3	.13755567	.13755567	.13755567	.13755567
6EGGDU	24.91836735	24.91836735	24.91836735	24.91836735
6EGGHA	1.12642347	1.12642347	1.12642347	1.12642347
6BROFA	.78849643	.78849643	.78849643	.78849643
6PYMTC	2.20779000	2.20779000	2.20779000	2.20779000
6TFBHA	.00270300	.00270300	.00270300	.00270300
6TKYHA	.09828125	.09828125	.09828125	.09828125
6TKMFA	.05896875	.05896875	.05896875	.05896875
6TKMTC	.75480000	.75480000	.75480000	.75480000
7OATAC	.31248126	.31248126	.31248126	.31248126

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
7BLYAC	.00564774	.00564774	.00564774	.00564774
7WHTDU	15.96144983	15.96144983	15.96144983	15.96144983
7OATED	181.85035004	180.12363351	180.12363351	180.12363351
7BLYDU	11.41656898	11.41656898	11.41656898	11.41656898
7MFDDU	3.78740000	3.78740000	3.78740000	3.78740000
7GFDDU	19.38480000	19.38480000	19.38480000	19.38480000
7THYDU				
7OATSD	562.46626671	562.46626671	562.46626671	562.46626671
7PASTD	562.46626671	562.46626671	562.46626671	562.46626671
7OATCO	76.94720637	75.22048984	75.22048984	75.22048984
7MFDCO	3.78740000	3.78740000	3.78740000	3.78740000
7GRDCO	19.38480000	19.38480000	19.38480000	19.38480000
7TAHAR				
7EOATD	68.94850000	68.94850000	68.94850000	68.94850000
7EBLYD				
7EROUD	65.99380000	65.99380000	65.99380000	65.99380000
7CFBH1	.10064440	.10078857	.10078857	.10078857
7CF021	.07496297	.07507035	.07507035	.07507035
7CF241	.07458816	.07469500	.07469500	.07469500
7CF461	.02927776	.02872628	.02872628	.02872628
7CF682	.02073003	.02018131	.02018131	.02018131
7CF802	.01734537	.01679940	.01679940	.01679940
7CSLA4	.00242135	.00296460	.00296460	.00296460
7CSLAO	.01725865	.01671540	.01671540	.01671540
7CABFC	6.66737500	6.66737500	6.66737500	6.66737500
7CAVLC	.61545000	.61545000	.61545000	.61545000
7HFBH1	.00231217	.00231217	.00231217	.00231217
7HFBH2				
7HF022	.03190799	.03190799	.03190799	.03190799
7HGSLA	.03126983	.03126983	.03126983	.03126983
7PORKC	4.69047500	4.69047500	4.69047500	4.69047500
7HRFA3	.14625649	.14625649	.14625649	.14625649

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
7EGGDU	24.62785114	24.62785114	24.62785114	24.62785114
7EGGHA	1.11329082	1.11329082	1.11329082	1.11329082
7BROFA	.77930357	.77930357	.77930357	.77930357
7PYMTC	2.18205000	2.18205000	2.18205000	2.18205000
7TKYHA	.09713542	.09713542	.09713542	.09713542
7TKMFA	.05828125	.05828125	.05828125	.05828125
7TKMTC	.74600000	.74600000	.74600000	.74600000
8OATAC	.41880511	.41880511	.41880511	.41880511
8BLYAC	.01161502	.01151309	.01151309	.01151309
8TAHYA	.21280086	.21290280	.21290280	.21290280
8WHTDU	35.67729721	37.91714153	36.26049868	18.20796192
8OATGD	317.36601353	317.37305550	317.25017615	314.98720926
8BLYDU	24.86532740	24.64709863	24.64709863	24.64709863
8MFDDU	4.12990000	4.12990000	4.12990000	4.12990000
8GFDDU	2.11380000	2.11380000	2.11380000	2.11380000
8THYDU				
8OATSD	753.84920000	753.84920000	753.84920000	753.84920000
8PASTD	753.84920000	753.84920000	753.84920000	753.84920000
8OATCO	173.29145619	173.29145619	173.29145619	173.29145619
8MFDCO	4.12990000	4.12990000	4.12990000	4.12990000
8GRFDC	2.11380000	2.11380000	2.11380000	2.11380000
8TAHAR				
8EOATD	92.09500000	92.09500000	92.09500000	92.09500000
8EROUD	92.86380000	92.86380000	92.86380000	92.86380000
8CFBH1	.13057753	.13057753	.13057753	.13057753
8CF021	.09725806	.09725806	.09725806	.09725806
8CF241	.09317877	.09317877	.09317877	.09317877
8CF461	.04760360	.04760360	.04760360	.04760360
8CF682	.04272692	.04272692	.04272692	.04272692
8CF802	.04251329	.04251329	.04251329	.04251329
8CSLA4	.03206928	.03206928	.03206928	.03206928

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
8CSLAO	.04230072	.04230072	.04230072	.04230072
8CABFC	9.94565000	9.94565000	9.94565000	9.94565000
8CAVLC	.91806000	.91806000	.91806000	.91806000
8HFBH2	.00333460	.003330533	.00330533	.00330533
8HFO22	.04801823	.14759680	.14759680	.14759680
8HGSLA	.04664487	.04664487	.04664487	.04664487
8PORKC	6.99673000	6.99673000	6.99673000	6.99673000
8HRFA3	.21643681	.21762600	.21643681	.20837781
8EGGDU	36.73709484	36.73709484	36.73709484	36.73709484
8EGGHA	3.14571599	3.36484864	3.14571599	1.66068367
8BROFA	2.20200119	2.35539405	2.20200119	1.16247857
8PYMTC	3.25494000	3.25494000	3.25494000	3.25494000
8TFBHA	.00838547	.00879658	.00879658	.00398503
8TKYHA	.30489583	.31984375	.31984375	.14489583
8TKMFA	.18293750	.19190625	.19190625	.08693750
8TKMTC	1.11280000	1.11280000	1.11280000	1.11280000
9OATAC	.02260812	.02260812	.02260812	.02355283
9BLYAC	.02149215	.02149215	.02149215	.02149215
9TAHYA	.52379973	.52379973	.52379973	.52285502
9WHTDU	2.27520000	2.27520000	2.27520000	2.27520000
9OATGD	54.96191691	54.96191691	54.96191691	57.25856793
9BLYDU	57.23209276	57.23209276	57.23209276	57.23209276
9OATSD	8.92646880	8.92646880	8.92646880	8.92646880
9PASTD	12.47993120	12.47993120	12.47993120	12.47993120
9BLYCO				
9EOATD				
9EBLYD	27.91820000	27.91820000	27.91820000	27.91820000
9EROUD	21.40640000	21.40640000	21.40640000	21.40640000
9CABFC	12.00842500	12.00842500	12.00842500	12.00842500
9CAVLC	1.10847000	1.10847000	1.10847000	1.10847000
9HFBH2	.00383124	.00383124	.00383124	.00383124
9HFO22	.05746861	.05746861	.05746861	.05746861

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
9HGSLA	.05631923	.05631923	.05631923	.05631923
9PORKC	8.44788500	8.44788500	8.44788500	8.44788500
9HRFA3	.21972788	.21972788	.21972788	.22811287
9EGGDU	44.35654262	44.35654262	44.35654262	44.35654262
9EGGHA	.30095238	.30095238	.30095238	2.00511735
9BROFA	.21066667	.21066667	.21066667	1.40358214
9PYMTC	3.93003000	3.93003000	3.93003000	3.93003000
9TFBHA				.00481155
9TKYHA				.17494792
9TKMFA				.10496875
9TKMTC	1.34360000	1.34360000	1.34360000	1.34360000
WHTDU	105.85344000	77.30241906	85.85438876	101.93075132
OATGD	135.24898000	94.65496983	103.85862338	102.42874134
BLYDU	177.02236000			
RYEDU	.54153000	.54153000	.54153000	.54153000
SCRDU	19.98359000		19.98359000	19.98359000
ECNDU	173.11529514	176.02357462	169.74770498	169.74770498
CORND	34.32340000	34.32340000	34.32340000	34.32340000
2. PRODUCT MOVEMENT				
13EGGS				
14EGGS				
23EGGS				
53EGGS				
54EGGS				
64EGGS				
74EGGS				
84EGGS				
1EGGS	.47460000	.47460000	.47460000	.47460000
3EGGS				
51PORK				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
52PORK				
53PORK		.33701359		
61PORK	.43625500	.43625500	.43625500	.43625500
62PORK				
64PORK	18.21121246	27.29026500	27.29026500	27.29026500
74PORK				
84PORK				
89PORK				
1PORK	.09944000	.09944000	.09944000	.09944000
2PORK	.93856000	.93856000	.93856000	.93856000
12CABF		.59904001		
13CABF	.34127496		.35896924	.35896924
62CABF				
63CABF	.53134315	1.55608557	.53134315	.53134315
64CABF	18.46320215	18.27027308	19.29501550	19.29501550
65CABF	5.19041634	5.19041634	5.19041634	5.19041634
74CABF	2.28986334	2.00792000	2.00792000	2.00792000
75CABF				
82CABF				
84CABF				
85CABF				
89CABF	12.00842500	12.00842500	12.00842500	12.00842500
2CABF	2.42888000	3.39270000	2.44657428	2.44657428
3CABF	.96382000		.94612572	.94612572
31CAVL				
32CAVL				
35CAVL				
41CAVL				
42CAVL	.49632000		.49632000	.49632000
43CAVL	.40326000	.40326000	.40326000	.40326000
45CAVL		.21994800	.21994800	.21994800
65CAVL				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
85CAVL	4.22829000	4.00834200	4.00834200	4.00834200
86CAVL	.28998466	.62271000	.62271000	.62271000
87CAVL	.11277734			
89CAVL	1.10847000	1.10847000	1.10847000	1.10847000
21TKMT	.02875259		.02875259	
23TKMT	.48880000		.37400000	
53TKMT		.31747196		.23227196
65TKMT				
73TKMT				
74TKMT				
75TKMT				
83TKMT				
85TKMT				
89TKMT	1.22880000	1.34360000	1.34360000	
93TKMT				
95TKMT				
1TKMT				
2TKMT		.08520000		
3TKMT		.02960000	.11480000	.11480000
9TKMT	.11480000			
23PYMT	.29336377			
51PYMT		.03786936		
53PYMT	.94970957	1.42974000	1.24307333	1.03810936
54PYMT				
84PYMT				
89PYMT	2.91066333	3.34016333	2.91066333	
1PYMT				.03786936
2PYMT		.42950000		
3PYMT				.39163064
9PYMT	.42950000		.42950000	
70CA24				
80CA24	.00359300	.00359300	.00359300	.00359300

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
12CA46	.00157988		.00153860	.00153860
13CA46		.00065407		
31CA46				
32CA46				
41CA46				
42CA46				
45CA46	.01134294	.01156632	.01156632	.01156632
75CA46	.00851778	.00829440	.00829440	.00829440
76CA46	.03399833	.03433625	.03433625	.03433625
70CA46				
80CA46	.01304000	.01304000	.01304000	.01304000
70CA68	.00840134	.00840134	.00840134	.00840134
80CA68	.00463866	.00463866	.00463866	.00463866
70CA80	.00328100	.00328100	.00328100	.00328100
12CAFA		.00026794		
13CAFA				
76CAFA				
12HGFA		.01896000		
13HGFA		.01824211	.02048887	.02048887
23HGFA	.02048887			
54HGFA				
60HGFA		.00041300	.00041300	.00041300
80HGFA	.00041300			
3. FEED RECEIPTS FROM OUTSIDE SOURCES				
2EWHET	21.34846183	4.89069429	15.92153741	11.89931876
2EOATS	26.71424335	10.41995770	19.62361124	18.19372920
2EBALY	34.46385767			
2ESCRE	19.98359000		19.98359000	19.98359000
3EWHET				

TABLE I (continued)

ACTIVITY	COST COMBINATION			
Feed Receipts from Outside Sources	1 COST	2 COST	3 COST	4 COST
3EXRYE				
3ESCRE				
4EWHET	84.50497817	68.80130539	68.80130539	68.80130539
4EOATS	108.53473665	84.23501214	84.23501214	84.23501214
4EBALY	142.55850233			
4EXRYE	.54153000	.54153000	.54153000	.54153000
4ESCRE				
5EWHET		3.61041938	1.13154596	1.52094756
5EOATS				
5EBALY				
9EWHET				19.70917961
9EOATS				
2EXCRN				
3EXCRN				
4EXCRN	138.79189514	141.70017462	135.42430498	135.42430498
5EXCRN				
4. BASIC HERD DISTRIBUTION				
ITBHCA	.00552673	.00532383	.00551769	.00551769
2TBHCA	.10683601	.10770624	.10684506	.10684506
3TBHCA	.00671676	.00657341	.00671676	.00671676
4TBHCA	.09249958	.09225677	.09278074	.09278074
5TBHCA	.08080183	.08080183	.08080183	.08080183
6TBHCA	.03811315	.03768782	.03768782	.03768782
7TBHCA	.10064440	.10078857	.10078857	.10078857
8TBHCA	.13057753	.13057753	.13057753	.13057753
1TBHHG		.00251400	.00138457	.00138457
2TBHHG	.00253169		.00121679	.00121679
4TBHHG	.00398466			
5TBHHG	.01461437	.01476721	.01461437	.01461437
6TBHHG	.02306326	.02694204	.02700752	.02700752

TABLE I (continued)

ACTIVITY Basic Herd Distribution	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
7TBHHG	.00231217	.00231217	.00231217	.00231217
8TBHHG	.00333460	.00330533	.00330533	.00330533
9TBHHG	.00383124	.00383124	.00383124	.00383124
1TTHAR	.01358502	.01347855	.01358502	.01347855
2TTHAR	.10265228	.10084155	.10191742	.10191742
3TTHAR	.08412154	.08362798	.08412154	.08362798
4TTHAR	.77049027	.77049027	.77049027	.77049027
5TTHAR	.86209238	.86337694	.86282002	.86231164
6TTHAR	.13755567	.13755567	.13755567	.13755567
7TTHAR	.14625649	.14625649	.14625649	.14625649
8TTHAR	.21643681	.21762600	.21643681	.20837781
9TTHAR	.28472955	.28466655	.28473676	.29390418
1TTHAG	.00020214	.00030511	.00020214	.00030511
2TTHAG	.00215851		.00174740	.00030511
3TTHAG		.00050754		.00050754
4TTHAG	.01554335	.01554335	.01554335	.01554335
5TTHAG	.01835379	.01949068	.01835379	.01918557
6TTHAG	.00270300	.00270300	.00270300	.00270300
7TTHAG	.00267149	.00267149	.00267149	.00267149
8TTHAG	.00838547	.00879658	.00879658	.00398503
9TTHAG	.00098624	.00098624	.00098624	.00579779
5. PASTURE-FORAGE BALANCE				
1FORDU	65.98220000	65.98220000	65.98220000	65.98220000
2FORDU	80.02813036	80.02813036	80.02813036	80.02813036
3FORDU	87.55720000	87.55720000	87.55720000	87.55720000
4FORDU	1078.29262433	1078.29262433	1078.29262433	1078.29262433
5FORDU	1087.11925201	1087.11925201	1087.11925201	1087.11925201
6FORDU	569.49640000	569.49640000	569.49640000	569.49640000
7FORDU	1124.93253341	1124.93253341	1124.93253341	1124.93253341
8FORDU	1507.69840000	1507.69840000	1507.69840000	1507.69840000
9FORDU	21.40640000	21.40640000	21.40640000	21.40640000

TABLE I

EFFECT OF THE RESOURCE RESTRICTIONS IMPOSED BY RIGHT HAND SIDE FOUR IN COMBINATION WITH ALTERNATIVE COST SITUATIONS UPON THE LEVEL OF ACTIVITIES AT OPTIMALITY

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
1OATAC	.00064650	.00525949	.00314177	.00314177
1BLYAC	.00347802	.00417050	.00385200	.00385200
1MXDAC	.00304180	.01380940	.00857575	.00857575
1TAHYA	.01016061	.01016061	.01016061	.01016061
1WHTDU	1.24800000	1.24800000	1.24800000	1.24800000
1OATGD	1.46382674	11.90870097	7.11368858	7.11368858
1BLYDU	10.27350000	12.31897997	11.37817916	11.37817916
1MXDGD	8.58963889	38.99594726	24.21679434	24.21679434
1THYDU	32.99110000	32.99110000	32.99110000	32.99110000
1PASTD	32.99110000	32.99110000	32.99110000	32.99110000
1OATCO				
1BLYCO				
1MXDCO	8.58963889	10.05991354	8.58963889	8.58963889
1TAHAR	32.99110000	32.99110000	32.99110000	32.99110000
1EOATD				
1EBLYD	10.27350000	10.27350000	10.27350000	10.27350000
1EROUD	5.17580000	5.17580000	5.17580000	5.17580000
1CFBH1	.00551769	.00539493	.00551769	.00551769
1CFO21	.00410974	.00401831	.00410074	.00410974
1CF241	.00408919	.00399822	.00408919	.00408919
1CF461	.00219156	.00266113	.00219156	.00219156
1CF682	.00218060	.00218060	.00218060	.00218060
1CF802	.00216970	.00263459	.00216970	.00216970
1CSLA4	.00033858	.00033858	.00033858	.00033858
1CSLAO	.00215885	.00262142	.00215885	.00215885
1CABFC	.76147500	.76147500	.76147500	.76147500
1CAVLC	.07029000	.07029000	.07029000	.07029000
1HGBH2				
1HFBH4		.00256374	.00138457	.00138457
1HFO21				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
1HF022				
1HF024		.03871247	.02090701	.02090701
1PORKC	.53569500	.53569500	.53569500	.53569500
1HRFA3	.01358502	.01347855	.01347855	.01347855
1EGGDU	2.81272509	2.81272509	2.81272509	2.81272509
1EGGHA	.12714796	.10782686	.10782686	.10782686
1BROFA	.08900357	.07547880	.07547880	.07547880
1PYMTC	.24921000	.24921000	.24921000	.24921000
1TFBHA	.00020214	.00030511	.00030511	.00030511
1TKYHA	.00734992	.01109375	.01109375	.01109375
1TKMFA	.00440995	.00665625	.00665625	.00665625
1TKMTC	.08520000	.08520000	.08520000	.08520000
2BLYAC		.01159091	.00982727	.01107058
2MXDAC				
2TAHYA	.02744000	.01584909	.01761273	.01636942
2WHTDU	.24000000	.24000000	.24000000	.24000000
2OATGD				
2BLYDU		26.37000521	22.35762433	25.18624412
2MXDGD				
2THYDU	33.37173036	33.37173036	33.37173036	33.37173036
2PASTD	46.65640000	46.65640000	46.65640000	46.65640000
2BLYCO		9.66880521		
2CRNCO				
2SCRCO	19.98359000		19.98359000	19.98359000
2TAHAR	33.37173036	33.37173036	33.37173036	33.37173036
2EWHTD				
2EOATD				
2EBLYD	16.70120000	16.70120000	16.70120000	16.70120000
2EROUD	8.30270000	8.30270000	8.30270000	8.30270000
2CFBH1	.00568599	.00654718	.00568599	.00568599
2CF021	.00423510	.00487654	.00423510	.00423510
2CF241	.00421392	.00485215	.00421392	.00421392
2CF461	.00573145	.00243714	.00573145	.00573145

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
2CF682	.00570279	.00242495	.00570279	.00570279
2CF802	.00567428	.00241283	.00567428	.00567428
2CSLA4		.00239075		
2CSLAO	.00564591	.00240077	.00564591	.00564591
2CABFC	5.37680000	5.37680000	5.37680000	5.37680000
2CAVLC	.49632000	.49632000	.49632000	.49632000
2HFBH1			.00121679	
2HFBH2	.00253169			.00121619
2HFBH4				
2HFO21	.04025395		.01934694	.01934694
2HFO24				
2HGSLA	.01896000	.01896000	.01896000	.01896000
2PORKC	3.78256000	3.78256000	3.78256000	3.78256000
2HRFA1	.00279514			
2HRFA3	.09985714	.10093641	.10191742	.10191742
2EGGDU	19.86074430	19.86074430	19.86074430	19.86074430
2EGGHA	1.04747131	.69798437	.89779592	.89779592
2BROFA	.73322992	.48858906	.62845714	.62845714
2PYMTC	1.75968000	1.75968000	1.75968000	1.75968000
2TFBHA	.00215851		.00164444	.00030511
2TKYHA	.07848341		.05979167	.01109375
2TKMFA	.04709005		.03587500	.00665625
2TKMTC	.08520000	.08520000	.08520000	.08520000
3OATAC	.00440459	.00445519	.00440459	.00445519
3BLYAC	.01311151	.01409539	.01311151	.01311151
3MXDAC				
3TAHYA	.02188390	.02084942	.02188390	.02183330
3WHTDU	.72000000	.72000000	.72000000	.72000000
3OATGD	8.69227898	8.79214515	8.69227898	8.79214515
3BLYDU	34.23047888	36.79911938	34.23047888	34.23047888
3MXDGD				
3THYDU	43.77860000	43.77860000	43.77860000	43.77860000
3PASTD	43.77860000	43.77860000	43.77860000	43.77860000

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3BLYCO	17.78067888	20.34931938	17.78067888	17.78067888
3MXDCO				
3CRNCO				
3RYECO				
3SCRCO				
3TAHAR	43.77860000	43.77860000	43.77860000	43.77860000
3EWHTD				
3EOATD				
3EBLYD	16.44980000	16.44980000	16.44980000	16.44980000
3EROUD	7.57270000	7.57270000	7.57270000	7.57270000
3CFBH1	.00671676	.00650231	.00671676	.00671676
3CF021	.00500285	.00484311	.00500285	.00500285
3CF241	.00497783	.00481890	.00497783	.00497783
3CF461	.00495294	.00577331	.00495294	.00495294
3CF682	.00492818	.00574444	.00492818	.00492818
3CF802	.00490354	.00571572	.00490354	.00490354
3CSLA4				
3CSLAO	.00487902	.00568714	.00487902	.00487902
3CABFC	4.36865000	4.36865000	4.36865000	4.36865000
3CAVLC	.40326000	.40326000	.40326000	.40326000
3HFBH2				
3HFBH4				
3HF021				
3HF022				
3HF024				
3HGSLA	.02048887	.01897822	.02048887	.02048887
3PORKC	3.07333000	3.07333000	3.07333000	3.07333000
3HRFA1				
3HRFA3	.08412154	.08362798	.08412154	.08362798
3EGGDU	16.13685474	16.13685474	16.13685474	16.13685474
3EGGHA	.09523810		.09523810	
3BROFA	.06666667		.06666667	
3PYMTC	1.42974000	1.42974000	1.42974000	1.42974000

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3TFBHA		.00050754		.00050754
3TKYHA		.01845417		.01845417
3TKMFA		.01107250		.01107250
3TKMTC	.48880000	.48880000	.48880000	.48880000
4BLYAC	.05869147	.10310941	.10310941	.10310941
4TAHYA	.41390853	.36949059	.36949059	.36949059
4WHTDU	2.21760000	2.21760000	2.21760000	2.21760000
4OATGD				
4BLYDU	152.35131057	267.65140000	267.65140000	267.65140000
4MXDGD				
4THYDU	449.64802433	449.64802433	449.64802433	449.64802433
4PASTD	628.64460000	628.64460000	628.64460000	628.64460000
4CRNCO	137.60709973	140.51537921	134.23950957	134.23950957
4RYECO	.54153000	.54153000	.54153000	.54153000
4SCRCO				
4TAHAR	449.64802433	449.64802433	449.64802433	449.64802433
4EOATD				
4EBLYD	267.65140000	267.65140000	267.65140000	267.65140000
4EROUD	62.72060000	62.72060000	62.72060000	62.72060000
4CFBH1	.09259850	.09235569	.09287966	.09287966
4CFO21	.06897014	.06878929	.06917956	.06917956
4CF241	.06862529	.06844534	.06883366	.06883366
4CF461	.03490595	.03583479	.03383042	.03383042
4CF682	.03473142	.03565562	.03366127	.03366127
4CF802	.03455776	.03547734	.03349296	.03349296
4CSLA4	.02158194	.02025066	.02264142	.02264142
4CSLAD	.03439498	.03529995	.03332550	.03332550
4CABFC	38.79232500	38.79232500	38.79232500	38.79232500
4CAVLC	3.58083000	3.58083000	3.58083000	3.58083000
4HFBH2	.00398466			
4HFBH4				
4HFO21	.06176226			
4HFO22				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
4HFO24				
4HGSLA	.06052702			
4PORKC	27.290265	27.290265	27.290265	27.290265
4HRFA1				
4HRFA3	.77049027	.77049027	.77049027	.77049027
4EGGDU	143.29051621	143.29051621	143.29051621	143.29051621
4EGGHA	6.47738265	6.47738265	6.47738265	6.47738265
4BROFA	4.53416786	4.53416786	4.53416786	4.53416786
4PYMTC	12.69567000	12.69567000	12.69567000	12.69567000
4TKBHA	.01554335	.01554335	.01554335	.01554335
4TKYHA	.56515625	.56515625	.56515625	.56515625
4TKMFA	.33909375	.33909375	.33909375	.33909375
4TKMTC	4.34040000	4.34040000	4.34040000	4.34040000
5OATAC	.06392189	.06428655	.06395319	.06403423
5BLYAC	.08464099	.08466716	.08464099	.08464099
5MXDAC	.05160329	.05196616	.05160329	.05160329
5TAHYA	.39158382	.39083013	.39155253	.39147148
5WHTDU	87.52320000	87.52320000	87.52320000	87.52320000
5OATGD	153.57042304	154.44651085	153.64561001	153.84032723
5BLYDU	265.16837842	265.25036927	265.16837842	265.16837842
5MXDGD	164.17071815	165.32512702	164.17071815	164.17071815
5CRNDU	277.55780000	277.55780000	277.55780000	277.55780000
5FDRCD	236.33430000	236.33430000	236.33430000	236.33430000
5THYDU	199.60558371	199.60558371	199.60558371	199.60558371
5PASTD	609.47950172	609.47950172	609.47950172	609.47950172
5BLYCD				
5MXDCD				
5CRNCO	277.55780000	277.55780000	277.55780000	277.55780000
5TAHAR	199.60558371	199.60558371	199.60558371	199.60558371
5EOATD				
5EBLYD	253.50830000	253.50830000	253.50830000	53.50830000
5EROUD	73.08140000	73.08140000	73.08140000	73.08140000
5CFBH1	.07652610	.07652610	.07652610	.07652610

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
5CF021	.05699893	.05699893	.05699893	.05699893
5CF241	.05671394	.05671394	.05671394	.05671394
5CF461	.07982241	.07982241	.07982241	.07982241
5CF682	.07942330	.07942330	.07942330	.07942330
5CF802	.07902618	.07902618	.07902618	.07902618
5CSLA4				
5CSLA0	.07863105	.07863105	.07863105	.07863105
5CABFC	45.80647500	45.80647500	45.80647500	45.80647500
5CAVLC	4.22829000	4.22829000	4.22829000	4.22829000
5HFBH4	.01461437	.01471714	.01461437	.01461437
5HF024	.21921561	.22075708	.21921561	.21921561
5HGSLA	.21483130	.21634194	.21483130	.21483130
5PORKC	32.22469500	32.22469500	32.22469500	32.22469500
5HRFA3	.86209238	.86328301	.86282002	.86231164
5EGGDU	169.19927972	169.19927972	169.19927972	169.19927972
5EGGHA	8.13312223	8.37803571	8.28279762	8.17822416
5BROFA	5.69318556	5.86462500	5.79795833	5.72475691
5PYMTC	14.99121000	14.99121000	14.99121000	14.99121000
5TFBHA	.01835379	.01949068	.01835379	.01918557
5TKYHA	.66734375	.70868125	.66734375	.69758750
5TKMFA	.40040625	.42520875	.40040625	.41855250
5TKMTC	5.12520000	5.12520000	5.12520000	5.12520000
6OATAC	.15819344	.17654714	.17654714	.17654714
6BLYAC	.03550649	.04938078	.04938078	.04938078
6TAHYA	.16550006	.13327208	.13327208	.13327208
6WHTDU	12.35026030	12.35026030	12.35026030	12.35026030
6OATGD	345.36634598	385.43595355	385.43595355	385.43595355
6BLYDU	81.57368299	113.44888321	113.44888321	113.44888321
6CRNDU				
6MFDDU	2.78780000	2.78780000	2.78780000	2.78780000
6GFDDU	14.26730000	14.26730000	14.26730000	14.26730000
6OATSD	284.74820000	284.74820000	284.74820000	284.74820000
6PASTD	284.74820000	284.74820000	284.74820000	284.74820000

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
6OATCO	187.67422048	192.76852716	192.76852716	192.76852716
6BLYCO				
6CRNCO				
6MFDCO	2.78780000	2.78780000	2.78780000	2.78780000
6GRDFC	14.26730000	14.26730000	14.26730000	14.26730000
6EOATD	53.16770000	53.16770000	53.16770000	53.16770000
6EROUD	31.08870000	31.08870000	31.08870000	31.08870000
6CFBH1	.03811315	.03768782	.03768782	.03768782
6CFO21	.02838782	.02807102	.02807102	.02807102
6CF241	.02824588	.02793066	.02793066	.02793066
6CF461	.06050025	.06212726	.06212726	.06212726
6CF682	.06019775	.06181662	.06181662	.06181662
6CF802	.06989676	.06150754	.06150754	.06150754
6CSLA4	.00160272			
6CSLAO	.05959728	.06120000	.06120000	.06120000
6CABFC	6.74602500	6.74602500	6.74602500	6.74602500
6CAVLC	.62271000	.62271000	.62271000	.62271000
6HFBH2	.01075256	.01495416	.01495416	.01495416
6HFO22	.15913791	.22132160	.22132160	.22132160
6HGSLA	.15595515	.21648217	.21648217	.21648217
6PORKC	4.74580500	4.74580500	4.74580500	4.74580500
6HRFA3	.13755567	.13755567	.13755567	.13755567
6EGGDU	24.91836735	24.91836735	24.91836735	24.91836735
6EGGHA	1.12642347	1.12642347	1.12642347	1.12642347
6BROFA	.78849643	.78849643	.78849643	.78849643
6PYMTC	2.20779000	2.20779000	2.20779000	2.20779000
6TFBHA	.00270300	.00270300	.00270300	.00270300
6TKYHA	.09828125	.09828125	.09828125	.09828125
6TKMFA	.05896875	.05896875	.05896875	.05896875
6TKMTC	.75480000	.75480000	.75480000	.75480000
7OATAC	.32406456	.32406456	.32406456	.32406456

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
7BLYAC	.00830674	.00830674	.00830674	.00830674
7WHTDU	12.20627210	12.20627210	12.20627210	12.20627210
7OATED	181.13271228	179.40599575	179.40599575	179.40599575
7BLYDU	16.79158604	16.79158604	16.79158604	16.79158604
7MFDDU	3.78740000	3.78740000	3.78740000	3.78740000
7GFDDU	19.38480000	19.38480000	19.38480000	19.38480000
7THYDU				
7OATSD	583.31620000	583.31620000	583.31620000	583.31620000
7PASTD	583.31620000	583.31620000	583.31620000	583.31620000
7OATCO	78.13200178	76.40528525	76.40528525	76.40528525
7MFDCO	3.78740000	3.78740000	3.78740000	3.78740000
7GRDCO	19.38480000	19.38480000	19.38480000	19.38480000
7TAHAR				
7EOATD	68.94850000	68.94850000	68.94850000	68.94850000
7EBLYD				
7EROUD	65.99380000	65.99380000	65.99380000	65.99380000
7CFBH1	.10482122	.10496538	.10496538	.10496538
7CF021	.07807399	.07818137	.07818137	.07818137
7CF241	.07768362	.07779046	.07779046	.07779046
7CF461	.02927776	.02872628	.02872628	.02872628
7CF682	.02073003	.02018131	.02018131	.02018131
7CF802	.01734537	.01679940	.01679940	.01679940
7CSLA4	.00242135	.00296460	.00296460	.00296460
7CSLAO	.01725865	.01671540	.01671540	.01671540
7CABFC	6.66737500	6.66737500	6.66737500	6.66737500
7CAVLC	.61545000	.61545000	.61545000	.61545000
7HFBH1				
7HFBH2	.00231217	.00231217	.00231217	.00231217
7HF022	.03190799	.03190799	.03190799	.03190799
7HGSLA	.03126983	.03126983	.03126983	.03126983
7PORKC	4.69047500	4.69047500	4.69047500	4.69047500
7HRFA3	.14625649	.14625649	.14625649	.14625649

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION			
	1 COST	2 COST	3 COST	4 COST
7EGGDU	24.62785114	24.62785114	24.62785114	24.62785114
7EGGHA	1.11329082	1.11329082	1.11329082	1.11329082
7BROFA	.77930357	.77930357	.77930357	.77930357
7PYMTC	2.18205000	2.18205000	2.18205000	2.18205000
7TKYHA	.09713542	.09713542	.09713542	.09713542
7TKMFA	.05828125	.05828125	.05828125	.05828125
7TKMTC	.74600000	.74600000	.74600000	.74600000
8OATAC	.41880511	.41880511	.41880511	.41880511
8BLYAC	.01161502	.01151309	.01151309	.01151309
8TAHYA	.41737986	.41748180	.41748180	.41748180
8WHTDU	35.67729721	37.91714153	36.40656621	18.20796192
8OATGD	317.36601353	317.37305550	317.26101052	314.98720926
8BLYDU	24.86532740	24.64709863	24.64709863	24.64709863
8MFDDU	4.12990000	4.12990000	4.12990000	4.12990000
8GFDDU	2.11380000	2.11380000	2.11380000	2.11380000
8THYDU				
8OATSD	753.84920000	753.84920000	753.84920000	753.84920000
8PASTD	753.84920000	753.84920000	753.84920000	753.84920000
8OATCO	173.29145619	173.29145619	173.29145619	173.29145619
8MFDCO	4.12990000	4.12990000	4.12990000	4.12990000
8GRFDC	2.11380000	2.11380000	2.11380000	2.11380000
8TAHAR				
8EOATD	92.09500000	92.09500000	93.09500000	92.09500000
8EROUD	92.86380000	92.86380000	92.86380000	92.86380000
8CFBH1	.13057753	.13057753	.13057753	.13057753
8CF021	.09725806	.09725806	.09725806	.09725806
8CF241	.09317877	.09317877	.09317877	.09317877
8CF461	.04760360	.04760360	.04760360	.04760360
8CF682	.04272692	.04272692	.04272692	.04272692
8CF802	.04251329	.04251329	.04251329	.04251329
8CSLA4	.03206928	.03206928	.03206928	.03206928

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
8CSLAO	.04230072	.04230072	.04230072	.04230072
8CABFC	9.94565000	9.94565000	9.94565000	9.94565000
8CAVLC	.91806000	.91806000	.91806000	.91806000
8HFBH2	.00333460	.00330533	.00330533	.00330533
8HFO22	.04801823	.04759680	.04759680	.04759680
8HGSLA	.04664487	.04664487	.04664487	.04664487
8PORKC	6.99673000	6.99673000	6.99673000	6.99673000
8HRFA3	.21643681	.21762600	.21654166	.20837781
8EGGDU	36.73709484	36.73709484	36.73709484	36.73709484
8EGGHA	3.14571599	3.36484864	3.16503709	1.66068367
8BROFA	2.20200119	2.35539405	2.21552596	1.16247857
8PYMTC	3.25494000	3.25494000	3.25494000	3.25494000
8TFBHA	.00838547	.00879658	.00879658	.00398503
8TKYHA	.30489583	.31984375	.31984375	.14489583
8TKMFA	.18293750	.19190625	.19190625	.08693750
8TKMTC	1.11280000	1.11280000	1.11280000	1.11280000
9OATAC	.02260812	.02260812	.02260812	.02355283
9BLYAC	.02149215	.02149215	.02149215	.02149215
9TAHYA	.52379973	.52379973	.52379973	.52285502
9WHTDU	2.27520000	2.27520000	2.27520000	2.27520000
9OATGD	54.96191691	54.96191691	54.96191691	57.25856793
9BLYDU	57.23209276	57.23209276	57.23209276	57.23209276
9OATSD	8.92646880	8.92646880	8.92646880	8.92646880
9PASTD	12.47993120	12.47993120	12.47993120	12.47993120
9BLYCO				
9EOATD				
9EBLYD	27.91820000	27.91820000	27.91820000	27.91820000
9EROUD	21.40640000	21.40640000	21.40640000	21.40640000
9CABFC	12.00842500	12.00842500	12.00842500	12.00842500
9CAVLC	1.10847000	1.10847000	1.10847000	1.10847000
9HFBH2	.00383124	.00383124	.00383124	.00383124
9HFO22	.05746861	.05746861	.05746861	.05746861

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
9HGSLA	.05631923	.05631923	.05631923	.05631923
9PORKC	8.44788500	8.44788500	8.44788500	8.44788500
9HRFA3	.21972788	.21972788	.21972788	.22811287
9EGGDU	44.35654262	44.35654262	44.35654262	44.35654262
9EGGHA	.30095238	.30095238	.30095238	2.00511735
9BROFA	.21066667	.21066667	.21066667	1.40358214
9PYMTC	3.93003000	3.93003000	3.93003000	3.93003000
9TFBHA				.00481155
9TKYHA				.17494792
9TKMFA				.10496875
9TKMTC	1.34360000	1.34360000	1.34360000	1.34360000
WHTDU	105.85344000	77.30241906	85.70832122	101.93075132
OATGD	135.24898000	94.66477173	103.82801693	102.42874134
BLYDU	177.02236000			
RYEDU	.54153000	.54153000	.54153000	.54153000
SCRDU	19.98359000		19.98359000	19.98359000
ECNDU	171.93049973	174.83877921	168.56290957	168.56290957
CORND	34.32340000	34.32340000	34.32340000	34.32340000
2. PRODUCT MOVEMENT				
13EGGS				
14EGGS				
23EGGS				
53EGGS				
54EGGS				
64EGGS				
74EGGS				
84EGGS				
1EGGS	.47460000	.47460000	.47460000	.47460000
3EGGS				
51PORK				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
52PORK				
53PORK		.22659628		
61PORK	.43625500	.43625500	.43625500	.43625500
62PORK				
64PORK	18.21121246	27.29026500	27.29026500	27.29026500
74PORK				
84PORK				
89PORK				
1PORK	.09944000	.09944000	.09944000	.09944000
2PORK	.93856000	.93856000	.93856000	.93856000
12CABF		.59904001		
13CABF	.35896924		.35896924	.35896924
62CABF		.13906262		
63CABF	.53134315	1.41702295	.53134315	.53134315
64CABF	18.65665902	18.46372996	19.48847237	19.48847237
65CABF	4.99695947	4.99695947	4.99695947	4.99695947
74CABF	2.28986334	2.00792000	2.00792000	2.00792000
75CABF				
82CABF				
84CABF				
85CABF				
89CABF	12.00842500	12.00842500	12.00842500	12.00842500
2CABF	2.44657428	3.39270000	2.44657428	2.44657428
3CABF	.94612572		.94612572	.94612572
31CAVL				
32CAVL				
35CAVL				
41CAVL				
42CAVL	.49632000		.49632000	.49632000
43CAVL	.40326000	.40326000	.40326000	.40326000
45CAVL		.219948000	.21994800	.21994800
65CAVL				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
85CAVL	4.22829000	4.00834200	4.00834200	4.00834200
86CAVL	.28998466	.62271000	.62271000	.62271000
87CAVL	.11277734			
89CAVL	1.10847000	1.10847000	1.10847000	1.10847000
21TKMT	.02875259			
23TKMT	.48880000		.37400000	
53TKMT		.31747196		.23227196
65TKMT				
73TKMT				
74TKMT				
75TKMT				
83TKMT				
85TKMT				
89TKMT	1.22880000	1.34360000	1.34360000	
93TKMT				
95TKMT				
1TKMT				
2TKMT		.08520000		
3TKMT		.02960000	.11480000	.11480000
9TKMT	.11480000			
23PYMT	.29336377			
51PYMT				
53PYMT	.94970957	1.42974000	1.24307333	1.03810936
54PYMT				
84PYMT				
89PYMT	2.91066333	3.34016333	2.94853269	
1PYMT		.03786936	.03786936	.03786936
2PYMT		.39163064	.39163064	.39163064
3PYMT				
9PYMT	.42950000			
70CA24				
80CA24	.00359300	.00359300	.00359300	.00359300

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TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
12CA46	.00153860		.00153860	.00153860
13CA46		.00097851		
31CA46				
32CA46				
41CA46				
42CA46				
45CA46	.01179428	.01201766	.01201766	.01201766
75CA46	.01159777	.01137438	.01137438	.01137438
76CA46	.03399833	.03433625	.03433625	.03433625
70CA46				
80CA46	.01304000	.01304000	.01304000	.01304000
70CA68	.00840134	.00840134	.00840134	.00840134
80CA68	.00463866	.00463866	.00463866	.00463866
70CA80	.00328100	.00328100	.00328100	.00328100
12CAFA				
13CAFA				
76CAFA				
12HGFA		.01896000		
13HGFA		.01897822	.02048887	.02048887
23HGFA	.02048887			
54HGFA				
60HGFA		.00041300	.00041300	.00041300
80HGFA	.00041300			
3. FEED RECEIPTS FROM OUTSIDE SOURCES				
2EWHET	21.34846183	5.03676182	15.77546987	11.89931876
2EOATS	26.71424335	10.42975959	19.59300479	18.19372920
2EBALY	34.35549190			
2ESCRE	19.98359000		19.98359000	19.98359000
3EWHET				

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
3EXRYE				
3ESCRE				
4EWHET	84.50497817	68.80130539	68.80130539	68.80130539
4EOATS	108.53473665	84.23501214	84.23501214	84.23501214
4EBALY	142.66686810			
4EXRYE	.54153000	.54153000	.54153000	.54153000
4ESCRE				
5EWHET		3.46435184	1.13154596	1.52094756
5EOATS				
5EBALY				
9EWHET				19.70917961
9EOATS				
2EXCRN				
3EXCRN				
4EXCRN	137.60709973	140.51537921	134.23950957	134.23950957
5EXCRN				
4. BASIC HERD DISTRIBUTION				
1TBHCA	.00551769	.00539493	.00551769	.00551769
2TBHCA	.10684506	.10770624	.10684506	.10684506
3TBHCA	.00671676	.00650231	.00671676	.00671676
4TBHCA	.09259850	.09235569	.09287966	.09287966
5TBHCA	.07652610	.07652610	.07652610	.07652610
6TBHCA	.03811315	.03768782	.03768782	.03768782
7TBHCA	.10482122	.10496538	.10496538	.10496538
8TBHCA	.13057753	.13057753	.13057753	.13057753
1TBHHG		.00256374	.00138457	.00138457
2TBHHG	.00253169		.00121679	.00121679
4TBHHG	.00398466			
5TBHHG	.01461437	.01471714	.01461437	.01461437
6TBHHG	.02306326	.02694237	.02700752	.02700752

TABLE I (continued)

ACTIVITY GROUP	COST COMBINATION 1 COST	2 COST	3 COST	4 COST
7TBHHG	.00231217	.00231217	.00231217	.00231217
8TBHHG	.00333460	.00330533	.00330533	.00330533
9TBHHG	.00383124	.00383124	.00383124	.00383124
1TTHAR	.01358502	.01347855	.01347855	.01347855
2TTHAR	.10265228	.10093641	.10191742	.10191742
3TTHAR	.08412154	.08362798	.08412154	.08362798
4TTHAR	.77049027	.77049027	.77049027	.77049027
5TTHAR	.86209238	.86328301	.86282002	.86231164
6TTHAR	.13755567	.13755567	.13755567	.13755567
7TTHAR	.14625649	.14625649	.14625649	.14625649
8TTHAR	.21643681	.21762600	.21654166	.20837781
9TTHAR	.28472955	.28466562	.28473838	.29390418
1TTHAG	.00020214	.00030511	.00030511	.00030511
2TTHAG	.00215851		.00164444	.00030511
3TTHAG		.00050754		.00050754
4TTHAG	.01554335	.01554335	.01554335	.01554335
5TTHAG	.01835379	.01949068	.01835379	.01918557
6TTHAG	.00270300	.00270300	.00270300	.00270300
7TTHAG	.00267149	.00267149	.00267149	.00267149
8TTHAG	.00838547	.00879658	.00879658	.00395803
9TTHAG	.00098624	.00098624	.00098624	.00579779
5. PASTURE-FORAGE BALANCE				
1FORDU	65.98220000	65.98220000	65.98220000	65.98220000
2FORDU	80.02813036	80.02813036	80.02813036	80.02813036
3FORDU	87.55720000	87.55720000	87.55720000	87.55720000
4FORDU	1078.29262433	1078.29262433	1078.29262433	1078.29262433
5FORDU	1045.41938543	1045.41938543	1045.41938543	1045.41938543
6FORDU	569.49640000	569.49640000	569.49640000	569.49640000
7FORDU	1166.63240000	1166.63240000	1166.63240000	1166.63240000
8FORDU	1507.69840000	1507.69840000	1507.69840000	1507.69840000
9FORDU	21.40640000	21.40640000	21.40640000	21.40640000

TABLE II

Effects of Alternative Activity Cost Combinations Used in Conjunction With the Restrictions Imposed by Right Hand Side One Upon the Levels of Resource Use and Simplex, Multipliers.*

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
1FDGAC	0.0	.08338422	.09348797	.08338422	.08338422
1WHTLP	1.248	.00001561	.00001865	.00001561	.00001561
1OATLP	21.2274	* 2.60773306	.00000342	* 2.60773306	* 2.60773306
1BLYLP	1.4293	.00002823	.00003165	.00002823	.00002823
1MXDLP	14.462	.00002171	.00002513	.00002171	.00002171
1THLP	58.2042	* 29.43019275	* 28.36850953	* 29.43019275	* 29.43019275
1PSTLP	32.9911	* 4.21709275	* 3.15540953	* 4.21709275	* 4.21709275
1GNAUS	10.2735	.00016363	.00016705	.00016363	.00016363
1RNAUS	5.1758	.00005549	.00005549	.00005549	.00005549
1BHCAT	.004398	.32965944	.32060454	.32965944	.32965944

*Slack levels are coded to four decimal places in terms of the original data. Similarly, the simplex multipliers are coded to five decimal places.

Slack may be defined as the difference between the left and right members of an equality. In this case it represents the amount of the resource which is unused when optimality is reached in the solution.

The term simplex multiplier, PI, is synonymous with shadow or implicit price. Such multipliers are obtained from the application of the product form of the inverse method to obtain optimality. This method is adopted by the I.B.M. L.P. III program to minimize computation time.

Leaf 473 omitted in page numbering.

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
1CACPS	.00296	.01543650	.01543650	.01543650	.01543650
1CABFD	.761475	.00518810	.00518810	.00518810	.00518810
1CAVLD	.07029	.00858514	.00846346	.00858514	.00858514
1BHHGS	.000607	.14638066	.15442667	.14638066	.14638066
1HGCPS	.00948	* .00948	* .00948	* .00948	* .00948
1PORKD	.535695	.00245887	.00248738	.00245887	.00245887
1THARN	.02725	.02715752	.02680408	.02715752	.02715752
1PYMTD	.24921	.00295420	.00296593	.00295420	.00295420
1EGGOD	.2343	.00583342	.00583342	.00583342	.00583342
1THAGN	.000148	.15761535	.17154768	.15761466	.13643399
1TKMTD	.0852	.00409856	.00416755	.00409856	.00402271
2FDGAC	0.0	.06162351	.11641974	.06162374	.09154600
2WHTLP	.24	.00001027	.00003927	.00001027	.00002454
2OATLP	5.7625	.00000150	.00002671	.00000150	.00001248
2BLYLP	.1712	.00002709	.00005117	.00002709	.00004024
2MXDLP	1.6661	.00000295	.00001706	.00000295	.00001768
2THYLP	90.8219	* 57.45016964	* 57.45016964	* 57.45016964	* 57.45016964
2PSTLP	46.6564	.00006316	.00005670	.00006316	.00006014
2GNAUS	16.7012	.00018311	.00020803	.00018311	.00019790
2RNAUS	8.3027	.00009618	.00008641	.00009018	.00008842
2BHCAT	.007917	* .00223101	* .00136982	* .00223101	* .00136982
2CACPS	.00568	* .00003409	* .00088848	* .00003409	* .00088848
2CABFD	5.3768	.00530460	.00530480	.00530460	.00530480
2CAVLD	.49632	.00859024	.00841975	.00859024	.00853363
2BHHGS	.000574	.26166580	* .00043174	.26166533	.02119172
2HGCPS	.01896	* .00103355	* .00776094	* .00103355	* .00103355
2PORKD	3.78256	.00245997	.00248848	.00245997	.00245997
2THARN	.1094	.03843572	.03457030	.03843572	.03653440
2PYMID	1.75968	.00291739	.00302925	.00291739	.00297241

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
2EGGOD	1.6544	.00592466	.00592466	.00592466	.00592466
2THAGN	.00074	.13420048	.10393790	.13419980	.08862656
2TKMTD	.0852	.00398186	.00405085	.00398186	.00390601
3FDGAC	0.0	.13197301	.19817129	.13197301	.09957193
3WHTLP	.72	.00002687	.00005404	.00002687	.00001725
3OATLP	19.8235	.00003480	.00006015	.00003480	.00002239
3BLYLP	.9231	.00005055	.00007591	.00005055	.00003814
3MXDLP	1.7145	.00002667	.00003108	.00002667	.00001457
3THYLP	106.4472	* 62.66860000	* 62.66860000	* 62.66860000	* 62.66860000
3PSTLP	43.7786	.00001364	.00002301	.00001364	.00007151
3GNAUS	16.4498	.00020472	.00023008	.00020472	.00019231
3RNAUS	7.5727	.00005947	.00006416	.00005947	.00008841
3BHCAT	.007571	.27186915	.20442724	.27186915	* .00042850
3CACPS	.00865	* .00439621	* .00286975	* .00439621	* .00319806
3CABFD	4.36865	.00530460	.00530460	.00530460	.00530460
3CAVLD	.40326	.00847294	.00834596	.00847294	.00853322
3BHHGS	.00498	* .00049800	* .00049800	* .00049800	* .00034392
3HGCPS	.02844	* .02844	* .02844	* .02844000	* .02620520
3PORKD	3.07333	.00243257	.00246108	.00243257	.00243257
3THARN	.05804	.06780086	.06518079	.06780086	.06908327
3PYMTD	1.42974	.00302386	.00302386	.00302386	.00302386
3EGGOD	1.3442	.00827880	.00827880	.00827880	.00827880
3THAGN	.000362	.12664563	.09983251	.12664494	.12280306
3TKMTD	.4888	.00409916	.00416815	.00409916	.00402331
4FDGAC	0.0	.10793347	.14185199	.10793347	.10793347
4WHTLP	2.2176	.00001829	.00002842	.00001829	.00001829
4OATLP	224.0788	.00001458	.00002765	.00001458	.00001458
4BLYLP	3.5363	.00004158	.00005465	.00004158	.00004158
4MXDLP	23.4045	* 8.63502648	* 3.54222399	* 8.63502648	* 10.32682320

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
4FDCLP	42.8642	* 42.8642	* 42.8642	* 42.8642	* 42.8642
4THYLP	1234.3971	*784.74907567	*784.74907567	*784.74907567	*784.74907567
4PSTLP	628.6446	.00005849	.00005681	.00005849	.00005849
4GNAUS	267.6514	.00019709	.00021016	.00019709	.00019709
4RNAUS	62.7206	.00008720	.00008622	.00008720	.00008720
4BHCAT	.116346	* .02677524	* .02719962	* .02677524	* .02720793
4CACPS	.06556	* .00020434	* .00054150	* .00020434	* .00054810
4CABFD	38.792325	.00522260	.00522260	.00522260	.00522260
4CAVLD	3.58083	.00844264	.00838686	.00844264	.00844264
4BHHGS	.012187	* .01090261	* .01045973	* .01090261	* .01104973
4HGCPS	.45792	* .37111838	* .37111838	* .37111838	* .37111838
4PORKD	27.290265	.00239620	.00242471	.00239620	.00239620
4THARN	.42674	.06971293	.06836275	.06971293	.06971293
4PYMTD	12.69567	.00300086	.00300086	.00300086	.00300086
4EGGOD	11.9361	.00818396	.00818396	.00818396	.00818396
4THAGN	.010798	.13333367	.13434299	.13333299	.11215232
4TKMTD	4.3404	.00402716	.00409615	.00402716	.00395131
5FDGAC	0.0	.17207778	.18253619	.17207778	.15546422
5WHTLP	87.5232	.00002180	.00002180	.00002180	.00002180
5OATLP	230.7131	.00003876	.00004210	.00003876	.00003346
5BLYLP	29.5187	.00005493	.00005827	.00005493	.00004962
5MXDLP	235.9536	* 1.68998244	.00001125	* 1.68998244	* 1.68998244
5CRNLP	277.5578	.00000773	.00001214	.00000773	.00000773
5FDCLP	236.3343	.00000535	.00000535	.00000535	.00000535
5THYLP	1243.7723	*786.99974189	*786.99974189	*786.99974189	*786.99974189
5PSTLP	969.0199	.00002215	.00001286	.00002215	.00002215
5GNAUS	253.5083	.00020240	.00020573	.00020240	.00019709
5RNAUS	73.0814	.00008815	.00008273	.00008815	.00008815

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
5BHCAT	.136243	* .00028327	.05283014	* .00028327	* .00014013
5CACPS	.10836	* .00942810	* .00920304	* .00942810	* .00931437
5CABFD	45.806475	.00522260	.00522260	.00522260	.00522260
5CAVLD	4.22829	.00849686	.00849686	.00849686	.00849686
5BHHGS	.02854	.13693762	.05730291	.13693762	.16259008
5HGCPS	.61344	* .37417792	* .36745053	* .37417792	* .37641272
5PORKD	32.224695	.00228167	.00231018	.00228167	.00228167
5THARN	1.03644	.03830898	.03796403	.03830898	.03885694
5PYMTD	14.99121	.00289086	.00289086	.00289086	.00289086
5EGGOD	14.0943	.00588384	.00588384	.00588384	.00588384
5THAGN	.004371	.13789658	.15616873	.13789590	.11829154
5TKMTD	5.1252	.00402716	.00409615	.00402716	.00395131
6FDGAC	0.0	.02674943	.02674943	.02674943	.02674943
6WHTLP	84.4608	* 60.50493001	* 60.50493001	* 60.50493001	* 60.50493001
6OATLP	208.5091	.00001225	.00001225	.00001225	.00001225
6BLYLP	46.6937	.00000733	.00000733	.00000733	.00000733
6MXDLP	27.9062	* 27.9062	* 27.9062	* 27.9062	* 27.9062
6CRNLP	1.1484	.00000784	.00000784	.00000784	.00000784
6MFDLP	2.7878	.00008179	.00008179	.00008179	.00008179
6GFDLP	14.2673	.00005207	.00005207	.00005207	.00005207
6OTSLP	322.9000	* 38.15180000	* 38.15180000	* 38.1518	* 38.1518
6FDCLP	17.7746	* 17.7746	* 17.7746	* 17.7746	* 17.7746
6THYLP	429.5232	*429.5232	*429.5232	*429.5232	*429.5232
6PSTLP	284.7482	.00007934	.00007934	.00007934	.00007934
6GNAUS	53.1677	.00013603	.00013603	.00013603	.00013603
6RNAUS	31.0887	.00008392	.00008392	.00008392	.00008392
6BHCAT	.046601	* .00256499	* .00256499	* .00256499	* .00256499
6CACPS	.0612	* .01138708	* .01142398	* .01138708	* .01139683
6CABFD	6.746025	.00504560	.00504560	.00504560	.00504560

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
6CAVLD	.62271	.00831986	.00831986	.00831986	.00831986
6BHHGS	.003683	.26812860	.33016218	.26812860	.26812860
6HGCPS	.22454	* .17112177	* .17112177	* .17112177	* .17112177
6PORKD	4.745805	.00221920	.00224771	.00221920	.00221920
6THARN	.23822	.03006565	.03006565	.03006565	.03006565
6PYMTD	2.20779	.00286559	.00286559	.00286559	.00286559
6EGGOD	2.0757	.00560893	.00560893	.00560893	.00560893
6THAGN	.01884	.11759801	.13686246	.11759732	.09641665
6TKMTD	.7548	.00388416	.00395315	.00388416	.00380831
6FDGAC	0.0	.08263816	.08263816	.08263816	.08263816
7WHTLP	93.36	* 72.95488144	* 72.95488144	* 72.95488144	* 72.95488144
7OATLP	264.2303	* 51.60766297	* 43.68436385	* 51.60766297	* 49.51422895
7BLYLP	112.0218	* 84.88276434	* 84.88276434	* 84.88276434	* 84.88276434
7MXDLP	24.7434	* 24.7434	* 24.7434	* 24.7434	* 24.7434
7MFDLP	3.7874	.00009404	.00009404	.00009404	.00009404
7GFDLP	19.3848	.00006432	.00006432	.00006432	.00006432
7OTSLP	488.1600	.00004591	.00004591	.00004591	.00004591
7FDCLP	.4102	* .4102	* .4102	* .4102	* .4102
7THYLP	302.7398	*247.04488863	*243.81908542	*247.04488863	*246.19259136
7PSTLP	583.3162	* 39.46128863	* 36.23548542	* 39.46128863	* 38.60899136
7GNAUS	68.9485	.00012377	.00012377	.00012377	.00012377
7RNAUS	65.9938	.00007734	.00007734	.00007734	.00007734
7BHCAT	.096187	.04075971	.04075971	.04075971	.04075971
7CACPS	.01968	.06224598	.06224598	.06224598	.06224598
7CABFD	6.667375	.00497960	.00497960	.00497960	.00497960
7CAVLD	.61545	.00830876	.00830876	.00830876	.00830876
7BHHGS	.003737	.23573337	.29357550	.23573337	.23573337
7HGCPS	.11834	* .06780081	* .06780081	* .06780081	* .06780081
7PORKD	4.690475	.00215320	.00218171	.00215320	.00215320

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
7THARN	.20591	.01137093	.01137093	.01137093	.01137093
7PYMTD	2.18205	.00281375	.00281375	.00281375	.00281375
7EGGOD	2.0515	.00467256	.00467256	.00467256	.00467256
7THAGN	.008451	.11115246	.13041691	.11115177	.08997110
7TKMTD	.7460	.00383216	.00390115	.00383216	.00375631
8FDGAC	0.0	.09644182	.09644182	.09644182	.09644182
8WHTLP	92.1312	* 35.44883379	* 46.94640418	* 35.44883379	* 35.44167275
8OATLP	392.8314	* 26.05406421	* 27.96029402	* 26.05406421	* 26.43299823
8BLYLP	325.0102	*241.80760491	*241.80760491	*241.80760491	*241.80760491
8MXDLP	75.7087	* 75.7087	* 75.7087	* 75.7087	* 75.7087
8MFDLP	4.1299	.00009194	.00009194	.00009194	.00009194
8GFDLP	2.1138	.00006222	.00006222	.00006222	.00006222
8OTSLP	476.2800	.00005358	.00005358	.00005358	.00005358
8THYLP	781.2640	*768.37010497	*772.65759139	*768.37010497	*769.22240223
8PSTLP	753.8492	*264.67530497	*268.96279139	*264.67530497	*265.52760223
8GNAUS	92.095	.00012587	.00012587	.00012587	.00012587
8RNAUS	92.8638	.00008251	.00008251	.00008251	.00008251
8BHCAT	.122629	* .04548055	* .04620064	* .04548055	* .04562370
8CACPS	.07437	* .01813985	* .01866292	* .01813985	* .01824383
8CABFD	9.94565	.00492960	.00492960	.00492960	.00492960
8CAVLD	.91806	.00820876	.00820876	.00820876	.00820876
8BHHGS	.011158	.14507160	.20542859	.14507160	.14507160
8HGCPS	.2625	* .10545130	* .10545130	* .10545130	* .10545130
8PORKD	6.99673	.00210320	.00213171	.00210320	.00210320
8THARN	.25202	* .01997807	* .01997807	* .01997807	* .01997807
8PYMTD	3.25494	.00275386	.00275386	.00275386	.00275386
8EGGOD	3.0602	.00373618	.00373618	.00373618	.00373618
8THAGN	.009273	.10339657	.12266103	.10339589	.08221522
8TKMTD	1.1128	.00378016	.00384915	.00378016	.00370431

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
9FDGAC	0.0	.23114799	.26995059	.23114187	.20711452
9WHTLP	2.2752	.00004383	.00005435	.00004383	.00003079
9OATLP	11.9007	.00007605	.00009062	.00007605	.00006703
9BLYLP	3.8713	.00008680	.00010137	.00008680	.00007778
9MXDLP	1.1269	* 1.1269	* 1.1269	* 1.1269	* 1.1269
9OTSLP	15.8580	* 6.93153120	* 6.93153120	* 6.93153120	* 6.93153120
9FDCLP	4.0335	* 4.0335	* 4.0335	* 4.0335	* 4.0335
9THYLP	125.7844	*125.7844	*125.7844	*125.7844	*125.7844
9PSTLP	167.0671	*154.58716880	*154.58716880	*154.58716880	*154.58716880
9GNAUS	27.9182	.00020612	.00022069	.00020612	.00019709
9RNAUS	21.4064	.00009597	.00009597	.00009597	.00009597
9BHCAT	.023824	* .023824	* .023824	* .023824	* .023824
9CACPS	.02584	* .02584	* .02584	* .02584	* .02584
9CABFD	12.008425	.00506460	.00506460	.00506460	.00506460
9CAVLD	1.10847	.00834376	.00834376	.00834376	.00834376
9BHHGS	.000374	* .000374	* .000374	* .000374	* .000374
9HGCPS	.08214	* .08214	* .08214	* .08214	* .08214
9PORKD	8.447885	.00223820	.00226671	.00223820	.00223820
9THARN	.2639	* .04565289	* .04565289	* .04565289	* .04565289
9PYMTD	3.93003	.00288886	.00288886	.00288886	.00288886
9EGGOD	3.6949	.00394209	.00403102	.00394207	.00385782
9THAGN	.005978	* .00098724	* .00098724	* .00098724	* .00098724
9TKMTD	1.3436	.00372516	.00379415	.00372516	.00364931
CNAUS	34.3234	.00015041	.00015482	.00015041	.00015041
CAN24	.003593	1.61643436	1.61643436	1.61643436	1.61643436
CAN46	.01304	1.68860322	1.68860322	1.68860322	1.68860322
CAN68	.01304	1.93345460	1.93345460	1.93345460	1.93345460
CAN80	.003281	2.20076401	2.20076401	2.20076401	2.20076401
CABFO	3.3927	.00132160	.00132180	.00132160	.00132180
HGSFA	.000413	.31548017	.31975717	.31548017	.31548017

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
PORKO	1.038	.00019803	.00016952	.00019803	.00019803
SFTEG	.4746	.00298938	.00298938	.00298938	.00298938
PLYMT	.4295	.00029986	.00029986	.00029986	.00029986
TKYOP	.1148	.00080916	.00087815	.00080916	.00073331
WHTLP	105.85344	.00002455	.00000927	.00000859	.00001009
OATLP	135.24898	.00004464	.00002977	.00002643	.00003399
BLYLP	177.02236	.00004826	.00003516	.00003182	.00003555
ECNLP	259.5561	.00000240	.00000681	.00000240	.00000240
RYELP	.54153	.00004825	.00000804	.00003147	.00002028
MFDLP	138.32123	*138.32123	*138.32123	*138.32123	*138.32123
SCRLP	19.98359	.00004019	* 10.31478479	.00001960	.00002028
BHCAT	0.0				
BHHGS	0.0				
THARN	0.0				
THAGN	0.0				

TABLE II

Effects of Alternative Activity Cost Combinations Used in Conjunction With the Restrictions Imposed by Right Hand Side Two Upon the Levels of Resource Use and the Simplex Multipliers.

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
1FDGAC	.0334	* .01096764	.00722964	.00722964	.00722964
1WHTLP	1.248	.00000562	.00000884	.00000884	.00000884
1OATLP	0.0				
1BLYLP	0.0				
1MXDLP	0.0				
1THYLP	0.0				
1PSTLP	32.9911	* .01402255	.00001589	.00000608	.00001354
1GNAUS	10.2735	.00013540	.00013540	.00013540	.00013540
1RNAUS	5.1758	.00005549	.00006344	.00005854	.00006226
1BHCAT	.004398	.23009123	.15077254	.19972760	.16251401
1CACPS	.00296	.01543650	.01543650	.01543650	.01543650
1CABFD	.761475	.00472577	.00476633	.00474129	.00476032
1CAVLD	.07029	.00773065	.00773065	.00773065	.00773065
1BHHGS	.000607	* .00058699	.09830566	.02369012	.02369012
1HGCPS	.00948	* .00948	* .00948	* .00948	* .00948
1PORKD	.535695	.00229073	.00233949	.00230588	.00230588
1THARN	.02725	.02753861	.02753861	.02753861	.02753861
1PYMTD	.24921	.00291671	.00292915	.00292915	.00292915
1EGGOD	.2343	.00585863	.00585863	.00585863	.00585863
1THAGN	.000148	.13495531	.14804194	.13038049	.11422251
1TKMTD	.0852	.00396663	.00402987	.00396663	.00390876
2FDGAC	.02744				
2WHTLP	.24	.00000092	.00003000	.00000092	.00001499
2OATLP	0.0				
2BLYLP	0.0				

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
2MXDLP	0.0	* 39.53542582	* 11.86764061	* 39.53542582	* 39.53542582
2THYLP	0.0				
2PSTLP	46.6564	.00004351	.00003879	.00004322	.00003948
2GNAUS	16.7012	.00013568	.00015685	.00015212	.00016155
2RNAUS	8.3027	.00007872	.00007597	.00007855	.00007637
2BHCAT	.007917	* .00224006	* .00136982	* .00223101	* .00138301
2CACPS	.00568	.01084566	* .00088848	* .00003409	* .00089896
2CABFD	5.3768	.00484227	.00488303	.00485779	.00487702
2CAVLD	.49632	.00773575	.00771424	.00773575	.00773575
2BHHGS	.000574	.43646968	.02022043	.30166496	.13077306
2HGCPS	.01896	* .00971989	* .00103355	* .00103355	* .00103355
2PORKD	3.78256	.00229073	.00234059	.00230698	.00230698
2THARN	.1094	.04119593	.03687607	.04021572	.03955209
2PYMTD	1.75968	.00287420	.00299349	.00287420	.00293599
2EGGOD	1.6544	.00592466	.00592466	.00592466	.00592466
2THAGN	.00074	.12374994	.08511338	.12093016	.08028523
2TKMTD	.0852	.00384933	.00391257	.00384933	.00379146
3FDGAC	.0394				
3WHTLP	.72	.00000593	.00001535	.00000593	.00000593
3OATLP	0.0				
3BLYLP	0.0				
3MXDLP	0.0	* 39.36500890	* 21.05585347	* 39.29095253	* 39.29095253
3THYLP	0.0				
3PSTLP	43.7786	.00004014	.00004781	.00004622	.00004743
3GNAUS	16.4498	.00015417	.00015417	.00015417	.00015417
3RNAUS	7.5727	.00007272	.00007656	.00007577	.00007637
3BHCAT	.007571	.03036363	* .00085424	* .00000624	* .00085424
3CACPS	.00865	* .00163995	* .00035291	* .00160586	* .00035291
3CABFD	4.36865	.00484227	.00488283	.00485779	.00487682
3CAVLD	.40326	.00769605	.00771475	.00769605	.00771475

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
3BHHGS	.000498	* .00044313	.03769419	* .00044313	* .00044313
3HGCPS	.02844	* .02764422	* .02121701	* .02764422	* .02764422
3PORKD	3.07333	.00227958	.00231319	.00227958	.00227958
3THARN	.05804	.07139638	.07139638	.07139638	.07139638
3PYMTD	1.42974	.00297805	.00298810	.00297805	.00296547
3EGGOD	1.3442	.00827880	.00827880	.00827880	.00827880
3THAGN	.000362	.12968402	.13398559	.12968402	.11352605
3TKMTD	.4888	.00396663	.00402987	.00396663	.00390876
4FDGAC	.4726				
4WHTLP	2.1276	.00000709	.00001915	.00000709	.00000874
4OATLP	0.0				
4BLYLP	0.0				
4MXDLP	0.0				
4FDCLP	42.8642	* 42.8642	* 42.8642	* 42.8642	* 42.8642
4THYLP	0.0	*803.03053225	*861.15347406	*813.17174785	*810.13347484
4PSTLP	628.6446	.00003613	.00003613	.00003613	.00003613
4GNAUS	267.6514	.00015551	.00015551	.00015551	.00015551
4RNAUS	62.7206	.00007416	.00007416	.00007416	.00007416
4BHCAT	.116346	* .02606028	* .02607393	* .02606074	* .02606074
4CACPS	.06556	* .00248192	* .00287876	* .00248020	* .00286828
4CABFD	38.792325	.00479403	.00479403	.00479403	.00479403
4CAVLD	3.58083	.00758815	.00758815	.00758815	.00758815
4BHHGS	.012187	* .00078497	* .00654902	* .00164351	* .00161632
4HGCPS	.45792	* .28472317	* .29776443	* .29776443	* .29735143
4PORKD	27.290265	.00220173	.00227683	.00222712	.00221138
4THARN	.42674	.07348714	.07139270	.07250693	.07322463
4PYMTD	12.69567	.00295505	.00296510	.00295505	.00294247
4EGGOD	11.9361	.00818396	.00818396	.00818396	.00818396
4THAGN	.010798	.12306478	.11760175	.12024500	.10381099
4TKMTD	4.3404	.00389463	.00395787	.00389463	.00383676

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
5FDGAC	.59175				
5WHTLP	87.5232	.00000992	.00001253	.00000992	.00000666
5OATLP	0.0				
5BLYLP	0.0				
5MXDLP	0.0				
5CRNLP	277.5578	*277.5578	*277.5578	*277.5578	*277.5578
5FDCLP	236.3343	.00000535	.00000535	.00000535	.00000535
5THYLP	0.0	*977.99371042	*875.31279526	*972.39261711	*972.39261711
5PSTLP	969.0199	*296.62235811	*296.63870840	*296.63870840	*296.63870840
5GNAUS	253.5083	.00014747	.00014747	.00014747	.00014747
5RNAUS	73.0814	.00007524	.00007524	.00007524	.00007524
5BHCAT	.136243	* .04106344	* .04106580	* .04106580	* .04106580
5CACPS	.10836	* .03891810	* .03891981	* .03891981	* .03891981
5CABFD	45.806475	.00479403	.00479403	.00479403	.00479403
5CAVLD	4.22829	.00764915	.00764915	.00764915	.00764915
5BHHGS	.020854	* .00489996	.07412140	* .00463180	* .00463180
5HGCPS	.61344	* .37891561	* .38140091	* .37497370	* .37497370
5PORKD	32.224695	.00212868	.00216229	.00212868	.00212868
5THARN	1.03644	.04231439	.04231439	.04231439	.04231439
5PYMTD	14.99121	.00284505	.00285510	.00284505	.00283247
5EGGOD	14.0943	.00588384	.00588384	.00588384	.00588384
5THAGN	.004371	.12925975	.14322592	.12925975	.11772975
5TKMTD	5.1252	.00389463	.00395787	.00389463	.00383676
6FDGAC	.232731				
6WHTLP	84.4608	* 60.50493001	* 60.50493001	* 60.50493001	* 60.50493001
6OATLP	0.0	* 52.20272539	* 52.20272539	* 52.20272539	* 52.20272539
6BLYLP	0.0				
6MXDLP	0.0				
6CRNLP	1.1484	* 1.1484	* 1.1484	* 1.1484	* 1.1484
6MFDLP	2.7878	.00009404	.00009404	.00009404	.00009404

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
6GFDLP	14.2673	.00006432	.00006432	.00006432	.00006432
6OTSLP	0.0				
6FDCLP	17.7746	* 17.7746	* 17.7746	* 17.7746	* 17.7746
6THYLP	0.0	*244.01398701	*244.01398701	*244.01398701	*244.01398701
6PSTLP	284.7482	.00005765	.00005765	.00005765	.00005765
6GNAUS	53.1677	.00012377	.00012377	.00012377	.00012377
6RNAUS	31.0887	.00007308	.00007308	.00007308	.00007308
6BHCAT	.046601	* .00797128	* .00797128	* .00797128	* .00797128
6CACPS	.0612	* .00054970	* .00054970	* .00054970	* .00054970
6CABFD	6.746025	.00461703	.00461703	.00461703	.00461703
6CAVLD	.62271	.00758993	.00758993	.00758993	.00758993
6BHHGS	.003683	.00259566	.16598121	.05783314	.02359787
6HGCPS	.22454	* .17153477	* .17112177	* .17112177	* .17153477
6PORKD	4.745805	.00202473	.00209983	.00205012	.00203438
6THARN	.23822	.03133169	.03133169	.03133169	.03133169
6PYMTD	2.20779	.00286559	.00286559	.00286559	.00286559
6EGGOD	2.0757	.00560893	.00560893	.00560893	.00560893
6THAGN	.010884	.08423170	.10189315	.08423170	.06807373
6TKMTD	.7548	.00375163	.00381487	.00375163	.00369376
7FDGAC	.318129	.00088115	.00088115	.00088115	.00088115
7WHTLP	93.36	* 72.95488144	* 72.95488144	* 72.95488144	* 72.95488144
7OATLP	0.0	*354.79604338	*354.79604338	*354.79604338	*354.79604338
7BLYLP	0.0				
7MXDLP	0.0				
7MFDLP	3.7874	.00009404	.00009404	.00009404	.00009404
7GFDLP	19.3848	.00006432	.00006432	.00006432	.00006432
7OSTLP	0.0	.00000049	.00000049	.00000049	.00000049
7FDCLP	.4102	* .4102	* .4102	* .4102	* .4102
7THYLP	0.0				
7PSTLP	583.3162	* 38.85212329	* 38.85212329	* 38.85212329	* 38.85212329

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
7GNAUS	68.9485	.00012377	.00012377	.00012377	.00012377
7RNAUS	65.9938	.00005463	.00005463	.00005463	.00005463
7BHCAT	.096187	.15575071	.15575071	.15575071	.15575071
7CACPS	.01968	.05381722	.05381722	.05381722	.05381722
7CABFD	6.667375	.00455103	.00455103	.00455103	.00455103
7CAVLD	.61545	.00759143	.00759143	.00759143	.00759143
7BHHGS	.003737	* .00142483	* .00142483	* .00142483	* .00142483
7HGCPS	.11834	* .08707017	* .08707017	* .08707017	* .08707017
7PORKD	4.690475	.00203856	.00203856	.00203856	.00203856
7THARN	.20591	.01137093	.01137093	.01137093	.01137093
7PYMTD	2.18205	.00281375	.00281375	.00281375	.00281375
7EGGOD	2.0515	.00467256	.00467256	.00467256	.00467256
7THAGN	.008451	.07414412	.09180557	.07414412	.05798615
7TKMTD	.7460	.00369963	.00376287	.00369963	.00364176
8FDGAC	.643221				
8WHTLP	92.1312	* 60.13410273	* 51.26301010	* 57.48130746	* 66.42169724
8OATLP	0.0	*435.82645523	*434.93041413	*435.39164832	*436.29282943
8BLYLP	0.0				
8MXDLP	0.0				
8MFDLP	4.1299	.00009194	.00009194	.00009194	.00009194
8GFDLP	2.1138	.00006222	.00006222	.00006222	.00006222
8OSTLP	0.0				
8THYLP	0.0	*620.62285851	*620.31978333	*620.31978333	*620.62285851
8PSTLP	753.8492	* 15.09443750	* 15.09443750	* 15.09443750	* 15.09443750
8GNAUS	92.095	.00012587	.00012587	.00012587	.00012587
8RNAUS	92.8638	.00005572	.00005572	.00005572	.00005572
8BHCAT	.122629	.14425915	.14425915	.14425915	.14425915
8CACPS	.07437	.01815002	.01815002	.01815002	.01815002
8CABFD	9.94565	.00450103	.00450103	.00450103	.00450103
8CAVLD	.91806	.00749143	.00749143	.00749143	.00749143
8BHHGS	.011158	* .00425137	* .00422211	* .00422211	* .00425137

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
8HGCPS	.2625	* .16503370	* .16503370	* .16503370	* .16503370
8PORKD	6.99673	.00203467	.00203467	.00203467	.00203467
8THARN	.25202	* .02634604	* .01997807	* .02444177	* .03085448
8PYMTD	3.25494	.00275386	.00275386	.00275386	.00275386
8EGGOD	3.0602	.00373618	.00373618	.00373618	.00373618
8THAGN	.009273	.06638824	.08404969	.06638824	.05023026
8TKMTD	1.1128	.00364763	.00371087	.00364763	.00358976
9FDGAC	.5679				
9WHTLP	2.2752	.00003263	.00004508	.00003263	.00002124
9OATLP	0.0				
9BLYLP	0.0				
9MXDLP	0.0				
9OSTLP	0.0	* 11.64260985	* 11.20088930	* 11.51051855	* 11.95568962
9FDCLP	4.0335	* 4.0335	* 4.0335	* 4.0335	* 4.0335
9THYLP	0.0	*2419.484085	*2420.57369180	*2419.80991901	*2418.71180067
9PSTLP	167.0671	154.58716880	154.58716880	154.58716880	154.58716880
9GNAUS	27.9182	.00011932	.00011932	.00011932	.00011932
9RNAUS	21.4064	.00009597	.00009597	.00009597	.00009597
9BHCAT	.023824	* .023824	* .023824	* .023824	* .023824
9CACPS	.02584	* .02584	* .02584	* .02584	* .02584
9CABFD	12.008425	.00463603	.00463603	.00463603	.00463603
9CAVLD	1.10847	.00762643	.00762643	.00762643	.00762643
9BHHGS	.000274	.29529825	.29529825	.29529825	.29529825
9HGCPS	.08214	* .07664220	* .07664220	* .07664220	* .07664220
9PORKD	8.447885	.00216967	.00216967	.00216967	.00216967
9THARN	.2639	* .03987930	* .04565289	* .04160582	* .03578713
9PYMTD	3.93003	.00288886	.00288886	.00288886	.00284493
9EGGOD	3.6949	.00347792	.00347792	.00347792	.00347792
9THAGN	.005978	* .00098724	* .00098724	* .00098724	* .00098724
9TKMTD	1.3436	.00358733	.00365057	.00358733	.00352946

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
CNAUS	34.3234	.00014800	.00014800	.00014800	.00014800
CAN24	.003593	1.48347289	1.48347289	1.48347289	1.48347289
CAN46	.01304	1.53707015	1.53707015	1.53707015	1.53707015
CAN68	.01304	1.77096896	1.77096896	1.77096896	1.77096896
CAN80	.003281	2.01555728	2.01555728	2.01555728	2.01555728
CABFO	3.3927	.00085927	.00090003	.00087480	.00089402
HGSFA	.000413	.30370891	.30520015	.30520015	.30515693
PORKO	1.038	.00036727	.00031741	.00035102	.00035102
SETEG	.4746	.00298938	.00298938	.00298938	.00298938
PLYMT	.4295	.00025405	.00026410	.00025405	.00024147
TKYOP	.1148	.00067663	.00073988	.00067663	.00061877
WHTLP	105.85344	.00001336	* 26.48329124	.00000260	.00000054
OATLP	135.24898	.00000873	* 38.46589280	* 8.07825973	* 3.11421653
BLYLP	177.02236	*136.22652425	*177.02236	*157.65283488	*156.31848002
ECNLP	259.5561	* 79.90805179	* 59.76102933	* 59.91902416	* 59.91902416
RYELP	.54153	.00002580	.00000091	.00000902	.00001165
MFDLP	138.32123	*138.32123	*138.32123	*138.32123	*138.32123
SCRLP	19.98359	.00002439	* 19.98359	.00000825	.00001353
BHCAT	0.0				
BHHGS	0.0				
THARN	0.0				
THAGN	0.0				

TABLE II

Effect of Alternative Activity Cost Combinations Used in Conjunction With the Restrictions Imposed by Right Hand Side Three Upon the Levels of Resource Use and Simplex Multipliers.

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
1FDGAC	.0334	* .01611145	.00252915	* .00767853	* .00766958
1WHTLP	1.248	.00001123	.00002014	.00001799	.00001058
1OATLP	0.0				
1BLYLP	0.0				
1MXDLP	0.0				
1THYLP	0.0				
1PSTLP	32.9911	.00003596	.00003327	.00003596	.00003596
1GNAUS	10.2735	.00013540	.00013626	.00013540	.00013540
1RNAUS	5.1758	.00007347	.00007252	.00007347	.00007347
1BHCAT	0.0				
1CACPS	.00296	* .00049666	.01613270	* .00046256	* .00046256
1CABFD	.761475	.00469935	.00470655	.00469935	.00469935
1CAVLD	.07029	.00752385	.00754092	.00752385	.00752385
1BHHGS	0.0				
1HGCPS	.00948	* .00948	* .00948	* .00948	* .00948
1PORKD	.535695	.00230423	.00228953	.00228953	.00228953
1THARN	0.0				
1PYMTD	.24921	.00286092	.00289564	.00288701	.00285843
1EGGOD	.2343	.00403687	.00404450	.00403687	.00403687
1THAGN	0.0				
1TKMTD	.0852	.00351184	.00355833	.00354620	.00350855
2FDGAC	.02744				
2WHTLP	.24	.00000466	.00003000	.00000168	.00001455
2OATLP	0.0				
2BLYLP	0.0				
2MXDLP	0.0				
2THYLP	0.0	* 76.12045526	* 29.86996096	* 36.90729741	* 31.94616591

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
2PSTLP	46.6564	.00003837	.00003554	.00003804	.00003804
2GNAUS	16.7012	.00014236	.00015685	.00015685	.00015685
2RNAUS	8.3027	.00007573	.00007408	.00007553	.00007553
2BHCAT	0.0	* .10115907	* .10115907	* .10115907	* .10115907
2CACPS	.00568	.02191285	* .00062054	* .00003409	* .00003409
2CABFD	5.3768	.00481585	.00482325	.00481585	.00481585
2CAVLD	.49632	.00761151	.00759082	.00761151	.00761151
2BHHGS	0.0				
2HGCPS	.01896	.02503923	.00137345	.01438277	.00801593
2PORKD	3.78256	.00230423	.00228953	.00228953	.00228953
2THARN	0.0				
2PYMTD	1.75968	.00275854	.00290112	.00278351	.00283443
2EGGOD	1.6544	.00354200	.00375120	.00355436	.00359347
2THAGN	0.0				
2TKMTD	.0852	.00339514	.00357797	.00342950	.00350121
3FDGAC	.0394				
3WHTLP	.72	.00001521	.00002084	.00001711	.00001443
3OATLP	0.0				
3BLYLP	0.0				
3MXDLP	0.0				
3THYLP	0.0	* 38.83488299	* 36.16111613	* 38.83488299	* 38.64384656
3PSTLP	43.7786	.00004357	.00004357	.00004357	.00004357
3GNAUS	16.4498	.00015417	.00015417	.00015417	.00015417
3RNAUS	7.5727	.00007444	.00007444	.00007444	.00007444
3BHCAT	0.0				
3CACPS	.00865	* .00377098	* .00323080	* .00377098	* .00377098
3CABFD	4.36865	.00481585	.00481585	.00481585	.00481585
3CAVLD	.40326	.00759051	.00759051	.00759051	.00759051
3BHHGS	0.0				
3HGCPS	.02844	* .00795113	* .01019789	* .00795113	* .00795113
3PORKD	3.07333	.00224543	.00227958	.00227267	.00227267

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
3THARN	0.0				
3PYMTD	1.42974	.00287584	.00288314	.00288314	.00285843
3EGGOD	1.3442	.00383695	.00383695	.00383695	.00383695
3THAGN	0.0				
3TKMTD	.4888	.00351244	.00357797	.00354680	.00354542
4FDGAC	.4726				
4WHTLP	2.1276	.00000336	.00001915	.00000970	.00000820
4OATLP	0.0				
4BLYLP	0.0				
4MXDLP	0.0				
4FDCLP	42.8642	* 42.8642	* 42.8642	* 42.8642	* 42.8642
4THYLP	0.0	*1080.35126564	*916.29957766	916.29957766	*916.29957766
4PSTLP	628.6446	.00003287	.00003287	.00003287	.00003287
4GNAUS	267.6514	.00015551	.00015551	.00015551	.00015551
4RNAUS	62.7206	.00007226	.00007226	.00007226	.00007226
4BHCAT	0.0				
4CACPS	.06556	* .00922034	* .00963663	* .00922034	* .00922034
4CABFD	38.792325	.00473385	.00473385	.00473385	.00473385
4CAVLD	3.58083	.00746391	.00746391	.00746391	.00746391
4BHHGS	0.0				
4HGCPS	.45792	* .39739298	* .45792	* .45792	* .45792
4PORKD	27.290265	.00221523	.00220053	.00220053	.00220053
4THARN	0.0				
4PYMTD	12.69567	.00275241	.00281678	.00277741	.00276976
4EGGOD	11.9361	.00369302	.00377479	.00370597	.00366165
4THAGN	0.0				
4TKMTD	4.3404	.00344289	.00353673	.00347725	.00346226
5FDGAC	.59175				
5WHTLP	87.5232	.00001063	.00001253	.00001253	.00000612
5OATLP	0.0				
5BLYLP	0.0				
5MXDLP	0.0				

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
5CRNLP	277.5578	.00000378	.00000378	.00000378	.00000378
5FDCLP	236.3343	.00000535	.00000535	.00000535	.00000535
5THYLP	0.0	*1284.24397443	*1280.28944250	*1284.12399425	*1283.81327274
5PSTLP	969.0199	* 335.22937606	* 335.22937606	* 335.22937606	* 335.22937606
5GNAUS	253.5083	.00014747	.00014747	.00014747	.00014747
5RNAUS	73.0814	.00007524	.00007524	.00007524	.00007524
5BHCAT	0.0				
5CACPS	.10836	* .03010170	* .03010170	* .03010170	* .03010170
5CABFD	45.806475	.00473385	.00473385	.00473385	.00473385
5CAVLD	4.22829	.00755053	.00757391	.00757391	.00757391
5BHHGS	0.0				
5HGCPS	.61344	* .39860870	* .39636194	* .39860870	* .39860870
5PORKD	32.224695	.00212868	.00212868	.00212868	.00212868
5THARN	0.0				
5PYMTD	14.99121	.00274284	.00275014	.00275014	.00272543
5EGGOD	14.0943	.00341434	.00341434	.00341434	.00341434
5THAGN	0.0				
5TKMTD	5.1252	.00343536	.00344497	.00344497	.00341242
5FDGAC	.232731				
6WHTLP	84.4608	* 72.11053970	* 72.11053970	* 72.11053970	* 72.11053970
6OATLP	0.0				
6BLYLP	0.0				
6MXDLP	0.0				
6CRNLP	1.1484	* 1.1484	* 1.1484	* 1.1484	* 1.1484
6MFDLP	2.7878	.00009020	.00009404	.00009404	.00009404
6GFDLP	14.2673	.00006048	.00006432	.00006432	.00006432
6OSTLP	0.0	.00000466	* 33.03665445	* 33.03665445	* 33.03665445
6FDCLP	17.7746	* 17.7746	* 17.7746	* 17.7746	* 17.7746
6THYLP	0.0	* 152.68951538	* 26.61364733	* 26.61364733	* 26.61364733
6PSTLP	284.7482	.00005571	.00005128	.00005128	.00005128
6GNAUS	53.1677	.00012761	.00012377	.00012377	.00012377
6RNAUS	31.0887	.00006978	.00006989	.00006989	.00006989

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
6BHCAT	0.0				
6CACPS	.0612	.00882586	.02103220	.02103220	.02103220
6CABFD	6.746025	.00455685	.00455685	.00455685	.00455685
6CAVLD	.62271	.00742453	.00744791	.00744791	.00744791
6BHHGS	0.0	* .01231069	* .01198788	* .01205336	* .01205336
6HGCPS	.22454	* .06858485	* .00805783	* .00805783	* .00805783
6PORKD	4.745805	.00203823	.00202353	.00202353	.00202353
6THARN	0.0				
6PYMTD	2.20779	.00278224	.00278117	.00278117	.00278117
6EGGOD	2.0757	.00364755	.00362239	.00362239	.00362239
6THAGN	0.0				
6TKMTD	.7548	.00345407	.00344999	.00344999	.00344999
7FDGAC	.318129	.04556631	.04556631	.04556631	.04556631
7WHTLP	93.36	* 77.39855017	* 77.39855017	* 77.39855017	* 77.39855017
7OATLP	0.0	*375.23498938	*376.96170591	*376.96170591	*376.96170591
7BLYLP	0.0				
7MXDLP	0.0				
7MFDLP	3.7874	.00009404	.00009404	.00009404	.00009404
7GFDLP	19.3848	.00006432	.00006432	.00006432	.00006432
7OSTLP	0.0	.00002531	.00002531	.00002531	.00002531
7FDCLP	.4102	* .4102	* .4102	* .4102	* .4102
7THYLP	0.0				
7PSTLP	583.3162	* 20.84993329	* 20.84993329	* 20.84993329	* 20.84993329
7GNAUS	68.9485	.00012377	.00012377	.00012377	.00012377
7RNAUS	65.9938	.00006704	.00006704	.00006704	.00006704
7BHCAT	0.0				
7CACPS	.01968	.03351666	.03351666	.03351666	.03351666
7CABFD	6.667375	.00449085	.00449085	.00449085	.00449085
7CAVLD	.61545	.00735753	.00735753	.00735753	.00735753
7BHHGS	0.0				
7HGCPS	.11834	* .08707017	* .08707017	* .08707017	* .08707017
7PORKD	4.690475	.00211732	.00211732	.00211732	.00211732

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
7THARN	0.0				
7PYMTD	2.18205	.00278078	.00278078	.00278078	.00278078
7EGGOD	2.0515	.00389695	.00389695	.00389695	.00389695
7THAGN	0.0				
7TKMTD	.7460	.00343411	.00343411	.00343411	.00343411
8FDGAC	.643221				
8WHTLP	92.1312	* 56.45390279	* 54.21405847	* 55.87070132	* 73.92323808
8OATLP	0.0	*539.07368649	*539.06664452	*539.18952387	*541.45249076
8BLYLP	0.0				
8MXDLP	0.0				
8MFDLP	4.1299	.00009194	.00009194	.00009194	.00009194
8GFDLP	2.1138	.00006222	.00006222	.00006222	.00006222
8OSTLP	0.0				
8THYLP	0.0	*632.68250720	*632.98558238	*632.98558238	*632.98558238
8PSTLP	753.8492	.00002221	.00002221	.00002221	.00002221
8GNAUS	92.095	.00012587	.00012587	.00012587	.00012587
8RNAUS	92.8638	.00006683	.00006683	.00006683	.00006683
8BHCAT	0.0				
8CACPS	.07437	.01484662	.01969915	.01969915	.01969915
8CABFD	9.94565	.00446285	.00447220	.00447220	.00447220
8CAVLD	.91806	.00725753	.00728091	.00728091	.00728091
8BHHGS	0.0				
8HGCPS	.2625	* .21585513	* .21585513	* .21585513	* .21585513
8PORKD	6.99673	.00203467	.00203467	.00203467	.00203467
8THARN	0.0				
8PYMTD	3.25494	.00275386	.00275386	.00275386	.00275386
8EGGOD	3.0602	.00373618	.00373618	.00373618	.00373618
8THAGN	0.0				
8TKMTD	1.1128	.00340989	.00340989	.00340989	.00340989
9FDGAC	.5679				
9WHTLP	2.2752	.00003263	.00003263	.00003263	.00002070
9OATLP	0.0				

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
9BLYLP	0.0				
9MXDLP	0.0				
9OSTLP	0.0	* 31.76814322	* 31.76814322	* 31.76814322	* 33.46861743
9FDCLP	4.0335	* 4.0335	* 4.0335	* 4.0335	* 4.0335
9THYLP	0.0	*2325.73366401	*2325.73366401	*2325.73366401	*2321.53904760
9PSTLP	167.0671	* 154.58716880	* 154.58716880	* 154.58716880	* 154.58716880
9GNAUS	27.9182	.00011932	.00011932	.00011932	.00011932
9RNAUS	21.4064	.00009597	.00009597	.00009597	.00009597
9BHCAT	0.0				
9CACPS	.02584	* .02584	* .02584	* .02584	* .02584
9CABFD	12.008425	.00459785	.00460720	.00460720	.00460720
9CAVLD	1.10847	.00739253	.00741591	.00741591	.00741591
9BHHGS	0.0				
9HGCPS	.08214	* .02582077	* .02582077	* .02582077	* .02582077
9PORKD	8.447885	.00203575	.00203575	.00203575	.00203575
9THARN	0.0	* .06500166	* .06493866	* .06500888	* .06579131
9PYMTD	3.93003	.00288886	.00288886	.00288886	.00284284
9EGGOD	3.6949	.00347792	.00347792	.00347792	.00347792
9THAGN	0.0	* .00098624	* .00098624	* .00098624	* .00098624
9TKMTD	1.3436	.00354489	.00354489	.00354489	.00352672
CNAUS	34.3234	.00014800	.00014800	.00014800	.00014800
CAN24	.003593	1.42929424	1.42929424	1.42929424	1.42929424
CAN46	.01304	1.49181752	1.49181752	1.49181752	1.49181752
CAN68	.01304	1.73315945	1.73315945	1.73315945	1.73315945
CAN80	.003281	1.98952995	1.98952995	1.98952995	1.98952995
CABFD	3.3927	.00083285	.00084025	.00083285	.00083285
HGSFA	.000413	.30520015	.30352994	.30352994	.30352994
PORKD	1.038	.00035377	.00036847	.00036847	.00036847
SETEG	.4746	.00334273	.00334209	.00334273	.00334273
PLYMT	.4295	.00016486	.00017712	.00016486	.00013443
TKYOP	.1148	.00025489	.00028797	.00025680	.00025542
WHTLP	105.85344	.00000962	* 28.55102094	* 19.99905124	* 3.92268868

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
OATLP	135.24898	.00001618	* 40.59401017	31.39035662	* 32.82023866
BLYLP	177.02236	.00000668	*177.02236	*177.02236	*177.02236
ENCLP	259.5561	* 86.44080486	* 83.53252538	* 89.80839502	* 89.80839502
RYELP	.54153	.00002580	.00000091	.00000902	.00001165
MFDLP	138.32123	*138.32123	*138.32123	*138.32123	*138.32123
SCRLP	19.98359	.00002957	* 19.98359	.00001587	.00000861
BHCAT	.561716	0.0			
BHHGS	.053672	0.0			
THARN	2.61792	0.0			
THAGN	.051004	0.0			

TABLE II

Effect of Alternative Activity Cost Combinations Used in Conjunction With the Restrictions Imposed by Right Hand Side Four Upon the Levels of Resource Use and Simplex Multipliers.

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
1FDGAC	.0334	* .01607308	.00252915	* .00766988	.00766988
1WHTLP	1.248	.00001123	.00002156	.00001847	.00001058
1OATLP	0.0				
1BLYLP	0.0				
1MXDLP	0.0				
1THYLP	0.0				
1PSTLP	32.9911	.00003596	.00003327	.00003596	.00003596
1GNAUS	10.2735	.00013540	.00013626	.00013540	.00013540
1RNAUS	5.1758	.00007347	.00007252	.00007347	.00007347
1BHCAT	0.0				
1CACPS	.00296	* .00046296	.01592689	* .00046256	* .00046256
1CABFD	.761475	.00469935	.00470615	.00469935	.00469935
1CAVLD	.07029	.00752385	.00753993	.00752385	.00752385
1BHHGS	0.0				
1HGCPS	.00948	* .00948	* .00948	* .00948	* .00948
1PORKD	.535695	.00230423	.00228953	.00228953	.00228953
1THARN	0.0				
1PYMTD	.24921	.00286092	.00290112	.00288886	.00285843
1EGGOD	.2343	.00403687	.00404450	.00403687	.00403687
1THAGN	0.0				
1TKMTD	.0852	.00351184	.00356554	.00354864	.00350855
2FDGAC	.02744				
2WHTLP	.24	.00000466	.00003000	.00000168	.00001445
2OATLP	0.0				
2BLYLP	0.0				
2MXDLP	0.0				

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
2THYLP	0.0	* 76.12045526	* 29.86996096	* 36.90729741	* 31.94616591
2PSTLP	46.6564	.00003804	.00003552	.00003804	.00003804
2GNAUS	16.7012	.00014236	.00015685	.00015685	.00015685
2RNAUS	8.3027	.00007553	.00007406	.00007553	.00007553
2BHCAT	0.0	* .10115907	* .10115907	* .10115907	* .10115907
2CACPS	.00568	* .00003409	* .00088848	* .00003409	.00046256
2CABFD	5.3768	.00481585	.00482285	.00481585	.00469935
2CAVLD	.49632	.00761151	.00759000	.00761151	.00752385
2BHHGS	0.0				
2HGCPS	.01896	.02503923	.00137345	.01438277	.00801593
2PORKD	3.78256	.00230423	.00228953	.00228953	.00228953
2THARN	0.0				
2PYMTD	1.75968	.00275854	.00290112	.00278351	.00283443
2EGGOD	1.6544	.003542	.0037512	.00355436	.00359347
2THAGN	0.0				
2TKMTD	.0852	.00339514	.00357797	.00342950	.00350121
3FDGAC	.0394				
3WHTLP	.72	.00001521	.00002084	.00001711	.00001443
3OATLP	0.0				
3BLYLP	0.0				
3MXDLP	0.0				
3THYLP	0.0	* 38.83488299	* 34.92961317	* 38.83488299	* 38.64384656
3PSTLP	43.7786	.00004357	.00004357	.00004357	.00004357
3GNAUS	16.4498	.00015417	.00015417	.00015417	.00015417
3RNAUS	7.5727	.00007444	.00007444	.00007444	.00007444
3BHCAT	0.0				
3CACPS	.00865	* .00377098	* .00296286	* .00377098	* .00377098

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
3CABFD	4.36865	.00481585	.00481585	.00481585	.00481585
3CAVLD	.40326	.00759051	.00759051	.00759051	.00759051
3BHHGS	0.0				
3HGCPS	.02844	* .00795113	* .00946178	* .00795113	* .00795113
3PORKD	3.07333	.00224543	.00227958	.00227267	.00227267
3THARN	0.0				
3PYMTD	1.42974	.00287584	.00288314	.00288314	.00285843
3EGGOD	1.3442	.00383695	.00383695	.00383695	.00383695
3THAGN	0.0				
3TKMTD	.4888	.00351244	.00357797	.00354680	.00354542
4FDGAC	.4726				
4WHTLP	2.2176	.00000336	.00001915	.00000970	.00000820
4OATLP	0.0				
4BLYLP	0.0				
4MXDLP	0.0				
4FDCLP	42.8642	* 42.8642	* 42.8642	* 42.8642	* 42.8642
4THYLP	0.0	*1080.50559607	* 916.29957766	* 916.29957766	* 916.29957766
4PSTLP	628.6446	.00003287	.00003287	.00003287	.00003287
4GNAUS	267.6514	.00015551	.00015551	.00015551	.00015551
4RNAUS	62.7206	.00007226	.00007226	.00007226	.00007226
4BHCAT	0.0				
4CACPS	.06556	* .00959309	* .01000938	* .00959309	* .00959309
4CABFD	38.792325	.00473385	.00473385	.00473385	.00473385
4CAVLD	3.58083	.00746391	.00746391	.00746391	.00746391
4BHHGS	0.0				
4HGCPS	.45792	* .39739298	* .45792000	* .45792000	* .45792000
4PORKD	27.290265	.00221523	.00220053	.00220053	.00220053
4THARN	0.0				
4PYMTD	12.69567	.00275241	.00281678	.00277741	.00276976
4EGGOD	11.9361	.00369302	.00377479	.00370597	.00366165
4THAGN	0.0				
4TKMTD	4.3404	.00344289	.00353673	.00347725	.00346226

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
5FDGAC	.59175				
5WHTLP	87.5232	.00001063	.00001253	.00001253	.00000612
5OATLP	0.0				
5BLYLP	0.0				
5MXDLP	0.0				
5CRNLP	277.5578	.00000378	.00000378	.00000378	.00000378
5FDCLP	236.3343	.00000535	.00000535	.00000535	.00000535
5THYLP	0.0	*1301.63281879	*1298.74333518	*1301.51283862	*1301.20211711
5PSTLP	969.0199	* 359.54039828	* 359.54039828	* 359.54039828	* 359.54039828
5GNAUS	253.5083	.00014747	.00014747	.00014747	.00014747
5RNAUS	73.0814	.00007524	.00007524	.00007524	.00007524
5BHCAT	0.0				
5CACPS	.10836	* .02972895	* .02972895	* .02972895	* .02972895
5CABFD	45.806475	.00473385	.00473385	.00473385	.00473385
5CAVLD	4.22829	.00755053	.00757391	.00757391	.00757391
5BHHGS	0.0				
5HGCPS	.61344	.39860870	.39709806	.39860870	.39860870
5PORKD	32.224695	.00212868	.00212868	.00212868	.00212868
5THARN	0.0				
5PYMTD	14.99121	.00274284	.00275014	.00275014	.00272543
5EGGOD	14.0943	.00341434	.00341434	.00341434	.00341434
5THAGN	0.0				
5TKMTD	5.1252	.00343536	.00344497	.00344497	.00341242
6FDGAC	.3592				
6WHTLP	84.4608	* 72.11053970	* 72.11053970	* 72.11053970	* 72.11053970
6OATLP	0.0				
6BLYLP	0.0				
6MXDLP	0.0				
6CRNLP	1.1484	1.1484	1.1484	1.1484	1.1484
6MFDLP	2.7878	.00009020	.00009404	.00009404	.00009404
6GFDLP	14.2673	.00006048	.00006432	.00006432	.00006432
6OSTLP	0.0	* .00000466	* 33.03665445	* 33.03665445	* 33.03665445

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
6FDCLP	17.7746	* 17.7746	* 17.7746	* 17.7746	* 17.7746
6THYLP	0.0	*647.43624342	*521.36037537	*521.36037537	*521.36037537
6PSTLP	284.7482	.00005571	.00005128	.00005128	.00005128
6GNAUS	53.1677	.00012761	.00012377	.00012377	.00012377
6RNAUS	31.0887	.00006978	.00006989	.00006989	.00006989
6BHCAT	0.0				
6CACPS	.0612	.00882586	.02103220	.02103220	.02103220
6CABFD	6.746025	.00455685	.00455685	.00455685	.00455685
6CAVLD	.62271	.00742453	.00744791	.00744791	.00744791
6BHHGS	0.0	* .01231069	* .01198821	* .01205336	* .01205336
6HGCPS	.22454	* .06858485	* .00805783	* .00805783	* .00805783
6PORKD	4.745805	.00203823	.00202353	.00202353	.00202353
6THARN	0.0				
6PYMTD	2.20779	.00278224	.00278117	.00278117	.00278117
6EGGOD	2.0757	.00364755	.00362239	.00362239	.00362239
6THAGN	0.0				
6TKMTD	.7548	.00345407	.00344999	.00344999	.00344999
7FDGAC	.5486	* .21622870	* .21622870	* .21622870	* .21622870
7WHTLP	93.36	* 81.15372790	* 81.15372790	* 81.15372790	* 81.15372790
7OATLP	0.0	396.60309607	398.32981260	398.32981260	398.32981260
7BLYLP	0.0				
7MXDLP	0.0				
7MFDLP	3.7874	.00009404	.00009404	.00009404	.00009404
7GFDLP	19.3848	.00006432	.00006432	.00006432	.00006432
7OTSLP	0.0				
7FDCLP	.4102	* .4102	* .4102	* .4102	* .4102
7THYLP	0.0				
7PSTLP	583.3162	.00002531	.00002531	.00002531	.00002531
7GNAUS	68.9485	.00012377	.00012377	.00012377	.00012377
7RNAUS	65.9938	.00006704	.00006704	.00006704	.00006704
7BHCAT	0.0				
7CACPS	.01968	.03351666	.03351666	.03351666	.03351666

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
7CABFD	6.667375	.00449085	.00449085	.00449085	.00449085
7CAVLD	.61545	.00735753	.00735753	.00735753	.00735753
7BHHGS	0.0				
7HGCPS	.11834	* .08707017	* .08707017	* .08707017	* .08707017
7PORKD	4.690475	.00203700	.00203700	.00203700	.00203700
7THARN	0.0				
7PYMTD	2.18205	.00278078	.00278078	.00278078	.00278078
7EGGOD	2.0515	.00389695	.00389695	.00389695	.00389695
7THAGN	0.0				
7TKMTD	.7460	.00343411	.00343411	.00343411	.00343411
8FDGAC	.8478				
8WHTLP	92.1312	* 56.45390279	* 54.21405847	* 55.72463379	* 73.92323808
8OATLP	0.0	* 539.07368649	* 539.06664452	* 539.17868950	* 541.45249076
8BLYLP	0.0				
8MXDLP	0.0				
8MFDLP	4.1299	.00009194	.00009194	.00009194	.00009194
8GFDLP	2.1138	.00006222	.00006222	.00006222	.00006222
8OSTLP	0.0				
8THYLP	0.0	*1240.92042363	*1241.22349881	*1241.22349881	*1241.22349881
8PSTLP	753.8492	.00002221	.00002221	.00002221	.00002221
8GNAUS	92.095	.00012587	.00012587	.00012587	.00012587
8RNAUS	92.8638	.00006683	.00006683	.00006683	.00006683
8BHCAT	0.0				
8CACPS	.07437	.00446285	.00447220	.00447220	.00447220
8CAVLD	.91806	.00725753	.00728091	.00728091	.00728091
8BHHGS	0.0				
8HGCPS	.2625	.21585513	.21585513	.21585513	.21585513
8PORKD	6.99673	.00203467	.00203467	.00203467	.00203467
8THARN	0.0				
8PYMTD	3.25494	.00275386	.00275386	.00275386	.00275386
8EGGOD	3.0602	.00373618	.00373618	.00373618	.00373618
8THAGN	0.0				

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
8TKMTD	1.1128	.00340989	.00340989	.00040989	.00340989
9FDGAC	.5679				
9WHTLP	2.2752	.00003263	.00003263	.00003263	.00002070
90ATLP	0.0				
9BLYLP	0.0				
9MXDLP	0.0				
90STLP	0.0	* 31.76814322	* 31.76814322	* 31.76814322	* 33.46861743
9FDCLP	4.0335	* 4.0335	* 4.0335	* 4.0335	* 4.0335
9THYLP	0.0	*2325.73366401	*2325.73366401	*2325.73366401	*2321.53904760
9PSTLP	167.0671	* 154.58716880	* 154.58716880	* 154.58716880	* 154.58716880
9GNAUS	27.9182	.00011932	.00011932	.00011932	.00011932
9RNAUS	21.4064	.00009597	.00009597	.00009597	.00009597
9BHCAT	0.0				
9CACPS	.02584	* .02584	* .02584	* .02584	* .02584
9CABFD	12.008425	.00459785	.00460720	.00460720	.00460720
9CAVLD	1.10847	.00739253	.00741591	.00741591	.00741591
9BHHGS	0.0				
9HGCPS	.08214	* .02582077	* .02582077	* .02582077	* .02582077
9PORKD	8.447885	.00203575	.00203575	.00203575	.00203575
9THARN	0.0	* .06500166	* .06493773	* .06501050	* .06579131
9PYMTD	3.93003	.00288886	.00288886	.00288886	.00284284
9EGGOD	3.6949	.00347792	.00347792	.00347792	.00347792
9THAGN	0.0	.00098624	.00098624	.00098624	.00098624
9TKMTD	1.3436	.00354489	.00354489	.00354489	.00352672
CNAUS	34.3234	.00014800	.00014800	.00014800	.00014800
CAN24	.003593	1.42929424	1.42929424	1.42929424	1.42929424
CAN46	.01304	1.49181752	1.49181752	1.49181752	1.49181752
CAN68	.01304	1.73315945	1.73315945	1.73315945	1.73315945
CAN80	.003281	1.98952995	1.98952995	1.98952995	1.98952995
CABFD	3.3927	.00083285	.00083285	.00083285	.00083285
HGSFA	.000413	.30520015	.30352994	.30352994	.30352994
PORKD	1.038	.00035377	.00036847	.00036847	.00036847

TABLE II (continued)

RESOURCE	LEVEL	1 COST SLACK* or PI	2 COST SLACK* or PI	3 COST SLACK* or PI	4 COST SLACK* or PI
SETEG	.4746	.00334273	.00334209	.00334273	.00334273
PLYMT	.4295	.00016486	.00017712	.00016486	.00013443
TKYOP	.1148	.00025489	.00028797	.00025680	.00025542
WHTLP	105.85344	* .00000962	* 28.55102094	* 20.14511878	* 3.92268868
OATLP	135.24898	* .00001618	* 40.58420827	* 31.42096307	* 32.82023866
BLYLP	177.02236	* .00000668	*177.02236	*177.02236	*177.02236
ECNLP	259.5561	* 87.62560027	* 84.71732079	* 90.99319043	* 90.99319043
RYELP	.54153	.00002580	.00000091	.00000902	.00001165
MFDLP	138.32123	*138.32123	*138.32123	*138.32123	*138.32123
SCRLP	19.98359	.00003646	* 19.98359	.00001587	.00000861
BHCAT	.561716				
BHHGS	.053672				
THARN	2.61792				
THAGN	.651064				

APPENDIX IX

Some Notes on Transportation Rates for Grain and Milled Products.

Rates for Products Milled in Western Canada*

The same freight rate applies to movements of milled products as to movements of domestic grain. Freight rates in Western Canada are applied in such a manner as to attempt to allow the milled products from local mills to be fully competitive in markets outside the prairie region with those produced in other areas.

The procedure used in determining rates on milled products is to charge the local freight rate on movement from the local point of origin to the mill. If milled products are shipped out to Eastern Canada, the rate is established by deducting the local rate paid from the Crowsnest rate on the grain to Fort William and adding a $0.0525 per cwt. milling in transit charge and applying this on the movement to Fort William. Beyond Fort William the regular rate applies. The procedure may be illustrated by the following example where grain originating at Biggar, Saskatchewan moves to Saskatoon for milling after which the milled products are shipped to Toronto, Montreal or Halifax. Rates are expressed in terms of dollars per hundredweight.

From Biggar to Saskatoon - local rate	$.18
Crowsnest rate Biggar to Fort William	.23
Additional over local rate paid	.05
Milling in transit charge	.0525
Total in addition to local rate for shipment to Fort William	.1025

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* This information courtesy of Mr. Tate, Rate Advisor, C.N.R., Saskatoon, Saskatchewan.

Beyond Fort William millfeeds are assessed $.73 per cwt. on movement to Montreal or Toronto and $1.07 per cwt. on that to Halifax. Since the rates to Toronto and Montreal are equal, local mills tend to have an advantage in long distance shipment. This favourable rate situation plus the subsidy will allow Western mills to be very competitive in Eastern Canada in the millfeeds trade. Eastern mills may benefit, however, from lower rates on grain than on millfeeds when such move by lake freighter.

Recent Developments

Under agreed charge contracts entered into by grain merchants and feed manufacturers with the railways for the movement of whole feed grains from Fort William to Eastern demand points (Contracts CTC AC No. 2438, Sept. 14, 1967 and CTC AC No. 2474, Nov. 28, 1967) the railways have agreed to haul feed grains at rates said to be competitive with those applying to the water-rail-truck sequence of movement previously used. These agreed rates are causing some concern among Eastern grain producers since they feel their competitive position in Maritime markets has been impaired notwithstanding that the subsidy has been extended to movements of feed grains out of Ontario. In addition, these rates serve to reduce the seasonal price movement of Western grains in Eastern markets which formerly existed. This price movement resulted from the lower transportation cost of shipments by water than by rail which existed during the navigation season as well as from the cost of storage.

APPENDIX X

Current Feed Grain Assistance Regulations

A copy of the current regulations (as of October 25, 1967) respecting Assistance on Feed Grains shipped into Eastern Canada and British Columbia as administered by the Canadian Livestock Feed Board is appended. These regulations incorporate several changes in those issued previously. These changes include:

(1) Areas in Ontario west of the Lakehead have been designated as a part of Eastern Canada and rates of freight assistance in North-Western Ontario and Kenora-Rainy River set at $4.80 per ton; Thunder Bay at $8.00 per ton.

(2) Rates of freight assistance on shipments of Ontario grown wheat to Quebec and the Atlantic Provinces will be at identical rates to those applicable on grain originating in Western Canada.

(3) Rates of freight assistance on shipments of Ontario grown corn to the Atlantic Provinces will be at the rate of $6.00 per ton lower than rates applicable on grain originating in Western Canada.

REGULATIONS RESPECTING ASSISTANCE ON FEED GRAINS SHIPPED INTO EASTERN CANADA AND BRITISH COLUMBIA

Short Title

1. These Regulations may be cited as the Feed Grain Assistance Regulations.

Interpretation

2. In these Regulations,

(a) "Act" means the Livestock Feed Assistance Act;
(b) "Livestock" means horses, cattle, sheep, goats, swine, foxes, mink, rabbits and poultry;
(c) "No. 1 Feed Screenings" and "Sample Feed Grain" have the same meaning as in the Canada Grain Regulations;
(d) "Prairie Region" means the provinces of Manitoba, Saskatchewan and Alberta and that part of British Columbia known as the Peace River District;
(e) "Western Canada" means all that part of Canada that is not in Eastern Canada; and
(f) "wholesaler" means a person or firm who, in selling a product eligible for transportation assistance, reduces the price of the product by the amount of assistance that may be paid under these Regulations prior to obtaining the assistance.

Designations

3. Rye, grain corn, wheat bran, wheat shorts, wheat middlings, No. 1 Feed Screenings and Sample Feed Grain are hereby designated as feed grain for the purposes of the Act.

4. All that area of Ontario lying west of the meridian passing through the eastern boundary of the city of Port Arthur is hereby designated as a part of Eastern Canada for the purposes of the Act.

Assistance

5. (1) The Board may pay assistance in the appropriate amount set out in the Schedule in respect of transportation expenses incurred on

(a) wheat, oats, barley and rye grown in Western Canada and shipped to a destination in Eastern Canada;
(b) No. 1 Feed Screenings and Sample Feed Grain produced in Western Canada and shipped to a destination in Eastern Canada;

(c) wheat bran, wheat shorts and wheat middlings produced in Western Canada and shipped to a destination in Eastern Canada or produced in Eastern Canada from wheat grown in Western Canada;
(d) wheat, oats, barley, rye and grain corn grown in the Prairie Region and shipped to a destination in British Columbia;
(e) No. 1 Feed Screenings and Sample Feed Grain produced in the Prairie Region and shipped to a destination in British Columbia;
(f) wheat bran, wheat shorts and wheat middlings produced in the Prairie Region and shipped to a destination in British Columbia or produced in British Columbia from wheat grown in the Prairie Region;
(g) wheat grown in Ontario and shipped to a destination in Eastern Canada other than a destination in Ontario; or Quebec.

(2) The Board may pay assistance in respect of storage expenses on wheat, oats and barley grown in Western Canada and stored in Eastern Canada except at Fort William or Port Arthur where grain is initially stored in a vessel approved by the Board as a place of storage necessary to supplement licensed elevator storage, in the amount of 2 1/2 cents per bushel for the total period that the grain is stored in Eastern Canada.

6. (1) The Board shall not pay assistance in respect of transportation
(a) where the grain, screenings or grain product is transported by truck from Western Canada into Eastern Canada, from Western Canada into British Columbia or from any place of shipment in British Columbia to a destination in that province; or
(b) where the grain, screenings or grain product is transported by truck from a place of shipment in Eastern Canada to a destination in Eastern Canada that has a higher rate of assistance than that of the place of shipment unless the owner of the truck is the wholesaler of the shipment or
(i) is licensed as a common carrier,
(ii) has furnished the Board with an undertaking in accordance with section 7, and
(iii) has complied with that undertaking.

(2) The Board shall not pay assistance in respect of transportation where
(a) it is satisfied that the produce shipped was not for feed for livestock in Eastern Canada or British Columbia; or
(b) it is not satisfied that the sale price to the buyers of the product has been reduced by the amount of the assistance that may be paid under these Regulations.

7. The undertaking of a trucker shall be in a form satisfactory to the Board and shall include an undertaking by the trucker to

(a) provide the Board with all tariffs set out by his firm on grain, screenings and grain products;

(b) issue bills of lading on all shipments eligible for assistance under these Regulations setting out the actual destination or destinations of all of the shipments;

(c) charge a rate on the movement of grain, screenings and grain products in accordance with the current tariff he has provided to the Board; and

(d) in any case where his truck licence permits the transport between any two points of a product for more than one shipper, make available to all shippers and consignees at those points the lowest rate he charges between those points for grain, screenings or grain products shipped in the same quantity per individual shipment.

8. In determining the amount of assistance payable on a shipment made by railway car to a destination

(a) the rail point nearest the actual destination is deemed to be the destination; and

(b) that rail point is deemed to be situated in the county or locality in which it is shown to be situated in

(i) the Gazeteer of Canada, in the case of a destination in the Province of Ontario, New Brunswick or Nova Scotia; or

(ii) the Canadian Guide, published by the International Railway Publishing Company Limited, in the case of a destination in the Province of Quebec.

SCHEDULE

Transportation Assistance

1. Shipments to Ontario:

(a)	to destinations in the Counties of Cochrane and Timiskaming, per ton	$12.60
(b)	to destinations in the Counties of Algoma and Manitoulin, per ton	10.00
(c)	to destinations in the County of Sudbury and to those destinations in the County of Nipissing that are west of the meridian passing through the eastern boundary of the City of North Bay, per ton	9.00
(d)	to destinations in the County of Thunder Bay, except Fort William and Port Arthur, per ton	8.00
(e)	to destinations in the Counties of Carleton, Dundas, Glengarry, Lanark, Prescott, Renfrew, Russell, Stormont, Parry Sound and to those destinations in the County of Nipissing that are east of the meridian passing through the eastern boundary of the City of North Bay, per ton	6.60
(f)	to destinations in the Counties of Durham, Frontenac, Grenville, Haliburton, Hastings, Leeds, Lennox and Addington, Muskoka, Northumberland, Ontario, Peterborough, Prince Edward and Victoria, per ton	5.40
(g)	to other destinations, except Fort William and Port Arthur in the County of Thunder Bay, per ton	4.80

2. Shipments to Quebec:

(a)	to destinations in the Magdalen Islands, per ton	18.00
(b)	to destinations in the Counties of Gaspe East, Gaspe West and Temiscamingue, per ton	13.60
(c)	to destinations in the Counties of Abitibi, Bonaventure and Saguenay, per ton	12.60
(d)	to destinations in the Counties of Compton, Gatineau, Labelle, Matane and Matapedia, per ton	10.60
(e)	to destinations in the Counties of Chicoutimi, Lac St. Jean East, Lac St. Jean West, Rimouski, Riviere du Loup, Stanstead, Temiscouata, per ton	9.40
(f)	to destinations in the Counties of Brome, Frontenac, Kamouraska, L'Islet, Richmond, Sherbrooke, Wolfe and Charlevoix, per ton	8.40
(g)	to other destinations, per ton	7.40

3. Shipments to New Brunswick:

(1) Except as provided in sub-item (2), shipments to New Brunswick

(a)	to destinations in the Counties of Carleton, Northumberland and Gloucester, per ton	16.60
(b)	to destinations in the Counties of Charlotte, York, Sunbury and Queens, per ton	14.80

(c) to destinations in the Counties of Restigouche, Kent, Kings and Saint John, per ton $13.60
(d) to other destinations, per ton 12.60
(2) Shipments of grain corn grown in Ontario, per ton. . appropriate rate set out in sub-item (1) less $ 6.00

4. Shipments to Nova Scotia:
(1) Except as provided in sub-items (2) and (3), shipments to Nova Scotia
(a) to destinations in the Counties of Cape Breton and Victoria, per ton 17.20
(b) to destinations in the Counties of Yarmouth, Shelburne, Richmond, Inverness and Digby, per ton 16.20
(c) to destinations in the Counties of Antigonish, Guysborough and Cumberland, per ton 13.40
(d) to destinations in the Counties of Queens, Pictou, Annapolis and Tatamagouche in the County of Colchester, per ton 11.20
(e) to destinations in the Counties of Halifax, Hants, Kings, Lunenburg and Colchester, except Tatamagouche in the County of Colchester, per ton 9.80
(2) Shipments of wheat bran, wheat shorts, wheat middlings to Nova Scotia from Ontario or Quebec
(a) to destinations taking a carlot freight rate from Fort William of $1.07 per hundredweight, per ton 15.20
(b) to destinations taking a carlot freight rate from Fort William of $1.12 per hundredweight, per ton 16.20
(3) Shipments of grain corn grown in Ontario, per ton. . appropriate rate set out in sub-item (1) less $ 6.00

5. Shipments to Prince Edward Island:
(1) Except as provided in sub-item (2), shipments to Prince Edward Island, per ton 14.80
(2) Shipments of grain corn grown in Ontario to Prince Edward Island, per ton 8.80

6. Shipments to Newfoundland:
(1) Except as provided in sub-item (2), shipments to Newfoundland . . . . . .
(a) to destinations in the Avalon Peninsula, being all that portion of the Province of Newfoundland contained within the following boundaries; commencing at the mouth of Pipers Hole River in Placentia Bay; thence up said river to the Terrenceville Highway Road; thence in a general easterly direction along the centre of said road to the Newfoundland Railway, (excluding the village of Goobies); thence southerly along said Railway to a point due west

of the northern extremity of Bull Arm; thence due east to Bull Arm; thence southeasterly along Bull Arm to Trinity Bay; thence north-easterly along Trinity Bay to the Ocean; thence southerly and westerly in the Ocean to Placentia Bay; thence northerly along said bay to the point of commencement (excluding Red Island, Long Island and Sound Island), per ton $17.40

(b) to all other destinations in Newfoundland and Labrador, per ton 23.40

(2) Shipments of grain corn grown in Ontario, per ton. . appropriate rate set out in sub-item (1) less $ 6.00

7. Shipments to British Columbia:

(a) to destinations served by rail, $4.40 per ton less than the lowest carload freight rate through Canada from Calgary, Edmonton, Lethbridge or point of origin as determined from the following Tariffs, supplements thereto and successive issues thereof or combinations thereof: C.P.R. Tariffs W.849-B and 5-B; C.N.R. Tariffs W.184-D and W.230-B; G.N. Railway Tariffs 625-i and 771-H; P.G.E. Railway Tariff 207-A (Domestic Section);

(b) to destinations served only by water carrier, the amount payable to the nearest mainland rail point, as determined in accordance with paragraph (a) plus the difference in amount between the assistance payable to Courtney and the assistance payable to Vancouver.